PROCEEDINGS OF ABSTRACTS V. INTERNATIONAL AGRICULTURAL, BIOLOGICAL, LIFE SCIENCE CONFERENCE AGBIOL 2024

18-20 SEPTEMBER 2024

EDIRNE, TURKEY

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WELCOME NOTES

You are welcome to our VI. AGBIOL Conference that is organized by Trakya University. The aim of our conference is to present scientific subjects of a broad interest to the scientific community, by providing an opportunity to present their work as oral or poster presentations that can be of great value for global science arena. Our goal was to bring three communities, namely science, research and private investment together in a friendly environment of Edirne, Turkey in order to share their interests and ideas and to get benefit from the interaction with each other.

In September 2018, we organized the first AGBIOL Conference with more than 700 scientists and researchers from all over the world with over 800 scientific papers. Due to COVID-19 situation, II. AGBIOL 2020 has organized fully on-line event which was one of the biggest online conferences in recent years in the world with 499 papers and 1133 authors with 333 oral and 166 e-poster presentations from 55 countries. Due to COVID-19 situation, AGBIOL 2021 was organized online again. AGBIOL 2022 conference was organized with a worldwide participation from 44 countries over 522 papers contributed by over 1300 authors. AGBIOL 2023 was organized with a record and worldwide participation from 33 countries 833 papers contributed by over 2000 authors with 522 oral and 311 poster presentations.

There is a worldwide participation from 55 countries 835 papers contributed by about 2000 authors with 522 oral and 311 poster presentations in AGBIOL 2024.

The AGBIOL 2024 is normal participation as well as with online participation in Trakya University Balkan Congress Center in Edirne, Turkey on 18-20 September, 2024. The program included oral talks by invited prominent scientists and oral and e poster presentations by participants in selected topics from the submitted abstracts focusing on Agriculture, Biology and Life Sciences topics.

With care for our nature and environment, we aim the green congress, meaning that as little as possible papers will be used. Abstract book is published in electronic book and is distributed to the participants by e mail for online participants. All the e-posters are prepared in electronic form and then submit to via the conference e mail and exhibited in electronical poster boards as well as in online e poster hall in our web page during the conference.

The participants with paid conference fee accesssed all the normal and virtual presentation talks in each session, as well as to visit the virtual poster hall via preliminary provided. The abstracts were published in the Conference Abstract and Proceedings Book. Participants might send us their full papers, which based on their preferences are published either in our Conference Abstract and Proceedings Book or in selected International Indexed Scientific Journals.

Conference Topics:

Agriculture, Forestry, Life Sciences, Agricultural Engineering, Aquaculture and Biosystems, Animal Science, Biomedical science, Biochemistry and Molecular Biology, Biology, Bioengineering, Biomaterials, Biomechanics, Biophysics, Bioscience, Biotechnology, Botany, Chemistry, Chemical Engineering, Earth Sciences, Environmental Science, Food Science, Genetics and Human Genetics, Medical Science, Machinery, Pharmaceutical Sciences, Physics, Soil Science.

We would like to thank all of you for joining this conference and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

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POTENTIAL APPLICATIONS OF PLANT DERIVED EXOSOMES IN REGENERATIVE MEDICINE

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ABSTRACT

Regenerative medicine is an exciting emerging discipline that aims to develop new therapeutics to repair and regenerate damaged and diseased organs. Stem cells, gene therapy, biomaterials, engineered tissue, and therapeutics containing biologically active compounds are widely used in regenerative medicine. In recent years, extracellular vesicles particularly exosomes have received great attention in the field of tissue repair and regeneration. Exosomes are well known for playing a leading role in intercellular communication. They transport lipids, proteins, nucleic acids and other biomolecules from one cell to another. As natural or engineered carriers, exosomes can be highly suitable for drug delivery. More recently, plant exosomes have received much attention due to their ability to serve as therapeutic delivery systems for drugs and regenerative medicine applications. It has become important to investigate plant-based exosomes as a cutting-edge platform for the treatment of diseases such as autoimmune, infectious diseases, inflammatory, neurological and cancer. Previously, *in vitro* and some preclinical studies have shown that plant derived exosomes have great potential for use in regenerative by promoting recipient cell proliferation, inhibiting apoptosis, facilitating angiogenesis and nerve regeneration, and preserving stem cell phenotypes. Current studies at Yeditepe University have focused on several types of exosomes derived from different biological sources including mamalian stem cells, plants and microorganisms. Our *in vitro* and *in vivo* studies have well documented the importance of plant-derived exosomes in their cell-free therapeutic potential in cartilage and bone tissue regeneration, neuroregeneration, wound healing, hair growth, antiviral therapy, and cancer treatment.

Key Words: Regenerative medicine, exosomes, drug delivery, biomarkers, extracellular vesicules

ENHANCING RASPBERRY POST-HARVEST QUALITY: THE IMPACT OF FOLIAR CALCIUM APPLICATIONS

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ABSTRACT

Raspberries are highly perishable fruits with a short shelf life, largely due to their delicate structure and high moisture content. The current work investigates the impact of foliar calcium applications on the quality and shelf life of 'Carmina' raspberry. Two calcium products were tested: a liquid fertilizer (CaO: 12%) applied in three doses-T1 (100 cc/hl), T2 (200 cc/hl), and T3 (400 cc/hl) - and Calcium Nitrate (CaO: 26.3%) applied in a single dose, T4 (230.8 g/hl). Data collected included fruit weight and size, color rating, firmness, acidity, total soluble solids (TSS), and weight loss during storage. Calcium concentration in fruit and leaves was also measured. Results indicated that foliar treatments did not significantly affect average fruit weight or size. However, treatments T2 and T3 significantly increased fruit firmness. There were no significant differences in TSS and acidity compared to the control (T0). Post-harvest weight loss was unaffected by the treatments. Foliar calcium application led to a 46% and 42% increase in leaf calcium content for T2 and T3, respectively, and a 35% and 18% increase in fruit calcium content for T2 and T3 compared to T0. Other element concentrations (Mg, K, Fe, Mn, Zn, Cu) in leaves and fruits showed no differences. The optimal application frequency was determined to be every 8 days. The study concluded that foliar calcium applications, especially at doses T2 and T3, improve fruit firmness and boost calcium content in both leaves and fruits without affecting other quality parameters. This suggests a positive effect on enhancing the post-harvest quality of 'Carmina' raspberries.

Keywords: Raspberry (*Rubus idaeus)*, foliar fertilization, Calcium, fruit firmness, postharvest, quality

EFFECT OF TILT ANGLE OF PHOTOVOLTAIC PANELS ON POWER OUTPUT WHEN INSTALLING SOLAR ENERGY SYSTEMS ON RESIDENTIAL BALCONY WALLS

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ABSTRACT

Our country is in an advantageous position compared to many other countries in terms of solar energy use. However, solar energy systems require a significant investment budget in terms of initial installation costs. Due to the lack of incentives for rooftop installations in some countries, small-scale solar energy conversion systems on individual balconies are promising. However, the amount of energy produced by balcony solar energy systems varies depending on the tilt angle of the photovoltaic panels. In this study, the effect of the tilt angle of a 100W photovoltaic panel mounted on the facade wall of a solar energy conversion system installed on the campus of Trakya University Faculty of Engineering was experimentally investigated for one month. When the results were analysed, the instantaneous maximum power output of the photovoltaic panel was measured as 25W when the inclination angle was 90° even on the day with the highest solar radiation, while this value was measured as 65W when the inclination angle was 30°. It was found that the energy efficiency decreased significantly when a 90° photovoltaic panel was applied to the facade or balcony wall. For this reason, it is necessary to specify the tilt angle of the photovoltaic panels in balcony solar energy system installations.

Key words: Energy, Photovoltaic panel, balcony wall, tilt angle

TECHNICAL AND COST ANALYSIS OF INVERTER SELECTION FOR A FARMHOUSE SOLAR ENERGY SYSTEM

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ABSTRACT

People's energy consumption is increasing significantly as the world's population grows and technology and comfort improve. Fossil resources are still largely used in electricity production. This situation causes the reserves of natural resources to decrease and also causes many environmental problems. For this reason, the transition to renewable energy has gained great importance in the current period and in the future. Direct current produced by photovoltaic panels from solar energy is converted to alternating current with inverters. The choice of inverter to be used in the design for this conversion significantly affects the system efficiency and cost. In this study, the technical and economic analysis of the inverter selection to be used in the solar energy system of a farmhouse located in İskenderköy, close to the center of Edirne, was made in the PV sol program. Upon analysis of the simulation results, it was determined that the initial investment cost for both inverter types in the designed solar energy system is 240.000 TL Furthermore, the payback period of the system was identified as 3.5-3.6 years at an equivalent point in time for both designs.

Keywords: Energy, photovoltaic panel, inverter, analysis

ELECTRICITY PRODUCTION AND COST ANALYSIS USING SOLAR PANELS ON AGRICULTURAL FENCES

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ABSTRACT

With the gradual depletion of fossil fuel resources, costs and environmental problems, the use of renewable energy is becoming more important every day. Recently, there has been a growing interest in solar energy as one of the renewable energy sources. However, problems still occur in solar power plants due to incorrect design and application in operating conditions. When mistakes are made in the selection of system components and in the economic analysis, both the investment cost and the payback period are adversely affected. In this study, the aim is to produce electrical energy and cost analysis by using photovoltaic panels in agricultural fences to be used at the borders of land in Edirne central location for site selection in a solar power plant. The economic analysis of the photovoltaic panel fence system designed for a 100-kWh solar power plant at the determined site was carried out using the PV sol program. According to the simulation results obtained, the investment cost of the designed system was found to be 3 278 880TL and the payback period was 7.1 years.

Keywords: Energy, economic analysis, solar panel, fence.

ASSESSMENT OF ETHYLENE EFFETCTS ON POSTHARVEST CHARACTERISTICS OF CUT SNAPDRAGON FLOWERS

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ABSTRACT

Snapdragon (Antirrhinum majus L.) flower has unique inflorescence, attractive colors, and shapes, and is known as a cut flower in the world flower market, however, it is considered a sensitive flower to ethylene. Ethylene hormone plays an important role in the senescence of ethylene-sensitive flowers, especially snapdragon flowers, and causes the stem bending of cut flowers. This complication greatly reduces the ornamental value of snapdragon flowers and causes economic damage to producers and consumers. This study investigated different levels of ethylene hormone (0, 1, 10, and 100 µl. L-1) on some growth characteristics and postharvest vase life of snapdragon flowers. The first visible response of snapdragon cut flowers to ethylene treatment was florets dropping whereas the flowers were turgid. The florets dropping was observed in all three levels of ethylene and indicated a significant difference with the control treatment. Ethylene also caused a disturbance in water absorption. Consequently, the relative water content, fresh weight, protein content, and vase life decreased. The curvature angle was also maximum at 100 µl. L-1 ethylene.

Key words: Antrrhinum majus, curvature angle, fresh weight, postharvest, senescence

THE EFFECT OF CHITOSAN APPLICATIONS ON SEED GERMING AND EARLY SEEDLING PERIOD OF RED BEET (Beta vulgaris L.) UNDER SALTY CONDITIONS

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ABSTRACT

Salinity is a global problem and can significantly reduce agricultural productivity and cause negative effects on plant growth. Chitosan is a natural biopolymer and is known to have plant growth promoting and stress reducing properties. This study aimed to determine the effect of chitosan applications on seed germination and early seedling growth in red beetroot under saline conditions. In the experiment, seeds of red beetroot were soaked in chitosan and pure water at concentrations of 100, 200 and 300 ppm for 1 hour. Then the seeds were allowed to dry for 24 hours and germinated at 22/24°C at 100 mM salt concentration for 10 days. In the study, various growth parameters such as seed germination rate, velocity and vigour as well as root and shoot length were determined. At the end of the experiment, it was found that water soaking and chitosan treatments significantly improved the parameters observed in red beetroot seeds compared to the control. In particular, 200 ppm chitosan dose was the most effective in reducing the negative effects of salt and increasing the growth parameters compared to control and water soaking. These findings suggest that chitosan can be used as a potential growth promoter and protective agent for plants exposed to salt stress.

Key words: Chitosan, Germination, Priming, Red Beetroot, Salt Stress, Seed

DIGITALIZATION OF LOCAL PLANT GENETIC RESOURCES IN THE FRAMEWORK OF MAINTAINING INTEROPERABILITY IN THE EUROPEAN AREA

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ABSTRACT

Plant genetic resources (PGR) play an important role in maintaining global food security, conserving biodiversity and promoting sustainable agriculture. International cooperation between genebanks has become crucial in ensuring the conservation and sustainable use of PGR. The paper aims to evaluate the role of the European collaboration for development of local PGR collection of Bulgaria, based on the long-standing mission of conserving, evaluating and using plant diversity. By sharing experiences, best practices and standartization of the genebank activities the collaboration in ECPGR aims to increase the use of national collections in line with the EU Biodiversity 2030 Strategy. In the area of digitalization, the partnership aims to improve the quality of data management in accordance with the FAO/Bioversity descriptors and to make it free accessible according to the Nagoya Protocol. The results include development of optimised databases supporting equitable sharing of benefits from the use of genetic resources under the International Treaty on PGR for Food and Agriculture. European collaboration contributes to environmental and traditional food protection through valorisation of indigenous PGR and their reintroduction to farms in line with the national conservation strategies.

Key words: plant diversity, landrace, collection, data base, European collaboration

DIVERSE PLANT GENETIC RESOURCES FOR SUSTAINABLE FOOD CHAINS IN BULGARIA

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ABSTRACT

The value of biodiversity for food security and dietary balance has been underlined as priority by FAO and Bioversity International. The study aims to evaluate the underutilized local Plant Genetic Resources (PGR) in Bulgaria and to extensively document the traditional food and seed systems in which PGR are used in order to promote their use for the benefit of farmers and consumers. The two basic concepts related to this general objective are: (1) to retrieve the embedded knowledge of local communities, in order to enhance awareness on PGR values; and (2) to support a chain-perspective approach in PGR study and management, aimed at development of on farm conservation. The results include harmonizing concepts of PGR international treaties; enrichment of current PGR collections; enhancing the documentation of the databases; prompting the urban consumers' awareness on the value of PGR for nutrition, biodiversity and sustainable agriculture. Main outcome is the creation of thematic networks and knowledge base aimed at promoting the durable use of local PGR and on farm conservation.

Key words: genebank, accession, expedition, introduction, climate change

IMPACT OF OLIVE MILL WASTEWATERS ON THE MINERAL NUTRITION OF THE OLIVE TREE

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ABSTRACT

The olive sector generates significant quantities of olive oil wastewater (OMW). Their uncontrolled release creates an environmental pollution problem that affects all countries in the Mediterranean basin. Their agricultural spreading is an alternative among the solutions allowing them to be valorized. In this study, we followed the impact of olive oil wastewater (OMW), from a local variety (Chemlal), on the mineral nutrition of the olive tree (Olea europaea L.). We used them as fertilizer at different concentrations (5 L/m², 10 L/m² and 20 L/m²), in an olive orchard (ITAFV, Sidi-Aich, Algeria). We followed evolution of some physicochemical parameters at soil and at the olive leaves. At low concentrations, these effluents improve soil fertility by increasing the level of organic matter (0.74%), which improves the structure of the soil and promotes biological activity. They also induce an increase in the electrical conductivity of soils and an enrichment of fertilizing elements, notably phosphorus (29.1 mg/kg), potassium (271.2 mg/kg) and nitrogen (286 mg/kg). This has caused an improvement in mineral nutrition of the olive tree; in fact foliar analysis shows a significant increase in the level of these fertilizing elements at the leaves.

Key words: olive mill wastewaters, spreading, valorization, mineral nutrition, leaf analyzes, Olea europaea L.

QUANTITATIVE ANALYSIS OF THE AGRICULURE SECTOR AND AGRICULTURAL INDUSTRIES USING INPUT-OUTPUT ANALYSIS TECHNIQUE AN ECONOMETRICS STUDY OF THE ALGERIAN ECONOMY FOR THE PERIOD 2005-2019.

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ABSTRACT

Several economic studies have emerged that utilize input-output analysis in the literature of quantitative economics, which deals with estimating the economic impacts of agriculture at the national. Agriculture plays a crucial role in the economy, representing 15.6% of the value added to the real economy in Algeria. It contributes 17.5% to the gross domestic product (GDP) and 23.6% to the value added in the real economy. The agricultural sector ranks second in terms of wealth creation, but with significant variations in different years due to climatic conditions.
Input-output models provide a suitable framework for tracking these forward and backward linkages in the economy. The methodology is based on analyzing key sectors according to the conditions and criteria of the Hirschman-Rasmussen framework, complemented by the Multiplier Product Matrix (MPM) and hypothetical extraction method (HEM). These models are graphically represented as economic landscapes, as introduced by Sonis in 1997. They offer an interpretation of the economic structure based on the column and row vector product of the inverse Leontief matrix B-1, providing a holistic economic view (economic landscape) of the economic structure. This aids in better understanding the changes in the economic structure of the Algerian economy during the years 2005-2019. The results of the Algerian Input-Output Table analysis indicate that the light and manufacturing industries maintain dominant roles in the national economy during the research period. Sectors such as agri-food industries and others with intensive labor, particularly processing industries, have emerged as leading sectors that can progress in the development process and achieve satisfactory results if they receive attention and support from experts and decision-makers in successive governments. The fuel sector is not a leading sector but plays a pivotal role and possesses the power to finance the leading sectors. Similarly, the services sector was not a leading sector in the national economy, hence the nature of Algeria's status as a developing country remains unchanged.

Key words: Algerian Input-Output,

THE EFFECT OF PLANT EXTRACTS ON THE HEALTH STATUS OF WINTER WHEAT (TRITICUM AESTIVUM L.) SEEDLINGS IN PHYTOTRON CONDITIONS

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ABSTRACT

The aim of the study was to assess the effect of alcoholic plant extracts from hemp inflorescences (10% - H10 and 20% - H20) and a mixture of extracts from hemp inflorescences, sage and tansy (10% - M10 and 20% - M20) on the phytotoxicity and health of wheat seedlings. winter (Triticum aestivum L.) under the conditions of a phytotron experiment. In all experimental combinations, slight phytotoxicity of the extracts was observed in the form of yellowing of the leaf tips, which was classified as 1° infection. The tested plant extracts and their mixtures, apart from the H20 extract, inhibited the development of fungal pathogens. Mycological analysis of the roots showed that after the use of plant extracts there was an increase in the total number of fungal species inhabiting the roots, especially the species Trichoderma hamatum. After spraying the seedlings with plant extracts, an increase in the total number of fungi was also noted on the above-ground part of the seedlings, where saprotrophic species such as T. hamatum and Gliocladium catenulatum also dominated. Seedlings sprayed with plant extracts were colonized to a lesser extent by Fusarium oxysporum than control seedlings. The lowest number of F. oxysporum colonies was isolated from seedlings sprayed with hemp extract at a concentration of 10%, and the highest from the control. The conducted research allowed us to confirm the high effectiveness of plant extracts in plant protection due to their biocidal effect against pathogenic fungi. The above research constitutes the initial phase of work that will aim to verify the results obtained in field conditions.

Key words: wheat seedlings, plant extracts, fungi

AGRO-MORPHOLOGICAL DIVERSITY WITHIN FIELD PEA (PISUM SATIVUM L.) GENOTYPES

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ABSTRACT

The objective of this study was to analyze the genetic diversity present in twelve Algerian pea genotypes using 24 agro-morphological traits. The experiment was carried out during three growing seasons (2013 to 2014, 2014 to 2015 and 2015 to 2016). ANOVA analysis revealed the presence of a great genetic variability for all characters studied. This diversity might be used in breeding programs. Also, expression of characteristics is highly influenced by the environment. For quantitative traits, correlation studies showed that weight of 100 seeds was significantly and positively correlated with leaflet length. Number of pods per 1 m² has a positive significant correlation with leaflet width. Weight of pods per 1 m² was correlated with three characters: Stipule length, leaflet length and leaflet width. The principal component analysis revealed that three components explained 85.92% of variation. Two groups were noted by dendrogram. The first group (demchi 1, p069, bouch1, p539, p593, p595 and p596) was characterized by a high pod yield; the other group comprises the less productive genotypes (p071, sefrou, p072, p073 and p350). Otherwise, the genotype p593 produced the best results for pods yield.

Key words: Genetic diversity, agro-morphological traits, field pea, Pisum sativum L.

EVALUATION OF THE PERFORMANCE OF A SIMPLE AQUAPONIC SYSTEM FOR THE PRODUCTION OF RED TILAPIA AND LETTUCE (ALGERIA- NORTH AFRICA)

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ABSTRACT

The objective of our work is the realization of an aquaponic system (NFT). For six (06) weeks, we opted for weekly measurements to determine the performance of this system on water quality through the measurement of certain physico-chemical parameters (Tº, pH, O2, NH4+, NO2- and NO3-) and on the growth of red Tilapia (Oreochromis niloticus) and on lettuce growth (Lactuca sativa). The results show that the concentrations of the different water parameters measured are satisfactory. It should be noted that the growth of Tilapia in our system is highly dependent on temperature and food. Thanks to the activity of nitrifying bacteria that proliferated in the system a decrease of ammonium, nitrite and nitrate was recorded. Overall, this was the objective of this first stage. Monitoring of biological parameters (Fish and Plant) shows a fairly good increase in growth over time.

Key words: Aquaponics; NFT; Red Tilapia (Oreochromis niloticus); Lettuce (Lactuca sativa); Nitrifying bacteria; Growth; Performance.

SILVOPASTURE SYSTEM COMMUNITY LIVESTOCK PERMIT HOLDERS PERCEPTIONS AND CHALLENGES: A CASE STUDY IN KWAZULU NATAL PROVINCE, SOUTH AFRICA

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ABSTRACT

A silvopasture system integrates trees, forages, livestock and related animals and plant species on the same land management unit(s). Hence, growing livestock in commercial plantations provides several benefits such as extra fertilization or weeding and diversifying the income. However, limited understanding, incorrect information, and a negative mindset could hinder the competitiveness of this practice. This case study of the silvopasture system community livestock permit holders (SSCLPH) attempts to explain the constraints to silvopasture system competitiveness by analyzing their perceptions and challenges. Hence, the study was aimed to document the perceptions of the constraints to silvopasture system competitiveness in Kwazulu Natal Province. The major objectives were: (1) to identify and describe the socio-economic characteristics of the selected SSCLPH. (2) to determine the perceptions and challenges among SSCLPH. Quantitative and qualitative designs were used as a questionnaire written in English, and stakeholder discussion and field observations were part of the data collection. A purposive and snowball sampling techniques were used to select 92 SSCLPH from 2 Districts (Zululand and Umkhanyakude), 4 Local Municipalities (Pongola, Abaqulusi, Nongoma and Mtubatuba) and 7 villages (Mooiplaas, Mhlabaneni, Ngongomane, Kwangwelu, Mahashini, Makhambani, Mapheleni). Perceptions were asked on seven factors namely: (1) Production (2) Demand (3) Related & Supporting Industries (4) Government Support (5) Organisational Strategy, Structure & Rivalry (6) Market (7) Chance. The results indicated that an insufficient source of water (100%) was perceived by all as not the most important factor causing a decrease in silvopasture system competitiveness. This is mainly due to the plantation area's high rainfall hence the communities indicated that they moved their livestock to the plantation area due to its good climate. Infrastructure was also (100%) was perceived by all as the most important factor causing a decrease in silvopasture system competitiveness. The communities indicated that in some parts of the plantation, there was no fencing or fencing was damaged hence poaching and accidents occurred. Furthermore, all SSCLPH agreed that poor interaction and support from government and land reform policy were perceived by all as the most important factor causing a decrease in silvopasture system competitiveness. Hence, South African Forestry Company Limited's (SAFCOL) support in allocating grazing land to their livestock was very helpful. However, all communities (100%) agreed that crime did cause a decrease in silvopasture system competitiveness, as poaching and infrastructure (fencing) were identified as their main challenges. In conclusion, the identified perceptions and challenges are in line with some of the researcher's field observations, and it is thus recommended that stakeholders should take note of the perceptions identified by the SSCLPH in an attempt to increase silvopasture system competitiveness in South Africa.

Key words: Silvopasture System, Agroforestry, Perceptions, Challenges, Kwazulu Natal and South Africa

SİLVOPASTURE SYSTEM COMMUNİTY LİVESTOCK PERMİT HOLDERS FOOD SECURİTY STATUS: A CASE STUDY İN MPUMALANGA PROVİNCE, SOUTH AFRİCA.

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ABSTRACT

Agroforestry is a land use system that includes the use of woody perennial and agricultural crops and animals in combination to achieve beneficial ecological and economical interactions for food, fiber and livestock production. Furthermore, a silvopasture system integrates trees, forages, livestock and related animals and plant species on the same land management unit(s). Hence, growing livestock in commercial plantations provides several benefits such as extra fertilization or weeding and diversifying the income. However, some researchers emphasized that the obstacle to the local development of the silvopasture system is the lack of scientific data. In the present study, research was conducted with the overall aim to determine the food security status of the silvopasture system community livestock permit holders. The major objectives were: (1) To identify and describe the socio-economic characteristics of the selected silvopasture system community livestock permit holders. (2) To determine the food security status and food insecurity levels among silvopasture system community livestock permit holders. Quantitative and qualitative designs were used as a questionnaire written in English, stakeholder discussion and field observations were part of the data collection. A purposive and snowball sampling techniques were used to select 40 SSCLPH from 1 District (Gert Sibande), 3 Local Municipalities (Mkhondo, Msukalinga and Albert Luthuli) and 12 villages (Lukwatine, Jaseville, Uluzi, Likwe, Vlakfontein, Fernie Trust, Ntokozweni, Diepdale, Kwathandeka, Nhlatzazhe, Amsterdam and Davidale Davel).These silvopasture system community livestock permit holders were spread on the South African Forestry Company Limited (SAFCOL) Jessievale, Rorbunia and Blairmore plantations and each silvopasture system community livestock permit holder was allocated an area for livestock grazing. The study also employed the following food security indicators: Food Availability, Food Accessibility and Food Diversity. The socio-economic data was also coded, captured and analyzed using Statistical Package for Social Science (SPSS version 21). The silvopasture system community livestock permit holders indicated that they received income from various sources: social grants (43%), agriculture (37%) and business (20%). In addition, there are 539 cattle's costing R15000 – R20000 each and 95 goats costing R1500 – R3000 each grazing in the plantation. Hence, in terms of food security and food insecurity levels: 60% of silvopasture system community livestock permit holders were food secure and 40% were mildly food insecure. In conclusion, the silvopasture system community livestock permit holders indicated that they could sustain their livelihoods as the land allocated and provided by SAFCOL enabled their livestock to graze, hence they can also access livestock products (manure, milk and meat etc.) and sell livestock in the informal and formal markets. It is thus recommended that the silvopasture system should be adopted and promoted throughout South Africa.

Key words: Silvopasture System, Agroforestry, Food Security, Mpumalanga Province and South Africa

IMPACT OF SEED TUBER AND FOLIAR APPLICATION OF ESSENTIAL OILS ON TUBER DORMANCY AND POST-HARVEST STORAGE QUALITY OF POTATO (SOLANUM TUBEROSUM L.)

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ABSTRACT

In this study, effects of sage (Salvia officinalis L.), oregano (Origanum onites L.), rosemary (Rosmarinus officinalis L.), dill (Anethum graveolens L.), cumin (Cuminum cyminum L.), fennel (Foeniculum vulgare var. dulce L.) and Turkish pickling herb (Echinophora tenuifolia L. subsp. sibthorpiana (Guss.)) essential oils applied to seed potato tubers and plant leaves at different doses on post-harvest storage quality and dormancy period in potatoes were investigated. Essential oils were applied to the seed tubers by dipping at doses of 150, 300, 450 and 600 ppm before planting, and to the plant leaves by spraying the upper parts of the plant three times at doses of 300, 600, 900 and 1200 ppm at 15-day intervals, starting 15 days after the completion of emergence. Harvested tubers were stored under controlled conditions (2-5 oC temperature and 85-90% relative humidity) for 6 months, and weight losses, dormancy period and quality changes in the tubers were determined during the storage period. Essential oil applications significantly reduced weight losses in the storage period, and the lowest weight losses were obtained from seed tuber-applied with sage essential oil and foliar-applied with dill essential oil. Dormancy periods of tubers varied between 110-160 days in seed tuber applicatios and 95-148 days in foliar applications. Seed tuber and foliar essential oil applications significantly reduced the total sugar and reducing sugar contents of the tubers during the storage period. In the study, it was understood that post-harvest storage losses could be reduced by extending the dormancy periods in potato tubers by applying essential oil to seed tubers and leaves.

Key words: Potato, Essential oil, Seed and foliar application, Dormacy period, Storage quality

PHENOLOGICAL AND MORPHOLOGICAL DEVELOPMENT OF DIFFERENT CULTIVARS OF GREEN BEANS

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ABSTRACT

It is necessary to extend the period of supply of fresh products and raw materials for processing, which is related to the adaptation of sowing and planting periods of vegetable crops to the changed environmental situation. Green beans are an important vegetable crop essential for nutritional balance and solving the protein problem for many peoples of the world. The main reason for the development of this paper is the establishment and popularization of up-to-date scientific information on the phenological and morphological development of garden beans, with a view to expanding the range of varieties in this vegetable crop. The experiments were carried out in the period 2021-2022, in the area of the village of Ezero, Nova Zagora municipality, with an altitude of 131 m, located in the Thracian valley. Four varieties of green beans were used. The experimental design was based on the block method. A total of 15 variants were tested, which were a combination of each variety and the three sowing dates. The results show that late sowing (May) contributes to the formation of better biometric indicators, supporting better vegetative development of plants and the establishment of an actively photosynthesizing leaf apparatus. By sowing at the beginning of May, the plants develop under conditions closer to their biological requirements and a better synchronization between vegetative development, flowering and fruiting is achieved.

Key words: garden beans, Phaseolus vulgaris, development, growth

STUDY OF DIFFERENT SOWING DATES ON YIELD AND FRUIT QUALITY OF GREEN BEANS

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ABSTRACT

Green beans are a vegetable crop with a very high nutritional value. Research on appropriate sowing dates and varietal structure of garden beans is topical and has been investigated by various scientists. It is topical to renew the cultivar structure of garden beans in order to expand the variety of this vegetable crop and to extend the period of fresh production on the Bulgarian market. The objective of this paper is to comparatively evaluate the cultivar characters of green bean at different sowing dates by observing the yield and fruit quality. The experiments were carried out in the period 2021-2022, in the area of the village of Ezero, Nova Zagora municipality, with an altitude of 131 m, located in the Thracian valley. Four varieties of green beans were used. The experimental design was based on the block method. A total of 15 variants were tested, which were a combination of each variety and the three sowing dates. The results show that higher yield was obtained from plants sown in early May. The difference with the yield from the second sowing date varies between 11 and 14%, with small differences for the different varieties. The same plants also yielded 57% to 22% higher than the first harvest. The results of the economic productivity of the plants and the quality characteristics of the fruit give us reason to conclude that the cultivars Capitano, Gina, Ebro and Playa can be recommended for cultivation with a view to enriching the cultivar range with new varieties of green beans.

Key words: garden beans, Phaseolus vulgaris, cultivars, growth, yield

VIGOR OF VEGETABLE SEEDS – ESSENCE, HISTORICAL DEVELOPMENT, SIGNIFICANCE AND PERSPECTIVES

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ABSTRACT

The most vegetable crops are grown through seeds, and this determines the need to establish their viable potential. The main element in this direction is the standard germination test, which is widely applied and is globally recognized for the quality of individual lots. Although germination is the backbone of seed quality, but it does not provide sufficiently complete and real information about seed behavior under field conditions. This necessitates looking for other indicators for a more complete assessment of their life status. Vigor adds to the characterization of the properties and potential of the seeds by noting, in addition to their ability to germinate, the ability of young sprouts to develop under a wide range of environmental conditions. Establishing vigor is particularly important in vegetable seeds which are small and, moreover, most are hybrid and heterosis and with high price. This article is an overview of the development of the vigor concept historically, its advantages and challenges for agronomic science. The specifics of the individual tests for which there are already recognized protocols for their application and their importance based on own research on the quality of seeds from different species of vegetable crops are followed. Attention is also paid to the modern requirements for creating fast and non-destructive tests. Some newly developed vigor determination methods suitable for use with vegetable seeds are also indicated. The author's new methodology for determining vigor, "Initial Vegetative Seed Productivity", is described in detail. The difficulties, the not fully solved problems, as well as the perspectives for the introduction of vigor as a standardized indicator widely adopted worldwide to evaluate the potential of individual lots of vegetable seeds are analyzed.

Key words: seeds, germination, tests, germination, sowing quality, viability

FIELD RESISTANCE OF BARLEY VARIETIES TO LEAF RUST

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ABSTRACT

Leaf rust is an economically important disease on barley in Bulgaria. Since cultivated barley Hordeum vulgare is considered nonhost or an intermediate type of host of leaf rust on wheat P. triticina and is to some extent attacked by this heterologous fungus as well, our studies were carried out in an infection field of Dobrudzha Agricultural Institute – General Toshevo, Bulgaria, where wheat, triticale and barley materials were planted. The study was conducted in three consecutive harvest years, and the infection load included the natural population of P. hordei and the artificial and natural population of P. triticina. Thirty-four barley varieties of Bulgarian and foreign breeding were subjected to screening for resistance to leaf rust. The final disease attack, the average coefficient of infection and the resistance rate of these varieties were measured. The varieties were divided into four groups depending on the manifested resistance to the pathogens. The four groups of varieties demonstrated different variations within the resistant type. Therefore, all investigated Bulgarian barley varieties, including also the three varieties of foreign breeding, can be involved in breeding programs for developing of improved cultivars, which carry resistance to leaf rust.

Key words: Barley, cultivars, field resistance, P. hordei

THE EFFECT OF DIFFERENT RATES OF MUSHROOM COMPOST ON THE HEAVY METAL CONTENT OF GRASS PLANTS

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ABSTRACT

The used mushroom compost can affect the heavy metal content in grass plants grown by mixing different ratios into soils. In this study, the use possibilities of mushroom waste compost for lawn establishment were evaluated. The research was established in the randomized block design in the form of a pot trial in field conditions in Ordu province. Mushroom compost (MC) and soil (S) were mixed in various rates (100% S, 75% S + 25% MC, 50% S + 50% MC, 75% S + 25% MC and 100% MC) and applied as cover material after sowing. In the experiment, dry grass yield and aluminum (Al), cadmium (Cd), cobalt (Co), chromium (Cr), nickel (Ni) and lead (Pb) contents of grass plants were determined. According to the results, it was determined that 50% S + 50% MC mixture was more effective on the dry herbage yield of grass plants in cover materials prepared by mixing mushroom compost with soil. The application of cover materials prepared at different rates caused differences in Al, Cd, Co, Cr, Ni and Pb contents of grass plants. Heavy metal contents of grass plants grown in 100%MC application increased compared to 100%S treatment (control). Al, Co, Cr, Pb contents decreased but Cd and Ni contents increased in 50% Soil + 50% Mushroom Compost mixture compared to 100%S treatment. According to our results, it was determined that the use of waste mushroom compost as a cover material in the creation of turf area is not suitable to be used alone because it causes an increase in dry grass yield and heavy metal content.

Key words: Waste, Mushroom compost, Lawn, Heavy Metals

A COMPARISON OF READ MAPPING AND VARIANT CALLING TOOLS FOR THE ANALYSIS OF CHICKPEA NGS DATA

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ABSTRACT

High-throughput sequencing has become an essential tool in plant genomics over the last few years. However, bioinformatic analysis in genomic data is still challenging. Selection of the most suitable pipeline is highly important for high accuracy and resolution. In this study, we compared the performance of three mapping tools (Minimap2, Bowtie2 and BWA-MEM) on chickpea genome. The comparison of mapping performance revealed that BWA-MEM had the highest average percentage of aligned read pairs (99.0%), followed by Bowtie2 (98.1%), and Minimap2 (91.2%). We also screened single nucleotide variants (SNVs) and insertions/deletions (indels) at sequencing depth of 20×. Bowtie2 identified 23,109 SNVs and 2,540 InDels, while BWA-MEM identified 19,627 SNVs and 2,404 InDels. Minimap2 detected 18,974 SNVs and 2,38 InDels. We found that all investigated tools are suitable for analysis of NGS data in chickpea research. When looking at different performance parameters, BWA-MEM and Bowtie2 were the best mappers, and they returned the best results in the variant calling step.

Key words: Bowtie2, BWA-MEM, InDel, Minimap2, SNV, Variant calling

QUALITY CHARACTERISTICS OF FLOUR, DOUGH AND BREAD OF TRITICUM AESTIVUM L. DEPENDING OF SOIL TREATMENT IN 4-FIELD CROP ROTATION

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ABSTRACT

During the period 2019-2022, in the experimental field of DZI-General Toshevo in a 4-field crop rotation, the influence of long-term applied basic soil treatments on the indicators characterizing the bread-making qualities of the Pchelina variety was tested. The crop rotation is beans-wheat-sunflower-maize. Tillage systems include 4 self-applied (ploughing, discing, zero and flat-cut) and three involving alternate plowing-zero rotation: flat-cut-disc and plough-disc. The indicated methods of soil treatment include independent and annual application of treatments with or without turning the cultivated layer, as well as the absence of soil treatment. The conditions thus created for the development of the culture reflect not only on the amount of yield, but also on a number of its qualitative characteristics. For this fact, the contribution of the conditions of the year has a determining role. Bread with the largest volume on average for the experiment was obtained in 2019 (704.29 ml). The differentiation between the years is fully manifested in the sedimentation value of the flour, the stability of the dough and the degree of its softening. Tillage systems also have a strong influence on the differentiation in the values of rheological characteristics and wet gluten (WG). On average for the period, their influence on the volume of bread is the weakest. Higher values were found in the application of annual plowing, while in the other treatments the differences were insignificant. Shallow treatments as well as direct seeding increase the softening degree values and contribute to low dough stability and extensibility. Gluten content is highly negatively correlated with grain yield and physical properties, while dough stability is highly correlated with these parameters as well as with the farinograph quality number.

Key words: bread-making qualities, crop rotation, tillage sistems

EVALUATION OF THE TECHNOLOGICAL CHARACTERISTICS OF BULGARIAN WINTER COMMON WHEAT VARIETIES

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ABSTRACT

The present research is aimed at evaluating the technological qualities of Bulgarian varieties of winter common wheat, selected in Dobrudzha Agricultural Institute (DAI). The level of variation and adaptability to the change of climatic conditions as well as the optimal combination of the quality indicators of the different genotypes were analyzed. 26 varieties were studied in a randomized balanced block experiment in four replications for the period 2020-2022. The parameters sedimentation (ml), wet gluten content (%), bread loaf (cm3), farinograph quality number, dough resistance, degree of softening (fu), valorimetric number, hectoliter, shape stability (H:D), quality of bread medium and vitreous (%) were evaluated. To analyze the variation in individual indicators, analysis of variance and the simplex method for evaluating the optimal combination of quality indicators are applied. The obtained results show that the influence of the climatic conditions was established with the highest degree of statistical reliability in the indicators of sedimentation, valometric number and dough resistance. The interaction of genotype x environmental conditions in the technological indicators of sedimentation, wet gluten, vitreous, bread loaf and coefficient of shape stability was statistically proven. The results obtained from the applied simplex method show that the winter soft wheat varieties Pchelina, Lazarka, Marilyn, Bojana, etc. come close to the optimal combination of quality indicators and are a high achievement of the Bulgarian selection regarding grain quality. In individual years, these varieties show higher, and in others, lower values for some of their technological indicators, which is explained by their reaction to different environmental conditions. The evaluation of the ecological plasticity and stability of the studied genotypes makes it possible to recommend to the farmers from Bulgaria and other countries the most suitable varieties for their economic activity.

Key words: sedimentation, wet gluten, rheological properties, analysis of variance, simplex method

MORINGA OLEIFERA LEAF EXTRACT MITIGATES THE EFFECT OF SALINITY STRESS IN FOXTAIL MILLET THROUGH PHYSIOLOGICAL SEED ENHANCEMENT

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ABSTRACT

Salinization poses significant global threats to crop production and future food security. Foxtail millet, a C4 cereal crop, is well-suited for cultivation on marginal lands due to its short growth duration and high nutritional value. Its performance can be further improved through physiological seed enhancement using MLE (Moringa Leaf Extract). A pot study was conducted to evaluate the effect of MLE seed priming (3% fresh MLE, 3% dry MLE, hydropriming, and a non-primed control) on foxtail millet under salinity stress. Biochemical, physiological, and seedling growth traits were recorded under both saline and non-saline conditions. The experiment followed a CRD factorial design with three replications. Salinity stress significantly reduced seedling growth, as well as biochemical and physiological traits, compared to non-saline conditions. Maximum growth traits (root and shoot length, root-and-shoot fresh weight, and root-shoot dry weight) were observed in the MLE treatments and strongly correlated with improved CAT activity, phenolic content, and MSI. The minimum accumulation of Na content was observed in the 3% fresh MLE treatment, followed by 3% dry MLE, which was linked to a high accumulation of K content in the leaves. Chlorophyll a, chlorophyll b, and carotenoid contents were significantly improved by the 3% fresh MLE treatment, followed by 3% dry MLE and hydropriming, compared to the control. In conclusion, MLE extract significantly enhanced the growth performance of foxtail millet on marginal salt-affected land. This study provides valuable insights for researchers, highlighting the potential of MLE to improve agricultural performance in foxtail millet

Key words: Salt stress, antioxidant, photosynthetic pigment, leaf phenolic, ionic content

THE IMPACT OF FLOWERING PERIOD ON THE QUALITY OF BLUEBERRIES

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ABSTRACT

In Morocco, blueberries (Vaccinium spp.) are primarily cultivated in the Loukkos region, offering significant added value to Moroccan agriculture due to unique off-season production opportunities from mid-February to June. However, the quality of blueberries varies with flowering dates. This study aims to determine the optimal flowering period for producing the highest quality blueberries, both biochemically and physically. The research was conducted in the Loukkos region, where blueberry plants were monitored across different flowering periods. Physicochemical properties such as fruit size, weight, and color were measured using standard laboratory techniques. Biochemical analyses, including total phenolic content, anthocyanin levels, and antioxidant activity, were performed using spectrophotometric methods. Results indicated that specific flowering periods significantly influenced blueberry quality, with certain periods yielding superior biochemical and physical attributes. These findings provide valuable insights for optimizing agricultural practices to enhance fruit quality and market competitiveness.

Key words: Vaccinium spp.; Fruit Quality; Biochemical quality; Antioxidant activity; Flowering periods

ISOLATION OF MICROORGANISMS ASSOCIATED WITH LOCAL VINEYARDS IN TURKEY PROMOTING PLANT GROWTH AND DROUGHT RESISTANCE

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ABSTRACT

Introduction: Vitis vinifera, which grows in the Mediterranean region, has an important role worldwide, especially in the pharmaceutical and food industries. V. vinifera is a plant species that is significantly affected by the effects of increasing drought and water stress caused by global warming and climate change. This leads to an increased risk of diseases and pests in vineyards. In nature, rhizobacteria interact with plants to promote their growth. They also play an active role in the control of plant diseases, promoting and increasing their resistance to stress. Manisa has an important place in Turkey in terms of industrial grape cultivation. With this approach, our study was carried out in vineyards in Manisa and its region. This study focused on the isolation and characterization of bacteria living in the grapevine rhizosphere in three different vineyard regions of Manisa. **Materials and Methods:** Bacterial isolation from soil samples was carried out by serial dilution method. The isolates obtained were phenotypically characterized. All isolates obtained were characterized by standardized analytical profile index (API) micro methods for the identification of Gram (-) and Gram (+) bacteria. API 50 CHB test kits for Gram (+) bacteria and API 20NE test kits for Gram (-) bacteria were used. **Results and Conclusion:** As a result of morphophysiological characterization, 22 Gram (+) and 10 Gram (-) bacteria were identified by Gram reaction. According to API results, 8 different bacteria, 3 Gram (+) and 5 Gram (-), were identified among all isolates. Gram (+) bacteria: Bacillus subtilis/amyloli quefaciens, Bacillus megaterium, Bacillus thuringiensis. Gram (-) bacteria: Pseudomons fluorescens, Sphingomonas paucimobilis, Vibrio fluvialis, Rhizobium radiobacter, Pseudomonas luteola. In this study, it was determined that Bacillus and Pseudomonas genera were common in grapevine orchards. In general, gram negatives were observed to be more common. As a result, further studies are needed to evaluate the plant's resistance and growth-promoting potential in terms of stress conditions and adaptation to its environment.

Key words: Vineyards, Rhizosphere, Soil bacteria, Bacterial isolation, Morphophysiological characterization

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USE OF ORIGANUM SPECIES ESSENTIAL OILS IN THE CONTROL OF PLANT DISEASES

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ABSTRACT

Origanum is a significant medicinal and aromatic plant belonging to the Lamiaceae family. In parallel with the developments in studies on the isolation and determination of various bioactive substances contained in Origanum species, it has been determined that they contain many different compounds. The main groups of these compounds are terpenoids, triterpene acids, hydroquinones, flavonoids, phenolic acids, hydrocarbons containing carvacrol, thymol, and various extracts as the main bioactive components. Studies on the effects of these different components against plant diseases have been the focus of attention of researchers in recent years. In studies on the impact of essential oils obtained from Origanium species on plant diseases, the effects of essential oils obtained from Origanum vulgare, O. compactum, O. heracleoticum, O. onites, O. syriacum, O. dictamnus, O. acutidens, O. rotundifolium, and O. majorana species were mostly in investigated. Essential oils obtained from Origanum species are used as antifungal agents against Alternaria spp, Aspergillus spp., Penicillium spp., Rhizopus spp., Fusarium spp., Phytophthora spp., Pythium spp., Colletotrichum spp., Monilinia spp., Geotrichum citri-aurantii, Verticillium dahliae, Botrytis cinerea, Plasmopara viticola, Sclerotium rolfsii, Rhizoctonia solani, Macrophomina phaseolina, Sclerotinia sclerotiorum, Phoma tracheiphila, Stemphylium beticola and Aphanomyces euteiches. They also have been observed to be effective as antibacterials in research on Clavibacter spp., Xanthomonasspp., Pseudomonas spp., Erwinia spp., Ralstonia solanacearum and Pectobacterium carotovorum. The essential oils from the O. vulgare plant were effective against Zucchini yellow mosaic virus coat protein (ZYMV-CP) and tomato leaf curl New Delhi virus (ToLCNDV) infections. Further studies are needed to evaluate the efficacy of the model products of these essential oils.

Key words: Origanum spp., antifungal, antibacterial, antiviral, plant diseases

USAGE OF PLANT ESSENTIAL OILS IN THE CONTROL OF PATULIN PRODUCING PENICILLIUM SPECIES

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ABSTRACT

Patulin is a toxin produced by some toxigenic species of fungi belonging to the Penicillium, Aspergillus and Byssochlamys genera. It is a type of enteropathogenic mycotoxin, it is rapidly absorbed by the intestines and can have toxic, mutagenic and cytotoxic effects in many living things. Patulin can be found especially in apples and apple products, and rarely in peaches, grapes, tomatoes, oranges and products derived from them. The most common patulin-producing fungus is Penicillium expansum. The main method to prevent and control the spread of patulin in food products is to prevent the development and production of patulin-producing fungi before and after harvest. Chemical and physical methods used to prevent patulin formation in apple fruits and derivatives, where patulin formation is most commonly observed, are expensive and may negatively affect product quality. Chemical applications require a thorough understanding of whether reaction products are toxic. In addition, some of these chemicals can seriously reduce the quality of the product by destroying its nutritional content and taste. Today, biological methods, such as the direct degradation of patulin by an antagonist microorganism or more natural factors such as plant extracts, stand out as the healthiest practices today. When the studies on the effects of some plant extracts on Penicillium expansum, the most important patulin producer, and patulin production are examined, Ocimum basilicum (basil), Foeniculum sativum (fennel), Lavandula officinalis (lavender), Origanum majorana (bridegroom), Oreganum vulgare (thyme), Satureja montana (winterwort), Mentha arvensis (mint), Rosmarinus officinalis (rosemary), Salvia officinalis (sage), Thymus vulgaris (thyme) essential oils were investigated. Studies have yielded promising results for plant essential oils.

Key words: Essential oil, Penicillium, patulin, apple

OPTIMIZING FODDER PEA YIELD: IMPACT OF PLANTING DENSITY AND ROW SPACING

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ABSTRACT

The aim of the study was to evaluate the influence of the number of plants and the distance between the rows on the production of fodder pea. The experiment was conducted in 2020-2023. Fodder pea "Voskopoja" (landrace with the greatest spread in this area of Korce district, Albania), was studied by applying three sowing densities (60, 80 and 100 seeds per 1 m2), with three row spacings (20, 30 and 40 cm), in four replicates in 24 m2 plots. The R factor, row spacing showed statistically significant influence on the number of seeds per pod, seed weight per pod and seed yield of fodder pea. Factor D planting density showed statistically significant effect on number of pods per plant, number of seeds per pod, seed weight per pod and seed yield of forage pea. The R x D interaction showed statistically significant effects on the number of seeds per pod, seed weight per pod and seed yield of forage pea. The number of plants and the distance between rows did not reflect significant changes in the weight of 1000 seeds. These factors did not reflect significant changes in protein content. This study showed that the interaction between the factors plant number and row spacing in winter pea modifies the yield of green mass, seeds, plant height and seed yield.

Key words: Forage pea, number of plants, row spacing, yield, protein.

SECURING AGRICULTURE DATA: A SEMANTIC REVIEW ON CYBERSECURITY IN AGRICULTURAL DATA MANAGEMENT

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ABSTRACT

Cybersecurity, according to the IEEE, is the practice of protecting systems, networks, and programs from digital attacks. Often, these are cyber attacks to break into, alter, or destroy sensitive information; extort money from users; or interrupt normal business processes. With this rise in digital dependence, cybersecurity has taken center stage in the safety of both people and organizations in ensuring personal and organizational data are safe. Cybersecurity is very important as breaches make way for financial loss, reputation damage, and operation disruptions. Robust cybersecurity is very important in the case of critical infrastructure such as agriculture in protecting sensitive information as needed for continued operations and effectiveness. The importance of such data for the nation's food security and business operations, therefore, requires that it be handled in a secure manner. Agricultural cybersecurity refers to securing data against unauthorized access, breaches, or cyber attacks related to agriculture. These potential vulnerabilities in agriculture are now on the rise due to the increasing pace of digitization as a result of IoT device adoption, sensors, and data analytics. It is very important that these systems be secured against data breaches for possible instances of loss of sensitive information, financial loss, and operation disruptions. In a sector like agriculture, potential threats include the theft of data, ransomware attacks, and sabotage on automated farming equipment, putting food production and supply chains at great risk. Therefore, as agriculture continues to evolve with the integration of digital technologies, ensuring the security of agricultural data becomes increasingly critical. This paper provides the semantic review of the topic: cybersecurity in agriculture. The literature review will try to systemically analyze the literature and research that has been done on the subject of best practices, challenges, and themes relevant to the protection of agricultural data from cyber threats. The main objective is to comprehensively know the different ways by which security measures can be effectively implemented within the agricultural sector to support integrity of data and uphold sustainable practices in agriculture. Therefore, we hope this semantic review will provide insight for policymakers, researchers, and practitioners alike in developing coherent cybersecurity strategies within agriculture. This study will explore the intersection of cybersecurity and agriculture, highlighting the importance of protecting agricultural data and providing recommendations for enhancing cybersecurity practices in this vital sector.

Key words: Cybersecurity in Agriculture, Agricultural Data Protection, Digital Farming Security

IMAGING TECHNOLOGIES IN AGRICULTURE: A COMPREHENSIVE SEMANTIC REVIEW

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ABSTRACT

Imaging systems refer to a variety of technologies used to capture visual data for analysis and interpretation. These systems include satellite imagery, RGB cameras, hyperspectral, multispectral, thermal cameras, and drone-mounted cameras. The importance of imaging systems lies in their ability to provide voluminous datasets encompassing both spatial and spectral information. Theese systems yield highly resolved, temporally accurate data in real-time, rendering them invaluable tool across a diverse array of applications. In agriculture, these systems play a crucial role by offering insights that can enhance crop management, optimize resource use, and improve overall productivity. The ability to monitor large agricultural areas efficiently and accurately makes imaging systems indispensable tools for modern farming practices. The use of imaging systems in agriculture is vital for several reasons. Firstly, these systems enable precise monitoring of crop health, soil conditions, and environmental factors, which are essential for informed decision-making. For example, satellite images incorporate a multitude of sensors operating in diverse wavebands encompassing the visible, red-edge, near infrared, short wave infrared regions in electromagnetic spectrum. This comprehensive spectral acquisiton capability facilitates the generation of detailed overviews of large agricultural areas. Consequently, such data enables the evaluation of crop health and the targeted identification of areas necessitating intervention. RGB cameras mounted on drones can capture high-resolution images for detailed field analysis, while hyperspectral and multispectral cameras can detect subtle changes in plant physiology and soil composition. Thermal cameras, unlike the previously mentioned cameras which senses reflected lights, they sense infrared radiation emitted by an object to produce a thermal image of the corresponding object. It can be used to detect water stresses in crops and can guide irrigation practices. These technologies support various applications such as precision agriculture, where farmers can apply the right amount of water, fertilizers, and pesticides at the right time and place. This targeted approach effectively reduces costs and environmental impact. Other examples include early detection of diseases and pests, yield prediction, and monitoring the effects of climate change on crops. As agriculture continues to adopt advanced technologies, the role of imaging systems becomes increasingly significant. This study aims to conduct a semantic review of the literature on imaging systems and technologies in agriculture. By systematically analyzing existing research, this review will identify key themes, advancements, challenges, and best practices associated with the use of imaging systems in farming. The goal is to provide a comprehensive understanding of how these technologies can be effectively utilized to enhance agricultural productivity and sustainability. Through this semantic review, we hope to uncover insights that will inform researchers, policymakers, and practitioners about the potential and application of imaging systems in agriculture.

Key words: maging systems in agriculture, satellite imagery, hyperspectral cameras, multispectral cameras, drone technology in farming

ACTIVITY OF PLANT EXTRACTS AGAINST THE PATHOGEN OF ROSACEAE PLANTS ERWINIA AMYLOVORA

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ABSTRACT

Erwinia amylovora is a devastating pathogen of plants of family Rosaceae causing blight on the leaves, shoots and flowers. Most affected are orchard trees but other plants, like strawberry, raspberry and hawthorn, can also be infected. Due to the extreme use of chemicals for plant protection, alternatives like plant extracts have been studied recently. Some of the research show a good potential for control of plant diseases, however, only a symbolic number of plant species have been tested and also, on a restricted number of pathogens. The information on activity of plant extracts against E. amylovora is scarce. In this study, we prepared plant extracts from a variety of plant species against the plant pathogenic bacteria E. amylovora. The products were prepared by Soxhlet extraction with following concentration of the crude liquid according to an established procedure. Plant parts (leaves, roots and fruits) of fifteen plant species were used as initial materials for the extractions. The finished products were diluted and tested for antibacterial activity in different concentrations in vitro against seven reference strains of E. amylovora, isolated from different hosts like pear, apple, quince, aronia, hawthorn, strawberry and musk strawberry. Out of 21 extracts, six showed antibacterial activity against some or all of the tested isolates. Extracts from the roots of Geranium macrorrhizum and fruits of Chaenomeles sp. genotypes show promising potentialities for further experiments on control of E. amylovora.

Key words: Erwinia amylovora, plant extracts, antibacterial activity, alternative control, Geranium macrorrhizum, chaenomeles

NEW BULGARIAN SUNFLOWER HYBRID KRASI CLP (HELIANTHUS ANNUUS L.)

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ABSTRACT

Hybrid Krasi CLP is a new Bulgarian two-line sunflower hybrid suitable for cultivation according to Clearfield Plus" technology obtained by inter-line hybridization. The hybridization involved the maternal sterile line 1111A as a component and the fertility restorer line GTS 51R. The two parental lines have very good general and specific combinatorial ability. Hybrid Krasi is medium-early with a vegetation period of 109-111 days, seed diameter 19-21cm, mass of 1000 seeds 62g, kernel content %-77%. The production potential, depending on the conditions of the year, varies from 328 kg to 350 kg. The oil is of the linoleic type and its content varies from 49-51%. The hybrid is characterized by good drought resistance, resistance to downy mildew 731, phoma, phomopsis, alternaria and orobanche cumana. The hybrid was recognized by the Minister of Agriculture of the Republic of Bulgaria under the RHS with order RD-12-3/17.03.2023. The hybrid was tested at IASAS for two years in three locations.

Key words: hybrid, sunflower, productivity,

INFLUENCE OF DRIP IRRIGATION AND FERTIGATION ON PHYSICAL CHARACTERISTICS OF WHITE STRAWBERRY FRUITS GROWN IN BULGARIA

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ABSTRACT

The aim of this paper is to present the effects of the applied regimes of fertilization and irrigation on the physical characteristics of white strawberry fruits. A two factors experiment was conducted during 2024 in unheated greenhouse in the Chelopechene experimental field, Sofia, Bulgaria with drip irrigated and fertigated strawberry variety (Fragaria x Anannassa „Snow White"). The irrigation and the fertilization factors were applied in two rates: I1 - 75% (ETc) I2 - 50% (ETc), F1: optimal fertilization N8.09P12.76K15.62; F2 – suboptimal fertilization - 75% (F1). Five treatments were tested: control: I0F0:100% (ETc) without fertigation; I1F1; I1F2; I2F1; I2F2. The highest yield (529 g/plant), fruit diameter (21.55 mm) and mean fruit weight (5.02 g) were found for I1F1 treatment.

Key words: white strawberry fruits, irrigation, fertigation, Bulgaria

ELEMENTS OF NITROGEN METABOLISM BASED ON ASSUMPTED NITROGEN OF WHEAT VARIETIES GROWN IN TRANSITION TO ORGANIC AND CONVENTIONAL PRODUCTION

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ABSTRACT

The present study concerns the changes in some characteristics of nitrogen metabolism related to nitrogen uptake by wheat. The same was carried out during the period 2018-2020 in a 4-field crop rotation with two systems of agricultural production - transition to organic (TOP) and conventional (CP) production. Varieties of common winter wheat (Dragana, Rada, Pchelina, Kosara and Kalina) were tested, grown after the predecessor's canola, peas, sunflower and maize. TOP reflects the level of natural fertility of Haplic Chernozems, and in CP the test was carried out with mineral fertilization with increasing nitrogen rates (0, 60, 120 and 180 kg N/ha) on the background of P2O5 - 60 kg/ha and K2O - 60 kg/ha. The determining role of the predecessor in the cultivation of wheat in TOP has been demonstrated. The greatest contribution to the accumulation of nitrogen in the tested varieties is made after pea. The total absorbed nitrogen after the predecessor's sunflower, canola and maize, was 62.97%, 67.84% and 71.99% of that after the pea predecessor, respectively. Against this background, the absorbed amounts of nitrogen by organs and years lead to a significant differentiation between the tested cultivars. In the final stage, the amounts of total nitrogen absorbed by the cultivars grown in the TOP vary within relatively narrow limits - 89.57 kg N/ha for the cv. Rada to 75.37 kg N/ha for the cv. Pchelina. Differentiation between cultivars is better expressed in the organs forming the non-economic part and in the grain. This leads to highly pronounced differences between years in nitrogen utilization efficiency (NUtE) values. The same averaged 46.621 kg.kg-1 grain, varying by year from 55.428 kg.kg-1 (2018) to 40.467 kg.kg-1 (2019). At CP system, nitrogen assimilation in the wheat organs is mainly controlled by mineral fertilization - 36.15% for the total biomass and 31.47% for the average assimilated grain nitrogen. Fertilization in a ratio of N:P:K=3:1:1 increases the amount of absorbed nitrogen in the leaves 3.50 times; in the stems – 2.47 times; in the grain - 2.25 times, and in the non-grain part of the ear - 1.93 times compared to the control. The enrichment of the non-economic part of production with nitrogen is particularly pronounced after the two oleaginous predecessors and after maize. The amount of absorbed nitrogen in the organs of wheat in CP significantly exceeds that found in TOP. For grain, the same is on average with 111.08%, for the non-profit part of the production – with 90.08% and for the total biomass – with 102.49%. The same varies from 180.30 kg/ha (Rada) to 152.03 kg/ha (Pchelina), and in grain – from 147.41 kg/ha to 121.14 kg/ha, respectively.
Fertilization with low nitrogen rate (N60P60K60) is distinguished by the highest amounts of recycled nitrogen (45.07 kg.kg-1). The increasing levels of nitrogen fertilization leads to a sharp decrease in the values for the NUtE, as for N180P60K60, they are on average 34.85 kg.kg-1. Regardless of the conditions of the year, increasing rates of nitrogen fertilization leads to reduced efficiency of nitrogen uptake. The capacity to convert the nitrogen absorbed in the biomass, as well as the other elements of the nitrogen metabolism, are subject to significant dynamics in both methods of wheat production, not only depending on the weather conditions, but also on the type of the predecessor. The predecessors of sunflower and especially maize in

TOP greatly complicate this process. In CP, this fact applies most strongly to the predecessor rapeseed.
Rada and Pchelina varieties, regardless of the cultivation, are distinguished by lower NUtE values compared to the others. Dragana and Kalina are characterized by larger amounts of NUtE, especially in TOP.

Key words: wheat cultivars, nitrogen metabolism elements, predecessors, transition to organic production, conventional production

DETECTION OF POTATO Y VIRUS BY DAS-ELISA METHODS IN PEPPER GROWING AREAS IN ISPARTA PROVINCE

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ABSTRACT

Potato Y virus (PVY) is a member of genus Potyvirus. PVY is a important viral disease affecting pepper production worldwide. This study was carried out of determine the presence PVY in pepper growing areas during growing seasons of 2022- 2023 in Isparta province of Turkey. Leaf samples were collected pepper plants showing virus-like symptoms (mosaic, deformation, rolling of leaves, yellowing). A total of 184 pepper leaf samples were collected from 11 locations in this region. Leaf samples were serologically tested by DAS-ELISA (Double Antibody Sandwich Enzyme Linked Immunosorbent Assay) methods. ELISA tests showed that among 184 samples, 33 were infected with PVY (17.93%).

Key words: Pepper, Virus, PVY, DAS-ELISA

YIELD AND QUALITY CHARACTERISTICS OF SYRIAN SCABIOUS (CEPHALARIA SYRIACA L.) GENOTYPES FROM TURKEY'S NATURAL FLORA UNDER THE ECOLOGICAL CONDITIONS OF BOLU.

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ABSTRACT

This study aimed to determine certain agronomic traits of Syrian scabious genotypes collected from 69 different locations within Turkey's natural flora during the 2022-2023 growing season under the ecological conditions of Bolu. The results obtained from the trial, which was established according to the Augmented Design under field conditions, revealed statistically significant differences among the genotypes in terms of yield and quality characteristics. The thousand seed weights of the genotypes ranged from 4 to 17 g, seed yield ranged from 3 to 453 kg da-1, single plant yield ranged from 0.4 to 6.8 g, oil yield ranged from 0.4 to 91 kg da-1, protein yield ranged from 0.5 to 95 kg da-1, oil content ranged from 5% to 24%, and protein content ranged from 13% to 24%. A considerable amount of variation was observed among the genotypes in terms of yield and quality traits, and genotypes that exceeded the standards in terms of yield and oil content were identified. However, despite these positive differences, no genotype with the targeted oil content of 30% or higher was found. Since Syrian scabious was registered as a cultivated plant in 2017, no breeding work other than selection has been conducted on it. The yield and oil content values obtained are quite good as a starting point. It is anticipated that genetic progress in Syrian scabious will be achieved through breeding studies over time.

Key words: Cephalaria syriaca L, yield, quality, Syrian scabious

MONITORING RESULTS FOR *SCAPHOIDEUS TITANUS* BALL (HEMIPTERA: CICADELLIDAE) IN GRAPE-GROWING REGION OF RAHOVEC IN KOSOVO

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ABSTRACT

The American grapevine leafhopper is a primary vector of the *Flavescence dorée* phytoplasma, posing a significant threat to vineyards worldwide. After the first record of leafhopper in the Kosovo vineyards in 2022, a comprehensive monitoring study was conducted during the year 2023 in order to assess the presence of first nymph and adult population dynamics of *Scaphoideus titanus* Ball (Hemiptera: Cicadellidae) in the grape-growing region of Rahovec, Kosovo. The monitoring program was carried out in four localities within the Rahovec region. Mainly wine varieties were the dominant population in all inspected vineyards. In order to study the first appearance of the nymph, the first and oldest leaves of the grapevine were inspected from the middle of May to the end of June 2023. While the adults were investigated and monitored from late June to early October 2023. Yellow sticky traps method was used across multiple vineyard sites throughout the growing season. Results indicated fluctuating population levels, with peak activity observed in mid-summer. The data collected provides essential insights for local viticulturists and can aid in developing targeted control measures to mitigate the impact of this pest and safeguard the viticulture industry in Rahovec.

Key words: *Scaphoideus titanus*, monitoring, grapevine, Kosovo

USE OF SCOT MARKERS IN THE ASSESSMENT OF GENETIC DIVERSITY OF COLLETOTRICHUM LINDEMUTHIANUM POPULATIONS, THE CAUSAL AGENT OF ANTHRACNOSE DISEASE ON COMMON BEAN

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ABSTRACT

The Start Codon Targeted (SCoT) markers system is a strong technique utilizing a single primer in a PCR and a higher annealing temperature to amplify a short, conserved region in genes surrounding the ATG translation start codon. The method has been successfully employed to assess intra- and interspecific diversity of important fungi species. Colletotrichum lindemuthianum, the causal agent of anthracnose disease in beans, is one of the most destructive fungi in global bean production regions. Determination of genetic differences of these pathogen populations across different growing regions is crucial for enhancing the effectiveness of breeding programs and disease management strategies. This study was performed to reveal the advantages of SCoT markers according to different molecular markers in the evaluation of genetic variation in C. lindemuthianum populations collected from seven different provinces of Türkiye. Five SCoT primers were employed to analyze genetic diversity within and among the populations, resulting in the amplification of 66 bands, with 78.79% showing polymorphism. The polymorphic information content (PIC) values of the primers ranged from 0.12 to 0.24. Resolving power of the primers ranged from 1.68 to 3.68. These results indicated that SCoT markers have higher or the same discrimination power compared to other molecular markers. Cluster analysis using UPGMA with Dice coefficients generated from SCoT data divided the pathogen isolates into two major groups with 82% genetic similarity, similar to the clustering of dendrograms based on the data of different molecular markers. The distribution within these clusters showed that the isolates obtained from nearby regions were closely related to together. SCoT markers are proved to be as effective as other markers in the evaluation of genetic diversity within and between different populations of C. lindemuthianum.

Key words: Colletotrichum lindemuthianum, genetic diversity, population structure, SCoT marker

CHERRY FRUIT PHYSICAL, ORGANOLEPTIC AND PHYTOCHEMICAL CHARACTERISTICS OF TWELVE CULTIVARS GROWN IN ARNISSA, WESTERN MACEDONIA, GREECE

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ABSTRACT

Cherry fruit is a drupe which is highly appreciated by consumers. Many cultivars have been developed around the world, based mainly on physical characteristics, such as size and color. Not all cultivars are suitable for a specific region and trials should be made before deciding which cultivar is best suited for this specific pedoclimatic conditions. Tweleve cultivars grown in the same are, Arnissa, Western Greece, were assessed for their physical, organoleptic and phytochemical characteristics. Fruits were provided by the Co-operative of Arnissa and were harvested at the commercial maturity of each cultivar. Cultivars assessed were “Samba”, “Kordia”, “Lapins”, “Germesdorfer”, “Grace Star”, “Durone Nero III”, “Crystallina”, “Regina”, “Skeena” and local ones such as “Opsimi”, “Tragana Edessas” and “Evlogimeno” while samples of “Regina” (REGA) from a specific location in the area were also assessed. Physical characteristics measured were fruit weight and size (diameter (wide and narrow). Length and flesh weight, as well as skin color, expressed as Hue angle and Chroma indexes). Furthermore, total soluble solids, pH and titratable acidity were assessed in the pulp as well as total phenols, total flavanols, total flavonoids and antioxidant capacity, based on Diphenyl picryl hydrazyl (DPPH) and ferric reducing antioxidant power (FRAP) assays. Results indicated that there were significant among cultivars regarding the measured parameters. Principal component analysis indicated that “Tragana Edessas” as well as “Durone Nero III” were distinguished from the other cultivars based mainly on their phenol content and antioxidant capacity. The highest fruit weight was determined in “Durone Nero III” and “Crystallina” fruits, while “Durone Nero III” also presented the highest total soluble solids, in contrast to “Evlogimeno” and “Germesdorfer” which presented the lowest. These significant differences among cultivars should be taken into account, along with the maturity period and tree load when someone needs to select the proper cultivar or cultivars for specific pedoclimatic conditions.

Key words: antioxidant capacity, cherry, organoleptic characteristics, phenolic compounds

EFFECT OF THE WAY OF WHEAT PRODUCTION IN A 4-FIELD CROP ROTATION ON THE NITROGEN HARVEST INDEX IN THE TOTAL BIOMASS AND SPIKE

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ABSTRACT

During 2018 – 2020, the effect of growing wheat in transition to organic production (TOP) and under conventional production (CP) in a 4-field crop rotation on the nitrogen harvest index in total biomass and spike was studied. The experiment was carried out in the trial field of Dobrudzha Agricultural Institute – General Toshevo on slightly leached chernozem soil (Haplic Chernozems). The cultivars (Dragana, Rada, Pchelina, Kosara and Kalina) were grown after 4 previous crops (winter oilseed rape, spring pea, sunflower and grain maize) and under 5 levels of soil nutrition regime. The first two levels (ТБ and Т0) reflected the natural soil fertility, under the two ways of crop growing, respectively. Under CP, three norms of increasing nitrogen fertilization were also tested (Т1, Т2, Т3) according to the type of previous crop, against background fertilization 60 kg P2O5/ha and 60 kg K2O/ha. The nitrogen harvest index of grain under TOP and CP was significantly affected by the year conditions. Under TOP, the cultivar played a significant role, surpassing the previous crop, while under CP, nitrogen fertilization had priority. Under both ways of production, the interactions year x cultivar, year x fertilization and year x fertilization x cultivar were important for nitrogen translocation in plants. During 2018 – 2020, the mean value of the nitrogen harvest index under CP was 79.11%, and under TOP – 76.59%. In the years with frequent stress conditions during the vegetative growth of the plants, the NHI under CP decreased with 5.36%, and under TOP, the decrease was with 14.24 %, as compared to the year with the most favorable conditions for plant development. Under both ways of production, pea as previous crop caused lower levels of translocation of nitrogen to grain, according to both the total biomass and spike. In the other previous crops, the differentiation was low, and between sunflower and maize it was insignificant. The cultivar with the best reutilization of nitrogen to grain was Rada. Under the considerably dynamic meteorological components during the period of study, it was averagely 81.27% (CP) and 80.55% (TOP). The nitrogen harvest index in the spike grain under both systems of wheat production exceeded 93.00 %. The dynamics of nitrogen translocation, regardless of the way of production, was highest in cultivars Dragana and Kalina. They were characterized by the highest amount of nitrogen in the non-economic part of the produce. Averaged for the investigated period, the grain harvest index under transition to organic production was 76.71%, and under conventional production, it was 79.11%. In the spike index, these values were 90.27% and 92.27%, respectively.

Key words: harvest indices of nitrogen, wheat cultivars, previous crops, transition to organic production, conventional production

INCIDENCE AND SEVERITY OF TOMATO LATE BLIGHT DISEASE (PHYTOPHTHORA INFESTANS) IN GEZIRA, SUDAN.

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ABSTRACT

The Tomato *(Lycopersicon esculentum L.*) is one of most important vegetable crops of Solanaceae grown all over the world, The main production areas of tomato in Sudan are Gezira, Khartoum, Kassala and Northern states. the aim of this study was to determinate of incidence and severity of the disease and isolation of the causal agent. For assessing the status of the disease, survey were conducted in different tomato cultivation areas included Tybia, Fadsi,, Kumor , Shalwha and Ubo Haraz , samples were collected from surveyed regions for the causal agent isolation and identification. The output of analyses showed higher infestation of tomato late blight disease, and the causal agent is a pathogen Phytophthora infestans.

Keywords: Tomato Lycopersicon esculentum L, Gezira, Phytophthora infestans

INVESTIGATION OF FATTY ACID COMPOSITION OF SYRIAN SCABIOUS (CEPHALARIA SYRIACA L.) GENOTYPES COLLECTED FROM TURKEY'S NATURAL FLORA IN BOLU ECOLOGICAL CONDITIONS

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ABSTRACT

This study was conducted in the 2022-2023 growing season to determine the fatty acid compositions. In the study, Syrian scabious (Cephalaria syriaca L.) genotypes collected from 69 different locations in the natural flora of Turkey were used. The trial was established according to Augmented Design in Bolu ecological conditions. The results of the study revealed that the differences among genotypes in terms of fatty acid components were statistically significant at the 0.01 level. The fatty acids identified in the genotypes were: oleic acid (C18:1) ranging from 23% to 38%, linoleic acid (C18:2) ranging from 23% to 40%, myristic acid (C14:0) ranging from 12% to 19%, nervonic acid (C24:1) ranging from 1% to 16%, palmitic acid (C16:0) ranging from 8% to 10%, stearic acid (C18:0) ranging from 1% to 2%, and lauric acid (C12:0) ranging from 1% to 4%. Overall, the proportion of unsaturated fatty acids was found to be between 70% and 76%, while the proportion of saturated fatty acids ranged from 23% to 30%. Additionally, a negative correlation was observed among some fatty acid components. Since all genotypes were subjected to the same conditions during the trial, the statistically significant differences in fatty acids indicate a high level of genetic variation among the genotypes.

Key words: Cephalaria syriaca L., Syrian scabious, fatty acid composition

INVESTIGATION OF ULTRASOUND TREATMENT ON THE VIABILITY OF SEEDS FROM DIFFERENT SPECIES OF GENIUS ZINNIA ELEGANS JACK.

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ABSTRACT

In the present study the effect of ultrasound on the sowing parameters of seeds from Zinnia elegans Jack. was studied. The experiments were carried out in the Department of Horticulture at the Agricultural University-Plovdiv, Bulgaria with three different varieties of this species. The seeds were treated with ultrasound for 2, 4, 6 and 8 minutes and placed for germination according to the prescription of ISTA Rules. The following indexes were investigated: germination energy (first count) germination (final count), length of embryo root and hypocotyls as well as fresh weight of seedlings were observed. The mean germination time, uniformity of germination, time of 50% of germinated seeds and velocity of germination were calculated. The highest increase of germination energy and germination, depends on variety specific was registered in variants 4- and 6-minutes ultrasound. The differences with controls were between 6.0% and 12.5%. The highest correlation coefficients between fresh weight and length of embryo and hypocotyls were established. The regression analysis between germination and periods for sounding was established and established that there is linear dependences. with high determination coefficients.

Key words: germination, seedlnig, mean germination time, embryo root, regression

TOWARDS SUSTAINABLE MEDITERRANEAN RAINFED AGRICULTURE: A COMPREHENSIVE STUDY FROM MOROCCO

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ABSTRACT

Sustainable agriculture in arid and semi-arid regions poses distinctive and significant challenges that necessitate careful evaluation and focused intervention strategies. These areas are marked by scarce water resources, unpredictable rainfall patterns, and delicate ecosystems, all of which intensify the intricacies of agricultural practices. This study bridges this gap by evaluating the sustainability performance of 50 rainfed farms in Morocco's Zaër Region using the innovative "Indicateurs de Durabilité des Exploitations Agricoles" (IDEA) method. This method integrates agro-ecological, social, and economic criteria to evaluate sustainability across nine components with 18 indicators tailored to the region's context. Statistical analysis and visualization, supported by an Excel macro, were employed for data interpretation. The findings highlight sustainability limitations, particularly socio-territorial factors such as product quality issues, inadequate farmer training, limited workforce mobilization, and low social engagement. Agroecologically, concerns include low crop diversification, suboptimal space management, and overreliance on chemical inputs. Economically, low specialization levels challenge viability despite some financial autonomy. The study underscores the urgency of interventions to enhance sustainability in rainfed agrosystems. Recommendations are proposed to address socio-territorial constraints, improve agricultural practices tailored to regional conditions, and bolster economic viability. These insights are invaluable for policymakers, farmers, and stakeholders seeking to prioritize strategies and actions aimed at achieving sustainable agriculture in challenging arid and semi-arid environments.

Key words: Sustainability, climate change, farming systems, multi-criteria assessment, Morocco

ENHANCING RASPBERRY POST-HARVEST QUALITY: THE IMPACT OF FOLIAR CALCIUM APPLICATIONS

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ABSTRACT

Raspberries are highly perishable fruits with a short shelf life, largely due to their delicate structure and high moisture content. The current work investigates the impact of foliar calcium applications on the quality and shelf life of 'Carmina' raspberry. Two calcium products were tested: a liquid fertilizer (CaO: 12%) applied in three doses—T1 (100 cc/hl), T2 (200 cc/hl), and T3 (400 cc/hl)—and Calcium Nitrate (CaO: 26.3%) applied in a single dose, T4 (230.8 g/hl). Data collected included fruit weight and size, color rating, firmness, acidity, total soluble solids (TSS), and weight loss during storage. Calcium concentration in fruit and leaves was also measured. Results indicated that foliar treatments did not significantly affect average fruit weight or size. However, treatments T2 and T3 significantly increased fruit firmness. There were no significant differences in TSS and acidity compared to the control (T0). Post-harvest weight loss was unaffected by the treatments. Foliar calcium application led to a 46% and 42% increase in leaf calcium content for T2 and T3, respectively, and a 35% and 18% increase in fruit calcium content for T2 and T3 compared to T0. Other element concentrations (Mg, K, Fe, Mn, Zn, Cu) in leaves and fruits showed no differences. The optimal application frequency was determined to be every 8 days. The study concluded that foliar calcium applications, especially at doses T2 and T3, improve fruit firmness and boost calcium content in both leaves and fruits without affecting other quality parameters. This suggests a positive effect on enhancing the post-harvest quality of 'Carmina' raspberries.

Key words: Raspberry (Rubus idaeus), foliar fertilization, Calcium, fruit firmness, postharvest, quality

OBSERVATION ON THE PHENOLOGICAL AND PHYSIOLOGICAL DEVELOPMENT OF SUNFLOWER HYBRIDS THROUGH CHANGE OF NDVI INDEX

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ABSTRACT

The main goal of precise agriculture is improving the efficiency of different agricultural practices related to the use of food products, identification of stress factors, integrated control of diseases, pests and weed associations. Another important element is the evaluation of the physiological status and the possibility to predict the productivity potential of the crops. The changes in the phenological development and the physiological status of the plants can be observed with the help of a number of nondestructive methods, but the comparison to direct field observations and agronomy assessment is mandatory for the purpose of verification. Sunflower is a main oilseed crop of high profitability in Bulgaria. The market situation, the larger areas of distribution and the nonobservance of major technological requirements are of key importance for the efficiency of production. The choice of a hybrid is a crucial moment – it should be suitable for growing under varied risk environments with regard to the biotic and abiotic factors. During the vegetative growth of the plants, within the framework of a competitive varietal trial at Dobrudzha Agricultural Institute, the response of 13 new sunflower hybrids was followed. The variation of the meteorological conditions was specific, but the suitable conditions for the distribution of diseases at the beginning of the vegetative growth and the drought at a later stage were major limiting factors. The aim of the investigation was assessment of the normalized difference vegetation index (NDVI), generated by using precise equipment GreenSeeker, and comparison to main economic indices related to realization of the productivity potential. The investigations were carried out during key phenological phases. Variation within 0.3 – 0.75 was determined. The applied correlation analysis revealed significant correlation with plant height at flowering, and no significant correlation with the quality parameters oil content (%) and oil yield (kg/da). The mean productivity within the trial was 374 kg/da. The highest NDVI correlating with yield was registered at mass flowering. The hybrid combinations 3607A x 29R and 3607A x 78 R demonstrated the highest productivity under the conditions of Dobrudzha Agricultural Institute. They also possesses very good stability.

Key words: sunflower monitoring, normalized difference vegetation index (NDVI), production preduction

EFFECTS OF MICROBIAL FERTILISER ON YIELD AND QUALITY OF CURLY LETTUCE

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ABSTRACT

Microbial fertilisers containing different microorganisms have positive effects on plant growth, development and flowering. They can be used in conventional, organic and sustainable agriculture systems by reducing chemical fertiliser consumption. In this study conducted under greenhouse conditions, the effects of Herasim microbial fertiliser on yield and some quality characteristics of lettuce were investigated. Caipira (Lactuca sativa var. crispa) lettuce cultivar was used as plant material. In pot trials, 70% peat + 30% perlite mixture was used as a growing medium. A total of 9 different treatments were included in the research: Control (C), 100% Chemical Fertilisation (100% CF), 50% Chemical Fertilisation + Microbial Fertilisation (50% CF + MF), 75% Chemical Fertilisation + Microbial Fertilisation (75% CF + MF), 100% Chemical Fertilisation + Microbial Fertilisation (100% CF + MF), Dipping + Chemical Fertilisation (D + CF), Microbial Fertilisation alone (MF), 50% Chemical Fertilisation + Microbial Fertilisation + Foliar Microbial Fertilisation (50% CF + MF + FMF), 75% Chemical Fertilisation + Microbial Fertilisation + Microbial Fertilisation (75% CF + MF + FMF). Head height (cm), root collar diameter (mm), number of leaves (number/plant), leaf colour (L*, a* and b*), chlorophyll (SPAD), soluble solid (%SS), pH, total and marketable yield (g/plant) criteria were examined. At the end of the research, similar total and marketable yield results were obtained from 100% CF + MF, D + CF, 75% CF + MF, 75% CF + MF + FMF and 50% CF + MF + FMF treatments to 100% CF treatment. In addition, similar or better results were obtained in terms of lettuce growth, colour, chlorophyll and SS criteria.

Key words: Bacteria, biofertiliser, chlorophyll, colour, quality

MORPHOLOGICAL AND DIAGNOSTIC CHARACTERISTICS OF THE PATHOGEN SPHAEROTHECA PANNOSA VAR.ROSAE IN ROSE CULTURE

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ABSTRACT

Rose ash disease caused by the pathogen Sphaerotheca pannosa var.rosae is one of the most problematic diseases in horticulture, which in all countries of the world causes great financial losses in the field of horticulture. In my country, in Kosovo but also in other Balkan countries, the growth of cultivated areas with this decorative plant is increasing every day.Farmers who cultivate roses have suffered huge losses, precisely because of the presence of this disease in the cultivars that the market is looking for. In our 2-year study, carried out during the 2022-2023 vegetation, we diagnosed the presence of the pathogen Sphaerotheca pannosa var.rosae. The presence of the pathogen was identified by sampling leaves, shoots and flowers, in which a white mold was found.We sent such samples to the plant protection laboratory in the Department of Phytopathology, from where it turned out to be the Pathogen Sphaeroteca pannosa var.rosae.In the laboratory, the vegetative reproductive organs of the pathogen - Conidia with the typical form of this pathogen were identified, where we made their morphological identification, measuring the length and width expressed in micrometers, which we have included in our tabular results. We also identified the intensity of the spread of this disease and found that the pathogen has an increase in virulence from April to September. We have calculated the intensity of the spread of this pathogen according to the Townsend GR and JW Heuberge formula. The 2-year results of this study have shown that protection with adequate fungicides against this disease should continue from the beginning of the vegetation until the end of autumn.

Key words: Disease, Pathogen, Horticulture, Sample, Conidia.

THE EFFECTS OF ATTAPOULGITE ALONE PLUS OLIVE MILL WASTE ON OLIVE YIELD, OLIVE OIL QUALITY, LEAF NUTRIENT STATUS AND SOIL PROPERTIES.

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ABSTRACT

The olive oil industry is considered one of the most important sectors in agriculture, especially for the countries in the Mediterranean basin. One of the key challenges the sector faces is the recycling and use of olive mill wastes. The aim of this trial was to investigate how a mixture of a soil amendment with olive mill waste can be utilized in olive groves. Olive mill waste derived from a two-phase olive mill was mixed with attapulgite and applied as a soil amendment to mature, bearing olive trees of the cultivar "Megareitiki," grown under rainfed conditions. The application was made in early spring, and the two constituents were mixed in a 1:1 ratio. The mixture was applied at a rate of 8 kg per tree. Untreated trees served as controls, while a third treatment involved the soil application of attapulgite at a rate of 4 kg per tree. At harvest in early November, the length of annual shoot growth was measured, and the trees were individually harvested and their yield measured. A sample of approximately 1.5 kg of olive fruits was used for oil extraction in an Abenchor-type laboratory olive mill to determine oil percentage. The olive oil produced was assessed for acidity, peroxide number, UV absorbance (K values), polyphenols, and antioxidant capacity. At the same time, soil samples were taken from 0-30 cm and 30-60 cm depths to assess soil physicochemical properties, and leaf samples were taken to assess tree nutrient status. The treatments did not have any significant effect on shoot growth (ranging from 15.2 to 16.4 cm), yield, olive oil percentage, or oil quantity per tree. Olive oils produced under the different treatments were all classified as Extra Virgin Olive Oil based on the measured variables, with none of the treatments having a significant effect on them. The addition of attapulgite resulted in higher concentrations of N-NO3, B, and Na in the soil (0-30 cm), while the mixture of olive mill waste and attapulgite resulted in higher P and Mn concentrations. At the depth of 30-60 cm, higher P concentrations were found in the control and attapulgite treatments, while higher Fe concentrations were found in the control. Attapulgite addition to the soil resulted in higher B and Mn, while the application of the mixture of olive mill waste plus attapulgite increased the concentration of N-NO3. In the leaves, the addition of the mixture resulted in a significant increase in P and Mg, with no other differences observed. It seems that olive mill waste can be used in a mixture with attapulgite to increase some minerals in the soil without affecting olive tree production or olive oil quality. However, a longer experimental period is required to fully understand the possible effects of this mixture on both soil properties and leaf mineral nutrient concentration, yield, and olive oil properties.

Key words: Nutrients, Olive oil, phenolics, soil properties

THE PRESENCE OF PROTISTAN PATHOGENS IN SOME CHRYSOMELIDAE PESTS IN GEORGIA WITH THE COMPARISON THEIR OCCURRENCE IN TÜRKİYE

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ABSTRACT

Different geographic and climatic conditions can create very favorable environments for the development of many plant pests. The protection of agricultural products is very important both to ensure food safety and to contribute to the country economy. The interest in the use of entomopathogens (EPOs) as an alternative to chemical insecticides in the control strategies against plant pests is increasing day by day. Among the entomopathogens, protistan pathogens play an important role as natural suppressor factor in pest insect populations. The present study includes presence of protistan pathogens in the populations of three important Chrysomelidae pests, Chaeotocnema tibialis, Phyllotreta atra and Leptinotarsa decemlineata from. During the study, 160 samples of Chrysomelidae pests were dissected and searched for protistan entomopathogens. Gregarine pathogens were found in the populations of two Chrysomlidae pests, Chaeotocnema tibialis and Phylloteta atra in Tsilkani village, Georgia for the first time. However, any infection was not found in the examined Leptinotarsa decemlineata population. The gregarine infection rates were considerably low, 14% for P. atra and 15.6% for C. tibialis when compared with their occurrence in the populations of the both pests, 8.6-70.3% in P. atra and 63.2% in C. tibialis, in Türkiye. The present study includes the first records on the occurrence and prevalence of gregarine pathogens in the populations of Chrysomelidae pests in Georgia. However, it is needed to increase the number of populations and samples from different locations to represent the entire Georgia. Furthermore, it is needed to investigate other pathogens and parasites and identify each of them at the species level.

Key words: Chrysomelidae pests, Chaeotocnema tibialis, Phylloteta atra, Leptinotarsa decemlineata, Georgia

SEASONAL DISTRIBUTION OF PROTIST PATHOGENS IN Plodia interpunctella POPULATIONS IN TÜRKİYE

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ABSTRACT

The Indian meal moth (Plodia interpunctella, (Lepidoptera; Pyralidae)) is one of the most economically significant pests of stored products globally. Stored product pests cause direct or indirect damage to contaminated food products. These pests lead to weight losses in products, deterioration of seed qualities, and degradation of quality and nutritional values, thereby negatively affecting the national economy. Interest in using entomopathogens (EPO) as an alternative to chemical insecticides for the control of the pest is increasing day by day. Among entomopathogens, protist pathogens play a significant role as natural suppressive factors in pest insect populations. This study aimed to determine the seasonal distributions of protist pathogens in different populations of P. interpunctella in Turkey during the five years (from 2019 to 2023). During the study, 6.367 P. interpunctella larvae, pupae, and adults (4.091 dead larvae, 609 living larvae, 1.330 adults, and 337 pupae) were dissected and examined under a light microscope from 14 different provinces in Turkey (Ankara, Aydın, Bolu, Denizli, Gaziantep, Isparta, Istanbul, Izmir, Kastamonu, Malatya, Ordu, Samsun, Siirt, and Trabzon). As a result. microsporidian, neogregarine, and coccidian pathogens were observed during the dissections. When the seasonal distributions of microsporidia and neogregarine pathogens were examined seasonally, and significant differences were detected in each season of the year. However, coccidian pathogens could not be analyzed seasonally as they were not observed in different periods. This study is the first to examine the seasonal distribution of protist pathogens in P. interpunctella populations in Turkey in detail. The results obtained confirmed once again that P. interpunctella populations in our country contain a considerable amount of protist entomopathogens.

Key words: Plodia interpunctella, protist pathogen, seasonal distribution, Türkiye.

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WHITEFLIES REPRESENTATIVES COMMON ON CITRUS OF THE ADJARA-GURIA REGION

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ABSTRACT

In recent years, seedlings of different citrus species and varieties, have been imported to the citrus plantations of the Adjara-Guria region from other countries, without any study or approval, which has led to the invasion of various pests that adapt to the climatic conditions of the subtropical zone of the Black Sea and are spreading in masse. Such pests, like whiteflies, are geographically widespread throughout the world. The invasion, mass and rapid spread of these pests have severely impacted Georgia's agriculture. Scientific, government, public organizations, and farmers assess the current situation as an economic and environmental problem and ask for assistance in this area. Therefore, phytosanitary monitoring was carried out in the citrus plantations of the Adjara-Guria regions, as a result of which it was established that four species of whiteflies have recently been intensively distributed in citrus plantations: citrus whitefly (Dialeurodes citri Ashmead), black (Aleurocanthus woglumi Ashby), woolly (Aleurothrixus floccosus Maskell) and spiny (Aleurocanthus spiniferus Quaintance) whiteflies, among which black, spiny and woolly whiteflies are new quarantine pests for Georgia. Dialeurodes citri Ashmead was recorded in Georgia in 1957 on citrus plantations near Batumi, from where it quickly spread to the Kobuleti and Khelvachauri municipalities, both on citrus and other subtropical crops. In 2018, new quarantine species of whiteflies were registered in Georgia, which belong to the Aleyrodidae family and are characterized by similar harmfulness. Whiteflies prefer young plants and are less common on mature plants. They damage the green mass of host plants and feed on the cell sap of branches and leaves, which weakens the plant. In such plant, the leaves of host plants turn yellow and begin to fall off, the branches dry up, and the annual growth, yield, and fruit quality deteriorate. The presented work reflects the results of phytosanitary monitoring conducted on citrus plantations in 4 municipalities of the Adjara-Guria region (Kobuleti, Khelvachauri, Ozurgeti, and Chokhatauri) and analyzes data on the distribution of whiteflies and the damage they cause. The ways of their invasion and spread, morphology, development, and dormancy period, the biology features of the different representatives of whiteflies, fertility, symptoms of plant damage, the characteristics of various ontogenesis phases, and the effect of the Capnodium fungus on fruit quality and yield by quantity are described. During the phytosanitary monitoring, the citrus whitefly (Dialeurodes citri Ashmead) had the highest spread among the whiteflies in all the visited plots. Its spread reached 80% in the Guria Municipality citrus plantations and 100% in the plots of Adjara Region. Aleurocanthus spiniferus Quaintance and Aleurothrixus floccosus Maskell were also

found with high spread (80–100%) in the mentioned region. A different phytosanitary picture was observed in the plantations of Guria, where the distribution of Aleurothrixus floccosus Maskell was high (90%) in Ozurgeti and 30% in the citrus plantations of Chokhatauri Municipality. Aleurocanthus spiniferus Quaintance was found in both municipalities with low spread (10% in Ozurgeti and 20% in Chokhatauri). Aleurocanthus woglumi Ashby (black whitefly) was found in small quantities (single biont) in almost all areas, and therefore the damage it causes is very insignificant. The citrus woolly whitefly (Aleurothrixus floccosus Maskell) stands out for its relatively high population density of damage by whiteflies. In the Kobuleti and Khelvathauri municipalities, it damaged 25–50% of the plants vegetative mass, i.e., the population density reached 3 points, while 10–25% of the vegetative mass of the plant is damaged by the citrus whitefly (Dialeurodes citri Ashmead) (the population density is 2 points), and 10% of the vegetative mass of the plant is damaged by Aleurocanthus spiniferus Quaintance (1 point).

Key words: Pest, Quarantine, Citrus, Monitoring, Spread

INVESTIGATION OF GRAFT COMPATIBILITY RATES OF DIFFERENT CLONAL ROOTSTOCKS WITH SOME PEACH AND ALMOND VARIETIES

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ABSTRACT

In rootstock breeding studies, the graft compatibility of selected rootstocks with fruit varieties is important. A high graft take rate ensures the commercial acceptance of the rootstock. This study was carried out in the greenhouses of the Eastern Mediterranean Transitional Zone Agricultural Research Institute Directorate in 2020-2021. In the study, 33 rootstocks were selected and 4 control rootstocks were used. Transvalia was used as a peach variety and Feragnes and Ferraduel were used as Flored almond varieties. As a result of the grafting studies, it was determined that the graft take rates of rootstocks grafted with peach varieties showed significant differences (1%). The highest graft take rates were determined in GN-22 (% 91.50), FC-19 (% 90.66), Rootpack-20 (% 90.50), FC-22 (% 89.50), and GF-677 (% 88.66) rootstocks. The average graft take rate in the entire graft combination was 73.33%. It was thought that the graft take rate was 70% and above in 24 out of 38 rootstocks and this result could be evaluated as positive. The lowest graft take rates were determined in KL-30 (% 56.33) and KL-44 (% 56.16) rootstock candidates. In almond varieties, the graft take rates of the rootstocks showed a distribution between 57.66% and 96.00%. The highest graft take rates were determined in GN-22 (% 96.00), GF-677 (% 93.83), and FC-19 (% 92.66) rootstocks, and the lowest graft take rates were determined in KL-1 (% 57.66), KL-6 (% 57.83) and KL-4 (% 58.83) rootstocks. In the distribution where the average graft take rate was 73.18%, the fact that the graft take rates of the majority of the rootstocks were above 70% was evaluated as a positive result. At the end of the study, a significant number of clonal rootstocks that can be used as rootstocks for peach almond fruit varieties were identified.

Key words: Key Words: Rootstock candidates, graft compatibility, seedling development, peach rootstock, almond rootstock

INVESTIGATION OF SCION GROWTH SITUATION OF SOME PEACH VARIETIES GRAFTED ONTO DIFFERENT CLONAL ROOTSTOCKS

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ABSTRACT

In rootstock breeding studies, examining the effects of rootstock on the growth vigor of varieties is an important stage. It is known that rootstocks are effective in resistance to soil and climatic conditions and growth vigor in fruit trees. The study was carried out in the greenhouses of the Eastern Mediterranean Transitional Zone Agricultural Research Institute. The study examined the effects of 33 selected clone rootstocks and 4 standard control rootstocks on plant development in Transvalia and Flored peach varieties. In this study, it was determined that rootstocks have significant effects on plant growth vigor in peach varieties. As rootstock scion combinations, it was determined that the highest rootstock diameter development was in Gn-22 (15.41 mm) and the lowest rootstock diameter development was in KL-26 (9.25 mm). In scion diameter developments, the highest was in Gn-22 (13.36 mm) and the lowest was in KL-4 (7.86 mm) rootstocks. The study observed that the Flored variety was stronger than the Transvalia variety in terms of growth vigor.

Key words: Key Words: Rootstock candidates, graft compatibility, seedling development, selection breeding

EFFECTS OF BIOSOL BIOFERTILIZER ON THE PRODUCTIVITY AND CHANGE OF HERBAGE IN NATURAL PASTURES IN STRANDZHA MOUNTAIN

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ABSTRACT

This article presents the results of a study on the impact of BIOSOL biofertilizer on the productivity and change of the herbage in natural pastures in Strandzha Mountain. Fertilization is the key factor for boosting the productivity and quality of biomass. For sustainable productivity and quality of biomass from grass associations, the most sensible approach is the application of appropriate biological fertilizers. Observations were made on 4 natural grasslands, fertilized with BIOSOL in the area near the state border in South-Eastern Bulgaria (Strandzha Mountain), during the period 2022-2024. The study results provide evidence that fertilization with BIOSOL biofertilizer on natural pastures in the region of Strandzha leads to increase in the yield of green mass by 7-8%. After fertilization, there are changes in the height of the plants in the pasture; the content of crude protein in the dry mass also increased. Botanical composition and herbage density were not affected by fertilization with BIOSOL.

Key words: Strandzha, naturalpastures, productivity biofertilizer

DETECTION OF SOME PLANT FUNGAL DISEASES BY IMAGE PROCESSING TECHNIQUE

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ABSTRACT

Image processing techniques, which are the subject of research in a multitude of disciplines worldwide and in our country, have made great progress in recent years, particularly in the field of agriculture. As the global population continues to expand, so does the need for food. It is therefore of particular importance to prevent fungal diseases in crop production per unit area. The implementation of appropriate and timely control measures is an effective method for reducing losses occurred by fungal diseases. The advancement of technology has facilitated the identification of diseases through image processing techniques, thereby enabling the formulation of effective strategies for their control. Plant fungal diseases can be detected quickly, accurately and conveniently using machine vision technology. By increasing the number of these identification studies and integrating them with drone technology, it will be possible to provide sustainable control of plant fungal diseases by saving both time and labor over very large areas. This study outlines the history, importance and stages of application of image processing, as well as providing an overview of its use in the detection of plant fungal diseases.

Key words: Fungal Diseases, Smart Agriculture, Drone Technology, Artificial Intelligence.

OPTIMIZING GERMINATION OF NIGELLA SATIVA L. WITH GIBBERELLIC ACID AND SEED PRIMING TECHNIQUES

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ABSTRACT

The use of Nigella sativa L., commonly known as black cumin, in traditional and medicinal practices is well-documented, due to the wide range of its biological activities. In light of its significance, this study investigates the efficacy of various seed priming treatments, specifically Gibberellic Acid (GA3) and different priming durations, under laboratory conditions to enhance the germination stages of Nigella sativa L. The objective of these priming treatments is to improve germination rates, the germination index, and average germination time, with the potential to increase agricultural productivity. The findings of this study demonstrate that priming durations and gibberellic acid doses have a significant impact on germination parameters under controlled conditions. These results provide valuable insights into the potential of these treatments to optimise crop growth. It can be concluded that appropriate seed priming can effectively enhance the early growth stages of Nigella sativa L., contributing to better crop establishment and yield.

Key words: Nigella sativa L., Seed priming, Gibberellic Acid (GA3), Germination rates, Germination index

THE CONTROL POSSIBILITIES OF *Fusarium proliferatum*, THE AGENT OF ROOT AND CROWN ROT IN PUMPKIN, WITH PROPOLIS EXTRACT (Api10)

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ABSTRACT

Propolis produced by honeybees is known to possess antifungal properties against fungal pathogens that cause yield losses in cultivated plants. This has created the opportunity to use propolis as an alternative application to pesticides, which are harmful to the environment and ecological balance. This study investigates the effect of propolis extract (Api10), developed by Tekirdağ Namık Kemal University Technopark (Tekirdağ/Türkiye), on *Fusarium proliferatum*, which causes root and root crown rot in pumpkin (*Cucurbita pepo* L.), a commonly grown plant in Türkiye. Initially, the effects of the extract at different concentrations on the mycelial growth and daily growth rate of the pathogen on Potato Dextrose Agar (PDA) were examined. After seven days of incubation, mycelial growth of the pathogen was inhibited by over 70% at the last three concentrations (0.925, 1.025, 1.125%), with the minimum inhibitory concentration (MIC) being 1.125%. The effective concentration for 50% inhibition of mycelial growth (EC_{50}) of the extract was determined to be 0.335%. While the growth rate in control plates without extract was 1.23 cm/day, no growth was observed at the 1.125% concentration, and the growth rates at 0.925% and 1.025% concentrations were 0.35 and 0.21 cm/day, respectively. Three concentrations found effective against the pathogen's mycelial growth were applied to pumpkin seeds along with the pathogen, and disease severity was measured in seedlings after a one-week incubation period. Disease severity was most effectively inhibited by concentration of 1.125% with a reduction rate of 44.13%. The authors suggest that the propolis extract, whose antifungal effect as seed treatment in pumpkin against *F. proliferatum* is identified for the first time in this study, is promising for integration into pot and field trials.

Keywords: Pumpkin (*Cucurbita pepo*. L.), Propolis extract, *Fusarium proliferatum*, Antifungal effect, Seed treatment

DETERMINATION OF TOTAL PHENOLIC CONTENT OF EXTRACTS OBTAINED FROM WASTE SUGAR BEET (BETA VULGARIS L.) LEAVES USING DIFFERENT SOLVENTS

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ABSTRACT

The growing global population and shrinking agricultural areas raise concerns about reaching food demand. This situation highlights the importance of crop production. On the other hand it is critical to evaluate agricultural product waste as part of a sustainable environmental management approach. Sugar beet leaves, an agricultural product, are usually thrown away in the field as waste after harvest. The use of sugar beet leaves is expected to promote the effective utilisation of natural resources, improve agricultural waste management, and contribute to local economies. Valorization of sugar beet leaves will make a significant contribution to achieving sustainability goals in agriculture and food systems. In this context, it becomes critical to extract phenolic compounds, which are plant secondary metabolites, from sugar beet leaves. The study's scope included phenolic compound extraction from beet leaves in a water bath using water, methanol, and ethanol as solvents, and the total phenolic content (TPC) were compared. TPC was determined using the Folin-Ciocalteu reagent method. Extracts were prepared at 27°C using water for 1:8,5 solids:liquid ratio and 12 hours, 42°C using methanol for 1:15 solids:liquid ratio and 14 hours, and 50°C using ethanol for 1:15 solids:liquid ratio and 24 hours, respectively. The total phenolic content (TPC) of the extract using water as solvent is 353.71 mg GAE/100g leaf, the TPC of the extract using methanol is 634 mg GAE/100g leaf, and the TPC of the extract using ethanol is 389.59 mg GAE/100g leaf has been determined. According to the results, the extract with the highest TPC content was obtained using methanol as the solvent.

Key words: Sugar beet leaves, waste management, phenolic compounds

HYDROCHEMICAL WATER QUALITY USE IN AGRICULTURAL ACTIVITIES IN THE NORTH-EAST OF ALGERIA: EL EULMA CITY.

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ABSTRACT

The study area is located at 25 km to El Eulma City, in the North - East of Algeria, where there exists a strong demand for water due to the socio-economic development of region during the recent years. The development of agricultural has led to a notable use of water resources and lead farmers to use groundwater for irrigation of crops and it is more suitable for irrigation purpose compared to surface water, which may affect the physico-chemical quality of groundwater and soil. In 2022, a sampling campaign conducted to assess the quality of groundwater for irrigation purposes. To achieve this objective, twenty groundwater samples were collected and analyzed for physical (pH, EC, TDS) and chemical (Na+, K+, Ca2+, Mg2+, HCO3−, Cl−, SO42−, NO3) parameters. The analysis results are processed using hydro-chemical and multivariate statistical methods. These analyses show that the tendency of the cations in the most samples of the groundwater are in the order of **Ca++ > Na+ > Mg++ > K+.** However, tendency of anions is in the order of **HCO3- > SO4-- > Cl-.** Evaluation of the water types using stabler diagram, show that the majority of the samples represents the **HCO3- Ca++** type of water. Thus, the dominance of bicarbonates and calcite facies is about 80%. The suitability of groundwater for irrigation was determined according to a number of parameters such as salinity, sodium adsorption ratio (SAR), sodium percentage (%Na+), residual sodium carbonate (RSC), permeability index (PI), Kelly's ratio (KR), potential salinity (PS) and magnesium hazard (MH). The study concluded that the water from the study area is good and suitable for irrigation with few exceptions.

Key words: Groundwater, irrigation water quality, agricultural activities, facies, El Eulma City.

EVALUATING THE IMPACT OF SATELLITE DATA AVAILABILITY ON CROP CLASSIFICATION ACCURACY USING SENTINEL-1 AND RANDOM FOREST

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ABSTRACT

Ensuring sufficient food for the rising global population is a critical focus, especially given the current turbulent political circumstances. The first step for policymakers in addressing this issue is acquiring accurate crop maps. Modern Earth observation missions and advancements in data processing, particularly in machine learning, have enabled the successful generation of these maps. Although considered a traditional method nowadays, the Random Forest algorithm has consistently proven effective for crop classification tasks. Conversely, while synthetic aperture radar (SAR) satellite data lags behind optical satellite missions in terms of practical usage, its contribution remains significant. In this study, we combined Sentinel-1 data with Random Forest to classify nine crop types in Vojvodina, Serbia. Specifically, we assessed how varying amounts of information from radar satellites impact crop classification accuracy by analyzing three data availability scenarios: 1) single monthly acquisitions, 2) bi-monthly acquisitions (every 15 days), and 3) all available acquisitions. For the first two scenarios, bicubic interpolation was used. Out of 2399 parcels, 80% were used for training and validation (5-fold cross-validation), with the remaining 20% for testing. We calculated the mean value for each parcel and considered data acquisitions between April 1st and September 30th, 2021. The scenarios achieved overall accuracies of 90%, 94%, and 96%, respectively, with high precision and recall across nearly all classes, despite class imbalance. These findings underscore the potential of SAR data for classifying diverse crop types and highlight the possibility of reducing inputs for regional or global mapping typically characterized with high computational demands, while still achieving remarkable results.

Key words: crop maps, classification, Sentinel-1, random forest,

THE EFFECT OF DIFFERENT IRRIGATION METHODS AND APPLICATIONS ON YIELD AND SOME QUALITY PARAMETERS IN RICE CULTIVATION IN THRACE REGION

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ABSTRACT

Rice is one of the most important agricultural crops both in the world agriculture and in Turkey's agriculture as it is the most common basic food source for all people. The most important limiting factor in rice cultivation is the provision and management of irrigation water. It does not seem possible to increase the production areas of this plant, which needs water continuously throughout the vegetation process, with water resources that cannot be increased. In this context, it has become essential to implement water-saving alternative methods in the short term. The study was based on the comparison of conventional flooding method with surface drip and subsurface drip irrigation methods. The study was conducted in a randomized blocks split trial design. The main treatments were irrigation methods (surface drip (DI), subsurface drip (SDI), conventional flooding (CF); sub subjects were irrigation levels (I1: Class A-pan (Ep) x 1.00; I2: Ep x 1.25, I3: Ep x 1.50). Imi tolerant Rekor CL was used as the cultivar. The effects of different irrigation methods and different irrigation water levels on yield and yield components of rice plant were investigated. According to the results obtained from the two-year field study, there was no statistical difference ($P>0.05$) in yield and quality parameters such as harvest index, plant height, cluster length between surface and subsurface drip irrigation methods, while the difference between different irrigation coefficients was significant ($P<0.01$). When the prominent drip irrigation subject (Ep x 1.50) was compared with conventional flooding method, 70% of water saving was achieved with the drip irrigation subject (Ep x 1.50) in spite of 20% yield loss. It was revealed that it was possible to increase rice productivity, production and water resource utilization efficiency with reduced global warming potential by using drip irrigation system. Surface drip irrigation method and Epan 1.5 coefficient are recommended for rice cultivation in the Thrace Region.

Key words: Rice, Drip Irrigation, Quality Parameters, Yield

STUDY ON THE INFLUENCE OF THE SOIL MAINTENANCE SYSTEM ON THE PRESENCE OF WEEDS IN INTENSIVE CURRANT PLANTATIONS

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ABSTRACT

The research carried out follows the influence of the soil maintenance system on weed control in blackberry plantations in the climate and soil conditions of the northwestern Romanian Plain. The creation and exploitation of fruit ecosystems must be done with the application of environmentally friendly technologies. Controlling weeds in orchards by manual weeding and using mechanical means requires a lot of labor and high expenses. A wide range of pre-emergent and post-emergent herbicides are used for chemical weed control, which are very effective in orchards of fruit trees. The problem of the use of herbicides in fruit growing must be seen not only from the perspective of the immediate or subsequent effect on the plantation or on the fruits, but also from the point of view of the quality of the environment in the entire fruit growing ecosystem. The application of a single method of weed control does not allow maintaining the sustainability of the fruit farm.

Key words: maintenance system, weed control, plantation of fruit trees, herbicides

CONSIDERATIONS ON THE BEHAVIOR OF SOME AUTUMN WHEAT VARIETIES IN THE CURRENT CONDITIONS IN DOBROGEA

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ABSTRACT

Dobrogea is a region known for its large areas cultivated with wheat (Triticum aestivum vulgare L). In recent years, over 215 million hectares have been cultivated with wheat annually in the world, and the average yields obtained were over 3500 kg/ha annually. If we compare these results obtained in the newly created varieties worldwide with the results obtained in the years 2000 for example, we will find that the yields per unit area have increased considerably. In Romania, the areas cultivated with wheat in recent years have exceeded 2 million hectares annually. The productions obtained are lower than at EU level, even lower than worldwide in some years. Although Romania also uses high-performance varieties, as well as state-of-the-art technologies, there are years in which, due to climatic anomalies, productions are lower, but higher than in 2007, the year of Romania's accession to the EU. In Constanța county, wheat cultivation has experienced a very large variation, if we refer to the average yields per surface unit. For example, in 2020 only 983 kg/ha were obtained. It seems that 2021 was a favorable year for wheat harvest, the average production this year was 5086 kg/ha. Until the writing of the paper, the official data available at the level of Constanța County were up to the level of 2021. For Dobrogea, wheat is a crop with a special weight, being cultivated on more than 37% of the total cultivated area. The paper presents the behavior of some winter wheat varieties, regarding the analysis of harvest indices, as well as data on the quality of winter wheat grains from the 2024 harvest.

Key words: wheat, behavior, variety, quality

RESEARCH ON THE CHARACTERISTICS AND PARAMETERS OF THE FRUITS OF DIFFERENT CHERRY GENOTYPES SELECTED IN THE POLLINATION PROCESSES

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ABSTRACT

There is an intense and continuous concern for the genetic improvement of cherry varieties as the main way to improve agricultural performance, harvest quality, increasing the commercial value of the fruit and the only possibility of increasing disease resistance, with implications in reducing production costs and the level of pollution of the agroecosystem. Thus, the creation of varieties with a special quality resistant to unfavorable conditions (frost, drought), early and possessing a good ecological plasticity, allowed the expansion of the culture in new, less favorable areas. The creation of varieties and hybrids is important because in the economy of a crop, the variety contributes 30% of the price of the respective product. In this work, the plant material was made up of different F1 hybrid combinations from the species Cerasus avium. The hybrids studied were obtained in Mihai Bravu locality, Giurgiu County in Romania.

Key words: pollination, disease resistance, fruit parameters

INFLUENCE OF HARVESTING, IRRIGATION AND FERTIGATION ON THE PHYSICOCHEMICAL AND BIOCHEMICAL PARAMETERS DURING COLD STORAGE OF WHITE STRAWBERRY FRUITS (FRAGARIA X ANANASSA "SNOW WHITE") GROWN UNDER GREENHOUSE CONDITIONS IN BULGARIA

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ABSTRACT

The aim of this paper is to present the effects of the time of harvesting, irrigation and fertigation on the physicochemical and biochemical indicators of white strawberry fruits during the cold storage (T= 4ºC). A two factors experiment was conducted during 2024 in unheated greenhouse in the Chelopechene experimental field, Sofia, Bulgaria with drip irrigated and fertigated strawberry variety (Fragaria x Anannassa „Snow White"). The irrigation and the fertilization factors were applied in two rates: I1 - 75% (ETc) I2 - 50% (ETc), F1: optimal fertilization N8.09P12.76K15.62; F2 – suboptimal fertilization - 75% (F1). Five treatments were tested: control: I0F0:100% (ETc) without fertigation; I1F1; I1F2; I2F1; I2F2. The storage under refrigeration conditions T= 4ºC and the analysis of the quality of the fruits by standardized methods for 6 days during the first fruiting and 3 days for the second and third fruiting was carried out in the laboratories of the Food Technologies Department at the Institute of Food Preservation and Quality - Plovdiv. In the 2024 growing season of the strawberries were determinated physicochemical and biochemical analyzes: soluble and insoluble solids contents,active acidity, moisture, water activity, chromatic parameters (L*, a*, b*), total polyphenols and antioxidant activity. It was found that the time of harvesting and the applied agricultural techniques have an influence on the values of the physicochemical and color parameters in all studied variants of white strawberry fruits (Fragaria x Ananassa "Snow White"). The most significant influence were on the antioxidant activity and the content of total polyphenols during their storage ($p>0.05$).

Key words: white strawberry, physicochemical parameters, color parameters, cold storage

ASSESSING THE ADOPTION OF GREEN LEAF QUALITY STANDARD (GLQS) PRACTICES TO MINIMIZE POST-HARVEST DAMAGE IN SRI LANKA: A CASE STUDY IN BADULLA DISTRICT

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ABSTRACT

Tea made from Camellia sinensis (L.) Kuntze is one of the top three beverages globally. The quality of leaf directly impacts the final quality of brewed tea as it is the primary ingredient in tea production. The study aims to evaluate the implementation of Green Leaf Quality Standard (GLQS) practices in reducing post-harvest damage within the green tea leaf supply chain in the Badulla district. It aims to identify prevalent post-harvest damages and address the obstacles encountered when implementing good agricultural practices in the green leaf supply chain process. The study used both quantitative and qualitative research designs, and was conducted as cross-sectional research. Data collection methods included observations, interviews, and surveys. The sample consisted of 30 tea factories, and data were collected from pluckers, smallholders, dealers, and factory officers using a cluster sampling method. Descriptive analysis, correlation, and multiple regression were used to identify the relationship among independent variables on green leaf suppliers' adoption of GLQS practices to mitigate post-harvest damage. Results indicate that Dealers had the highest adoption of GLQS practices at 26.25%, followed by factory officers with moderate adoption at 25.98%, and pluckers with lower adoption levels at 24%. Throughout the green leaf supply process, weight loss percentages were calculated at various points: 18.1% at the weighing point, 4.52% before loading onto the lorry, 49.78% after unloading from the lorry, and 27.59% at the withering trough. Adapting to GLQS practices presented challenges such as a lack of awareness (54%), resistance to change (32%), and both the cost of compliance and limited access to resources (7% each). The results of the correlation analysis revealed that several key factors influenced the adoption of GLQS practices. These factors included age, experience in the tea field, attitudes of various stakeholders (plucker, smallholder, dealer, and factory officer), extension services, and training programs. Additionally, the multiple regression model demonstrated a strong fit, with high R-squared values for plucker, smallholder, dealer, and factory officer, which were 0.881, 0.931, 0.972, and 0.898 respectively. In conclusion, dealers have shown the best adoption of this strategy. Post-harvest losses occur at every point, with transportation presenting the most significant challenge. A lack of awareness was identified as a major barrier to adopting GLQS practices. To minimize post-harvest damage during transportation, well-equipped vehicles with racks and roofs can be utilized. Additionally, increased extension services are needed to change attitudes towards implementing GLQS practices. Therefore, based on the study findings, it is recommended to implement education and awareness programs and training initiatives and incentivize compliance to reduce post-harvest damage in the green leaf supply chain process.

Strengthening extension services and investing in research and development are also crucial for improving overall efficiency and sustainability.

Key words: Adoption; Green Leaf Quality Standard (GLQS); Post-harvest damage; Tea leaf supply chain; Tea leaves

THE EVALUATION OF CURRENT SITUATION REGARDING THE SOIL PEST AND CONTROL OPTIONS IN MAIZE CROP FROM SOUTHERN ROMANIA

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ABSTRACT

With an annual cultivated surface of 2.6 to 2.8 million hectares, maize is the most important cereal crop in Romania, followed by wheat and barley. Yields of maize crops have considerably fluctuation between years, mainly due to abiotic factors like drought and biotic factors represented by pest insects. Maize is attacked by a large number of arthropods, the southern area of Romania being particularly affected by the attack of some harmful species such as Tanymecus dilaticollis, Opatrum sabulosum, different complexes of wireworms and others soil pests that can compromise crops, on large areas, from the first stages of crop vegetation. An extensive pest survey in field conditions has been performed in 2024 spring in 4 experimental farms belonging to four research institution representatives for the southern Romania conditions. The paper presents the similarities and differences betwen the four experimental farms in term of species of soil insects that are pests of maize and represents an economic threat to maize cultivation in Southern Romania. Also, the effects of their attack on maize production, and control strategies that can be used for their management are discussed.

Key words: Maize, coleopteran soil pests, pest occurrence and dynamic, IPM on maize, Southern Romania

RISK MANAGEMENT AND SUSTAINABILITY IN WATERMELON PRODUCTION IN KARATAS DISTRICT OF ADANA PROVINCE

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ABSTRACT

In this study, risk management and sustainability issues in agricultural enterprises producing watermelon in Karatas district of Adana province were examined. In the agricultural enterprises within the scope of the study, issues such as demographic characteristics, risk sources encountered in agriculture, risk management strategies, farmers' reasons for agricultural production, thoughts of continuing agricultural production in the future, and information sources for agricultural production were investigated. In the study, data obtained from primary and secondary sources were used. The primary source of the study was the data obtained from the surveys applied to 32 farmers producing watermelon in the 2022 production period in Karatas district of Adana province. Similar studies conducted nationally and internationally, reports and records of relevant institutions and organizations are the secondary sources of the study. According to the results obtained from the study; changes in input costs, changes in interest rates, changes in product yields, lack of adequate support for basic inputs such as fertilizers, pesticides, irrigation and diesel fuel, and the high difference between consumer and producer prices are important risk sources affecting watermelon production. According to the data obtained from the surveys applied to farmers in farms producing watermelon, planning expenditures, increasing solvency, planning borrowing, and preventing excessive use of existing resources have been identified as important strategies to manage risk.

Key words: Risk Management, Risk Resources, Sustainability, Watermelon, Adana.

INFLUENTIAL FACTORS SHAPING CLIENT PERCEPTIONS OF TEA CULTURE ECOTOURISM'S EFFECTIVENESS IN PROMOTING SRI LANKAN TEA: A CASE STUDY OF THE UVA PROVINCE, SRI LANKA

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ABSTRACT

Tea culture tourism combines the historical aspects of tea culture with the ecological environment and leisure activities. Traditional tourism is no longer sufficient to meet the evolving needs and desires of tourists, whose lifestyles and values have changed. Consequently, many tourists have increasingly embraced tea culture tourism. However, there is a significant knowledge gap in understanding the efficacy of tea culture ecotourism as a marketing strategy. Addressing this gap is crucial for developing targeted strategies that appeal to tourists and for promoting Sri Lankan tea globally. This study aims to identify the factors affecting clients' perceptions of the effectiveness of tea culture ecotourism, investigate the relationship between tea promotion strategies and client perceptions of the efficacy of these experiences, and develop evidence-based recommendations for promoting tea culture ecotourism as an effective strategy for tea promotion. The study was conducted at Sky Cafe in Halpewatte Tea Factory, Hela Halpe, Bandarawela District, Sri Lanka. A total of 130 visitors who experienced tea culture ecotourism at this location were selected using systematic random sampling and surveyed using pretested questionnaires and interviews to collect data. Descriptive and statistical analyses were performed using SPSS software. The research findings indicate that clients perceive ecotourism experiences centred around tea culture as more effective when they are culturally immersive and authentic and contribute to the well-being of the local community. The study also found that educational interpretation and environmental responsibility positively correlate with the perceived effectiveness of these experiences. A strong positive correlation ($R = 0.746$) was observed between the independent variables such as cultural immersion, authenticity, local well-being, educational interpretation, and environmental responsibility, and the dependent variable (clients' perception of the effectiveness of tea culture ecotourism). This correlation explains 55.6% of the variance in clients' perceptions, indicating that these factors significantly influence how effective they perceive tea culture ecotourism to be. Given these findings, tea culture ecotourism emerges as a promising marketing tool for promoting tea. It underscores the importance of creating authentic and culturally rich experiences that benefit the local community, provide educational value, and are environmentally responsible.

Key words: Clientele Perception; Effectiveness; Marketing Approach; Tea Culture Ecotourism

EFFECTS OF DIFFERENT NACL DOSES ON GERMINATION AND EARLY SEEDLING STAGE OF SOME RADISH (RAPHANUS SATIVUS L.)

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ABSTRACT

Seed germination and early seedling growth are critical stages for species survival. Salinity affects the germination, seedling growth, and yield of several crop species, such as radish. The current study was carried out to reveal the effects of NaCl on seed germination and the early seedling stage of radish (Raphanus sativus L.). In order to study salinity stress on three radish cultivars, a laboratory experiment with a completely randomized design was conducted with three replications in the Department of Horticulture, Akdeniz University, Türkiye. To create salinity stress, sodium chloride (NaCl) at three levels of 0 (as a control), 100, 200, and 300 mg/L were used. Results showed that there were statistical differences in final germination percentages (%), hypocotyl lengths, and root lengths in terms of cultivars. Accordingly, among the cultivars tested, the black radish variety showed better performance than the other cultivars regarding the parameters measured at different salinity levels.

Key words: radish, salinity, germination, germination percentage, growth parameters

INTERSPECIFIC HYBRIDIZATION IN THE GENUS HELIANTHUS

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ABSTRACT

Remote hybridization was carried out between cultivated sunflower Helianthus annuus L and specimens of perennial wild species of the genus Helianthus, with different new ploidy. The goal is to transfer genes for resistance to abiotic and biotic factors from wild species to cultivated sunflower. In hybridization, a CMS line developed at DAI-General Toshevo was used as a maternal parent, and samples of perennial wild species of the genus Helianthus, which are stored and maintained in the collection of wild sunflower species in DAI-General Toshevo, were used as paternal parents. As a result, five F1 interspecific hybrids were obtained, of which two showed signs of dwarfism. All have a multi-year development cycle and have features of an intermediate type of inheritance, with those of the wild parent being more pronounced. Plants do not possess RF genes for CMS Pet-1. In the self-pollination of an F1 cross between a maternal CMS parent and a perennial paternal parent, an F2 hybrid was obtained, which has intermediate traits, has a multi-year developmental cycle and does not possess Rf genes for CMS Pet-1.

Key words: interspecies hybridization, sunflower, wild species, CMS Pet-1.

ECOSYSTEM SERVICES OF ORGANIC AGRICULTURE TO ENVIRONMENT AND SOCIETY (CASE STUDY: TÜRKİYE)

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ABSTRACT

The current trend of decline in the ability of agroecosystems to provide ecosystem services is a major threat to food security worldwide. The total area of organic agriculture in Türkiye totaled about 310.584 ha from 24 million ha of agriculture area in 2022. On the other hand, Türkiye is facing environmental problems such as soil degradation, deforestation, climate change, loss of biodiversity, etc, which pose major threats to human safety, health, environment, and productivity. Therefore, organic farming can provide the important services to environment and society. Basically, the function of organic farming systems plays an important role in both ecological and economic aspects by improving livelihoods, protecting biodiversity and increasing soil fertility and health. The development of organic farming is possible for the use of its services such as provisioning, regulating, cultural and supporting services. For example, organic farming provides a systems approach to reducing greenhouse gases (GHG) emissions and increasing soil carbon sequestration while maintaining healthy soils and protecting biodiversity. This can reduce the world's agricultural GHG emissions by about 20%. Also, this agricultural system can reduce soil erosion by 22%. This is a problem that the agricultural lands of Türkiye are suffering from it. In general, organic farming reduces negative impacts on nature-related ecosystems while simultaneously providing ecosystem services. In this paper, we will answer this question, how can the development of organic agriculture minimize the environmental problems of Türkiye by providing ecosystem services.

Key words: Agriculture, biodiversity, ecosystem services, organic farming, Türkiye

MICROWAVE DRYING OF PERSIMMON PUREE USING FOAM MAT TECHNIQUE

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ABSTRACT

Persimmon is notable for its high nutritional value and substantial antioxidant content. This fruit is abundant in vitamins, minerals, and fiber, contributing to the enhancement of the immune system and overall health. Furthermore, dried persimmon is a nutritious snack available year-round. For this purpose, it was aimed to determine the possibilities of drying persimmon with a microwave-assisted fan and foam mat method is the best for drying time, color and energy consumption. Persimmon puree, initially containing 82.90% moisture content, was dried using a foam drying method augmented with microwave and fan combinations until the moisture content decreased to an average of 14.31% ± 0.73. Soy protein (1%) and maltodextrin (1%) were employed as foaming agents in the foam drying process. Microwave drying trials conducted at 1.8 Wg-1, 3.6 Wg-1, and 5.4 Wg-1 lasted 62, 22, and 14 minutes, respectively. Combination trials at 1.8 Wg-1, 3.6 Wg-1, and 5.4 Wg-1 at 100°C lasted 57, 23, and 13 minutes, respectively, and at 150°C for 47, 21, and 14 minutes, respectively. Post-drying, the persimmon was powdered. Eleven thin-layer drying equations were applied to determine the drying models. Each trial's drying rate, color parameters, and energy consumption were analyzed. The lowest color change observed at highest power density and temperature (5.4 Wg-1 & 150°C). Külcü, Alibaş and Jena-Das models emerged as the most suitable empirical equations, evidenced by the lowest root mean square error values. Statistical analyses categorized color parameters and energy consumption. The optimal energy efficiency was achieved with the 5.4 Wg-1 microwave drying method, yielding an energy consumption value of 2.12 Whg-1.

Key words: Drying, Microwave drying, Foam mat method, Spesific energy consumption

EVUALATION OF YIELD AND YIELD RELATED TRAITS OF DURUM WHEAT UNDER DIFFERENT CONDITIONS

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ABSTRACT

Durum wheat (Triticum durum L.) is a crucial crop for various industries including bulgur, macaroni, and cake production. Durum wheat cultivation is economically valuable due to its diverse array of end products. Durum wheat is an ideal ingredient for making pasta due to its convenient handling, cooking, and storage properties, as well as its high digestibility, nutrient profile, and cost-effectiveness. Additionally, its nutritional composition is ideal for human consumption, with 12-16% protein, 70% carbohydrate, 1.9% fat, 1.6% fiber, and 1.6% minerals. This study was conducted to evaluate the yield and yield related traits of durum wheat cultivar (Svevo) in under rainfed and irrigated field conditions during 2020-2021 growing season. The experimental desing was randomized complete block with four replicates for both treatments. As a result of the variance analyzes, examined traits showed significant variance among themselves in terms of examined characteristics. Yield, flag leaf area and thousand kernel weight are examined to evaulate the effect of supplemental irrigation. Supplemental irrigation had positive effect on yield and yield related characteristics. There was a strong positive correlation between flag leaf area and yield. Our results have shown that flag leaf in durum wheat have an importance in terms of yield.

Key words: yield, flag leaf area, thousand kernel weight, rainfed, supplemental irrigation

THE EFFECT OF DIFFERENT NITROGEN FORMS ON TOMATO SPOTTED WILT VIRUS INFECTION IN PEPPER PLANTS GROWN IN FULL- AND DEFICIENT-WATER CONDITIONS

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ABSTRACT

Abiotic environmental stressors have an impact on both plants and their pathogens. Water and nutrient deficiencies are among the major abiotic stress factors in agricultural systems. Viruses are obligate parasite pathogens causing detrimental yield reductions on crop plants worldwide. However, there are limited studies on the impact of abiotic factors on plant-virus interactions. In this study, the effects of different forms of nitrogen fertilizers on Tomato spotted wilt virus (TSWV) infection in pepper plants grown under two different irrigation regimes (water deficient and full irrigation) were investigated in the controlled growth room conditions. Fertilizer applications consisted of five individual treatments with three replications. The pepper plants were applied with identical doses (12 kg/ha) of urea (CH4N2O), NH4NO3, Mg(NO3)2, (NH4)2SO4, and MgSO4 as a control to compare the effects of Mg2+ and SO24- in the fertilizer. Each treatment contained healthy (non-inoculated) control plants. TSWV-inoculated and non-inoculated plants were tested by enzyme-linked immunosorbent assay (ELISA) to confirm virus infection four and eight weeks after mechanical inoculation. The results showed that the virus-inoculated plants applied with urea and NH4NO3 had lower ELISA absorbance values in both limited- and full-water conditions ($p<0.01$), indicating more tolerance to TSWV infection in the case of these fertilizers. On the other hand, the plants applied with magnesium-containing fertilizers were relatively less affected by the virus in water-deficient conditions, however, the plants treated with (NH4)2SO4 had higher virus content in low irrigation conditions. The severity of TSWV symptoms was less apparent in limited-irrigated plants, despite better canopy development in full-capacity watered plants. This study indicated that urea, NH4NO3 or Mg(NO3)2 may provide a positive contribution to plant fitness or may suppress virus infection under water-deficient conditions. In the future, the impact of different nutrients and water contens on plant-virus interactions under field conditions is needed to be studied.

Key words: TSWV, plant nutrients, water stress, tolerance

NEW WAYS TO DEVELOP RESILIENT RURAL COMMUNITIES – CASE STUDY IN ROMANIA

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ABSTRACT

In Romania exist heterogeneous agricultural lands due to the natural landscape of the Carpathians Mountains as well as continuous agricultural activity longer than 7,000 years. In this case, many of the villages positioned in Southeast Transylvania, a historical province, comprise natural boundaries such as cricks, forests, hills, or natural geological formations that are splitting agricultural lands. Based on different studies, these heterogenous agricultural lands are considered today as hotspots for biodiversity, relevant to the European Union countries, and many of them are included in different protected areas. The scope of this paper is to describe the direct connectivity between the surface of home gardens and the minimum requirements of a family to ensure food security for one year. In Moșna village, from Sibiu County, Romania, traditional Saxon home gardens can be considered as reference historical households. Based on our results, and taking into consideration local climatic conditions, a minimum of 500 m2 per home garden is sufficient to ensure the vegetables' needs for 365 days for a single person. Therefore, we consider that resilient communities should have also defined the "resilience for one adult person" included for in-depth analysis when mitigation and adaptation measures against climate change are taken into consideration for sustainable development in rural areas.

Key words: traditional home gardens, resilience, agriculture, land use

DETERMINATION OF FUNGAL DISEASES IN AVOCADO PRODUCTION AREAS IN EASTERN ANTALYA

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ABSTRACT

This study aimed to determine fungal diseases in Eastern Antalya (Alanya, Gazipaşa, Manavgat), where avocado cultivation is rapidly increasing. Avocado (Persea americana) is a subtropical fruit belonging to the Lauraceae family, whose homeland is Central Mexico. It is grown in regions with tropical climates as well as in various regions with Mediterranean climates. The countries with the highest avocado production in the world are Mexico, Colombia, Peru, the Dominican Republic and Indonesia, respectively. The first avocado production trials in Turkey started in 1970 with the adaptation studies of 4 important cultivars (Hass, Fuerte, Bacon, Zutano) brought to our country from California to Antalya, Mersin, Muğla, Hatay and Adana. The varieties produced in Antalya, which ranks first in avocado cultivation in Turkey, are Fuerte and Hass. As of 2023, 38.462 tons of avocado has been produced in an area of 47.205 da in Turkey. Major economic losses due to important fungal diseases and abiotic factors limiting avocado production worldwide are noteworthy. In the study, diseased plant samples were collected from surveyed areas in Eastern Antalya; classical mycological isolations were made from fruit, leaf, shoot and root regions and fungal diseases were determined at the genus or specie level with classical diagnostic methods. As a result of the study, the most commonly isolated fungal disease agent was determined as Fusarium spp. (F. oxysporum, Fusarium verticilloides, Fusarium poae). Other fungi and fungus-like genera or species isolated were recorded as Rhizoctonia solani, Alternaria sp., Pleiochaeta sp., Verticillium sp., Phytophthora sp., Pythium sp., Cylindrocarpon sp., Aspergillus spp.,. Considering the favorable climate of our country and the increase in cultivation especially on the Mediterranean coasts, it will be important to determine fungal diseases and take measures to prevent the spread of diseases for high-yield avocado production.

Key words: Persea americana, avocado disease, fungal disease, Fusarium spp.

COMPARISON OF THREE ORGANIC CULTIVATION TECHNIQUES IN OLIVE TREES (cv. KORONEIKI), BASED ON THEIR YIELD AND THE QUALITY OF THE OLIVE OIL PRODUCED

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ABSTRACT

Olive is considered one of the most significant crops worldwide, given its capacity to thrive in vast array of soil and climatic conditions, as a result of the wide range of available varieties. The aim of the present study was to investigate the impact of irrigation regimes and three distinct cultivation techniques under organic conditions on the yield and quality of the olive oil produced from the Koroneiki variety. Olive trees from two groves were used, one irrigated and one non-irrigated. A total of 12 trees were selected from each grove. Four of them comprised the control treatment (C), representing the standard cultivation technique used by the producer. Another four trees were treated with a boron-zinc based product, a chitosan based product, a kaolin clay particle based product, and a potassium based product, all registered for use in organic cultivation and comprised the second treatment (T2). The third treatment consisted of the application of a boron-zinc-molybdenum-based product, a silicon-calcium-based product and a potassium-based product (T3). The results of the present study indicate that the control treatment resulted in an increase in the oil content and concentration of total phenolics and total flavonoids in olive oil produced from the irrigated olive grove. The T2 treatment resulted in higher olive oil production and increased antioxidant capacity (as determined by the FRAP and DPPH methods) of the olive oil in the irrigated olive grove. Conversely, the T3 treatment led to comparable results in the olive oil from the non-irrigated olive grove. Furthermore, the T3 treatment also led to an increase in total flavonoids in the non-irrigated olive grove and total phenolics in the irrigated olive grove. Finally, both treatments, T2 and T3, resulted in an increase in the concentration of total o-diphenols in the olive oil produced from both olive groves.

Key words: Olive oil quality, Oil acidity, Kaolin clay particles

Effect of Gibberellic Acid on Waterlogging Stress in Melon

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ABSTRACT

Melon (Cucumis melo L.) is an economically important summer vegetable species with an aromatic taste and high nutritional value, produced in large quantities worldwide. Waterlogging has become one of the most common stress factors threatening crop production and food security worldwide. Waterlogging seriously impairs the growth and productivity of agricultural products. In this study, we aimed to determine the effect of waterlogging stress on melon and whether gibberellic acid (GA3) can change stress conditions. Waterlogging stress conditions caused significant changes in almost all measured parameters in melon. Only PAR values did not change statistically. It was determined that stress tolerance could be increased in some parameters in the group where GA3 was applied together with waterlogging stress. SPAD values were defined as 30.36±0.89 in the control group, 23.55±1.69 in the waterlogging group, and 22.65±174 in the GA3+waterlogging group. It was determined that the GA3 application reduced visual damage under waterlogging stress conditions. In this study, it was determined that this flooding stress significantly negatively affected the melon. Although GA3 application could improve some parameters in melon under waterlogging stress, its healing effect on many parameters was limited.

Key words: giberellic acid; melon; resistance; waterlogging stress

DETERMINATION OF FATTY ACID COMPOSITION CHANGES IN SOME EDIBLE SEED WATERMELON GENOTYPES

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ABSTRACT

The increase in food consumption has revealed the necessity of making the best use of existing food resources. Some genotypes of watermelon, one of the important vegetable species, have snack potential due to their seed characteristics. This study was carried out to determine the seed oil ratio and fatty acid composition values of some edible seeded watermelon genotypes. Oil was obtained from the seeds of twenty-four watermelon genotypes. The oil ratio and composition of the oils obtained were determined. According to the results obtained, it was determined that watermelon seeds contained an average of 15.93% oil (on a dry basis), and this oil contained 59.75% linoleic acid, 20.63% oleic acid, 11.23% palmitic acid, and 7.53% stearic acid. The highest linoleic acid content was determined in genotype number 1, and the highest palmitic acid content was determined in genotype number 11. The results of this study can be used in breeding strategies to develop edible seeded watermelon varieties.

Key words: Citrullus lanatus, Fatty Acid Composition, seed

MOLECULAR CHARACTERIZATION OF SOME TOMATO GENOTYPES USING POX TECHNIQUE

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ABSTRACT

Tomato (Solanum lycopersicum) is among the most produced and consumed annual vegetables worldwide. The rich nutritional content of tomato makes it a foodstuff that attracts consumers' attention. Tomato, which is an important foodstuff in terms of both health and economy, is used as a model organism in studies. In this study, 14 specific peroxidase gene (POX) primers were used to determine peroxidase gene polymorphism (POGP) in 12 tomato genotyp. In the study, 127 of the 192 bands obtained from 14 POX primers were found to be polymorphic. The average polymorphism rate was 65.9% and the number of bands varied between 9 and 18. The similarity coefficient range of the genotyp varied between 0.74 and 0.97. According to the UPGMA dendogram, the closest genotyp are determined as the number 7 genotyp and number 8 genotyp, while the most distant genotyp are the number 3 genotyp and number 5 genotyp. The findings obtained from the current study show that there is genetic variation among the domates genotyp examined. The obtained data will enable the domates genotyp with genetic differences to be used more effectively for future breeding programs.

Key words: molecular characterization, POX, POGP, solanum lycopersicum, Tomato

DETERMINATION OF GENETIC DIVERSITY IN SOME MELON VARIETIES USING PEROXIDASE GENE MARKERS

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ABSTRACT

Melon is one of the most important summer vegetables produced widely in the world. Many local melon genotyp and commercial varieties are used in cultivation in the world. The success of melon breeding is based on the existence of sources with high genetic diversity, the characteristics of the genetic material and the creation of combinations with the desired characteristics. Genetic characterization of plant material is the most important step of this process. In this study, 14 specific peroxidase gene (POX) primers were used to determine peroxidase gene polymorphism (POGP) in 12 melon genotyp. In the study, 244 of the 259 bands obtained from 14 POX primers were found to be polymorphic. The average polymorphism was 94.4% and the number of bands varied between 13 and 26. The similarity coefficient range of the genotyp varies between 0.30 and 0.90. The genotyp that are genetically closest to each other are number 2 genotyp and number 3 genotyp, while the most distant genotyp are genotyp 1 and 10. The findings obtained from the current study show that there is genetic variation among the melon genotyp examined. The obtained data will enable the melon genotyp with genetic differences to be used more effectively in future breeding programs.

Key words: Cucumis melo, genetic characterization, melon, POGP, POX, UPGMA, variety

IMMOBILIZATION OF HEAVY METAL BY CLAYS IN AGRICULTURAL SERPENTINE SOILS

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ABSTRACT

Heavy metals and metalloids can accumulate in soil, with potentially toxic effects to human health and ecosystems, threatening the sustainable use and management of soil resources. The concern of high concentration of heavy metals coming from mineralized soil is even greater when we cultivate food plants. Several procedures have been proposed to reduce the concentration of heavy metals in the soil; among them, the application of materials such as bentonite, able to absorb these elements, making them less available to plants. The present study deals with the use of clay material as an adsorbent and Ni hyperaccumulator plant, Odontarrhena chalcidica, for the removal of Ni from solutions of agricultural serpentine soil in Albania, as an alternative reduce nickel availability and to reduce the risk of uptake of nickel by vegetable. In-situ experiment was conducted with serpentine soil Where we add clays and cultivated Odontarrhena calchidica plant. The experiment was conducted in 1 kg plastic plot. We used four doses of clays: 0.0; 10.7; 21.4 and 32.1 g kg-1, corresponding to 0, 30, 60 and 90 t ha-1, respectively. Experiment was with 3 replications for plots with clays and them with clays an Ni hyperaccumulator. After the 60 th day of experiment, the plants collected separating the aerial part, washing with distillated water, conditioned in paper sacks and dried in forced air stove at 65o C during 48 hours. Total metal determination will conduct after digestion of soils and plants, using ICP. We measured available metals in soil of ex-situ experiment before experiment for every treatment and after 60 days. In situ experiment help us to know capacity of clay to immobilize metals and capacity of Ni hyperaccumulator plant to extract metal and soil remediation.

Key words: Heavy metals, Odontarrhena chalcidica,serpentine soil ,total metal ,available metals

ANTIFUNGAL ACTIVITY OF Taraxacum spp. ON SOME PLANT DİSEASES

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ABSTRACT

Taraxum spp. It is a perennial herbaceous plant belonging to the Asteraceae family, often called dandelion. The plant grows in temperate regions of the world. Its extracts are known to be very effective. Rhizoctonia solani Kühn. and Fusarium oxysporum fungi were used in the study. Three different doses of plant extracts were applied to cultures of fungal pathogens transferred from the culture collection in three replicates. Colony diameters were measured after the process in the cultures and the % efficiency of the extracts was calculated with the Abbott formula.Taraxum spp. was prepared with ethanol and three different doses of the herbal extracts mentioned in our study were used: 2.5, 5 and 10%. The results were evaluated statistically and the effects of the extracts applied in our study were examined. In the determination of phenolic compounds by HPLC, the highest values were found to be Chlorogenic acid 812.4, Kamferol 292.0, Quercetin 103.5 micrograms/gram, respectively.
In the evaluation of antifungal activity, 500 microliter dose was found to be effective against Fusarium solani and Rhizoctonia solani, while 1000 microliter dose of dandelion extract was found to be more effective against 100% Rhizoctonia solani.
According to our study, Dandelion was found to be effective against Rhizoctonia and Fusarium, which are soil-borne plant fungal diseases.
The use of alternative plant extracts to the pesticides used in subsequent studies seems promising.

Key words: antifungal activity, Taracum spp, HPLC, Plant pathogens

ENHANCING AGRICULTURAL SUSTAINABILITY: THE IMPACT OF ALGAL BIOSTIMULANTS ON CROP GROSS MARGINS IN LATVIA.

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ABSTRACT

The study explores the potential of using seaweed extract as a biostimulant in organic farming to enhance crop productivity and economic outcomes. This research addresses the pressing need for sustainable agricultural practices in the face of global environmental challenges. The main objective of the study is to assess the feasibility and effectiveness of using seaweed biomass found on the Latvian coast as a biostimulant in organic farming. The research involves a comprehensive analysis of the role of organic farming in sustainable agriculture, the regulatory framework for organic farming in Latvia, and the factors influencing its development. Empirical methods such as SWOT analysis, expert interviews, and quantitative strategic planning matrices were used to evaluate the impact of different factors on organic farming and to develop strategic recommendations. Laboratory evaluations of seaweed extract were conducted in collaboration with two Latvian universities, focusing on its agrochemical properties and potential applications. The findings show that seaweed extract can significantly enhance seed germination, root system quality, and overall crop productivity, thereby increasing gross margins for organic farmers. The extract demonstrated effectiveness in safeguarding crops from pests and promoting growth, with an optimal concentration of 12% and a maximum wholesale price of €4.13 per liter. The study concludes that seaweed extract is a viable biostimulant for organic farming, offering both environmental and economic benefits. It recommends further research and development, including additional validation of the extract's potential and a business model for its commercialization. The findings underscore the importance of integrating innovative biostimulants into sustainable agricultural practices to achieve higher productivity and economic sustainability. Empirical research methods included secondary data analysis, SWOT analysis, expert interviews, pairwise analysis, Quantitative Strategic Planning Matrix (QSPM), ranking method, L-shaped chart, and descriptive statistical time series analysis. The SWOT analysis identified several strengths, including the abundance of seaweed biomass along the Latvian coast and its rich composition of bioactive compounds beneficial for plant growth. Weaknesses highlighted the variability of seaweed composition depending on the harvest location and season, which could affect the consistency of the biostimulant's effectiveness. Opportunities included the growing market demand for organic and sustainable agricultural products, which could drive the adoption of seaweed-based biostimulants. However, threats such as regulatory challenges and competition from established chemical biostimulants were also identified. The study confirms the hypothesis that seaweed biomass washed up on the Latvian coast can be used as an extract in organic farming to increase the productivity of organic crops. At a concentration of 12% and a maximum wholesale price of EUR 4.13 per liter, the extract meets the primary objectives defined by pesticides: to protect crops from pests and to promote growth and productivity. Given the ongoing validation of the potential of the seaweed extract, the author proposes to continue the trilateral R&D&I cooperation, attract investors focused on sustainable product development, continue the

validation process with Latvian university laboratories, and develop a scalable and diversified business model. This research contributes significantly to sustainable agriculture by providing empirical evidence of the benefits of algal biostimulants and strategic insights for their integration into organic farming practices. The integration of seaweed extract as a biostimulant not only enhances the economic viability of organic farming but also contributes to environmental sustainability by reducing reliance on chemical pesticides and fertilizers. The results of the study are relevant to policymakers, agricultural scientists, and organic farmers seeking to adopt more sustainable and economically viable farming practices.

Key words: Agricultural Sustainability, Algal Biostimulants, Latvia, Crop Gross Margins

THE EFFECTS OF CHITOSAN AND ESSENTIAL OIL APPLICATIONS ON FRUIT CRACKING PREVENTION AND QUALITY CRITERIA IN 0900 ZIRAAT CHERRY VARIETY

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ABSTRACT

This study was conducted during the 2022-2023 period in the experimental plot located at the Çukurova University Pozantı Agricultural Research and Application Center, situated at an altitude of 1200m. The study focused on the 0900 Ziraat cherry variety grafted onto MaxMa 60 rootstock, planted at a 5x5m spacing, and pruned in a Central Leader system. The trees were five years old. In the study, %0.5 CaCl2, 300ppm Green Stim, 100ppm Chitosan, 400ppm Thyme oil, combinations of these treatments, and water as a control were used. The study was conducted in a randomized complete block design with 3 replications, each containing 10 plants. As a result of this study, while the control application showed a 36% cracking rate, the lowest fruit cracking rate of 2% was obtained with the Thyme Oil (400 ppm) application. Particularly, the thyme oil application had positive effects on fruit size. The fruit weight, which was 7.39 g in the control, was determined to be 8.42 g with the thyme oil application, indicating a positive effect on fruit weight. The best result in fruit firmness was also achieved with the thyme oil application. While the control had a fruit firmness of 4.5 kg, the thyme oil application resulted in a fruit firmness of 5.42 kg.

Key words: Cherry, quality, fruit cracking, essential oil

PRELIMINARY STUDY OF THE FLORISTIC BIODIVERSITY OF THE NATURAL HABITATS OF THE DESERT LOCUST (SCHISTOCERCA GREGARIA FORSSKÅL) ON THE TADEMAÏT PLATEAU (ALGERIAN SAHARA)

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ABSTRACT

The Algerian Sahara occupies more than 80% of the country's territory, and its edapho-climatic characteristics are highly restrictive for the spontaneous survival of living beings. Saharan plants play an important role in the life of the desert locust (Schistocerca gregaria Forskål), a species feared for its massive and destructive invasions. Certain plants are of particular interest (shelter, food, etc.) to the desert locust. The aim of this research is to describe the Saharan habitats of the desert locust based on an analysis of plant biodiversity. We carried out field surveys on the Tademaït plateau to determine the floristic richness, biogeographical types and biological types of plant species in the biotopes. On the basis of 60 floristic surveys carried out on the plateau (natural environments), we identified 19 plant species belonging to 14 botanical families and belonging to different biogeographical and biological types. These plants are of great interest to the desert locust in the biotopes studied.

Key words: desert locust, plant biodiversity, natural biotopes, biogeographical types, biological types, Tademaït Plateau

A REVIEW ON PROGRAMMED CELL DEATH IN COTTON

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ABSTRACT

Programmed cell death (PCD) is DNA disruption in which the cell death program is rendered irreversible and facilitates the fragmentation of the nucleus. PCD is actively involved in leaf senescence, self-incompatibility and the formation of tracheary elements in many plants. PCD appears to be mainly involved in cotton fiber development and secondary wall formation. PCD, which occurs under the coordination of Ca2+, hydrogen peroxide, and brassinosteroids, plays a role in the main process leading to fiber maturation following the secondary cell wall. Both developmental-regulated PCD and environmental-induced PCD are affected by several plant hormones. In this review, we have written about gland formation in cotton, its role in anther fertility under high-temperature stress and the role of PCD in the regulation of synergid death. A better understanding of the PCD network will enable us to develop future breeding strategies to improve cotton yield and quality and to increase its tolerance to biotic and abiotic stresses.

Key words: Cotton, DNA disruption, programmed cell death, reactive oxygen species, stress

DETERMINATION OF SEED YIELD AND SOME CHARACTERISTICS OF SELECTED QUINOA (CHENOPODIUM QUINOA WILLD.) LINES

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ABSTRACT

This study was carried out to determine seed yield and some traits of quinoa (Chenopodium quiona Willd.) lines improved by selection method under Erzurum conditions. The study was carried out at Atatürk University, Faculty of Agriculture, Department of Field Crops. A field study was established in augmented experimental design using 28 lines developed by selection method and 5 cultivars (control). Plant height, seed yield, harvest index, thousand grain weight and number of days to flowering were determined in quinoa genotypes. The findings obtained as a result of the research can be explained as follows. The improved lines were taller and had higher seed yield than the cultivars. On the other hand, the lines lagged behind the cultivars in harvest index. Selection studies delayed the maturity of the plants. The lines generally flowered later and reached harvest maturity in a longer time. According to the results of this study; studies should continue on lines 2017/33, 2017/39, 2017/31, 2017/25, 2017/14 and 2017/13 for seed type quinoa.

Key words: Quinoa, variety improvement, seed yield, plant characteristics

EXPLOITATION OF CHARCOAL ROT RESISTANT LINES OF SUNFLOWER IN HYBRID BREEDING

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ABSTRACT

Sunflower is an important oilseed of the world and yield of the sunflower has been threatened by the biotic and abiotic factors under current scenario of global climate change. Charcoal rot is a peculiar disease of tropical and subtropical climate and is characterized by the presence of lesions on stem which causes wilting and premature lodging of stem. Introgression of disease resistant genes is the only solution to combat disease. This paper describes results of the utility of charcoal resistant lines in breeding program. Resistant inbred lines i.e. B-208, B-124, B-224, B-112 were crossed with the male fertility restorer lines to yield 16 half sib cross combination. These crosses significantly differ for the incidence of charcoal rot resistance. Cross combinations C.112 ×RSIN.82 and C.208 ×RH.344 showed significant negative heterosis and complete to over dominance toward resistant breeding lines. Heterosis estimates were low and show high magnitude of dominance variance than additive variance for disease resistance. Breeding lines B-112, B-208 and RSIN.82 had significant general combining ability effects and may be exploited in breeding program.

Key words: dominance, heterosis, fertility restorers, symptoms, infestation

VALORIZATION OF CHERRY BIORESOURCES IN ALGERIAN AGRICULTURE: A PATHWAY TO ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

The agriculture sector in Algeria holds significant potential for economic growth and environmental sustainability throught the valorization of cherry bioressources. However, challenges such as limited markets access and inadequate post-harvest processing infrastructure hinder the realization of this potential. The aim is to investigate the multifaceted potential of cherry cultivation and provide actionable insights for enhancing both economic viability and environmental sustainability. Through comprehensive field surveys, inter views with local farmers, and analysis of agricultural data, the study evaluated current cherry production practices and assessed advanced agricultural techniques. The results indicate several key solutions: adopting advanced agricultural practices to improve production efficiency and sustainability; developing value-added products to open new markets and increase local profitability; implementing sustainable farming practices to enhance soil health, conserve water, and reduce greenhouse gas emissions; improving post-harvest processing infrastructure to reduce losses and enhance product quality; and strengthening policy frameworks to support sustainable practices and provide incentives for value-added production. These solutions provide a pathway to a more resilient and economically robust cherry industry in Algeria, aligning with broader goals of environmental sustainability and resource optimization. The study delivers valuable insights for policymakers, practitioners, and researchers committed to advancing sustainable agriculture and maximizing the benefits of cherry bioresources in the region.

Key words: sustainable agriculture, climatic changes, economic growth, cherry bioresources, Algeria

EFFECT OF DİFFERENT VERMİCOMPOST COMBİNATİONS ON YİELD AND YİELD COMPONENTS İN SAFFLOWER

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ABSTRACT

This research was conducted at the Field Crops Central Research Institute İkizce Research and Application Farm for two years in 2020 and 2021. In the study conducted on Safflower/Wheat crop rotation system; 7 different fertilizer combinations (DAP+UREA, Solid Worm Casting (KSG)+UREA, DAP+Liquid Worm Casting (SSG), KSG+SSG, KSG Only, SSG Only and No Fertilizer control) were used. The effects of these applications on safflower yield and yield components were examined. The experiment was set up with 3 replications according to the Randomized Blocks experimental design. As a result of the research, the highest grain yield was obtained from the DAP + UREA application with 363 kg/da, and the lowest grain yield was obtained from the Fertilizer-Free (Control) application with 278 kg/da. It has been determined that KSG+UREA application provides 2 days earliness in safflower flowering time and 4 days earliness in ripening time. As a result, for sustainable agriculture, cultivation with KSG+UREA application, one of the vermicompost applications, can be recommended in safflower production in terms of soil and environmental health. In terms of sustainable agriculture, it can be said that long-term solid and liquid worm fertilizer applications improve the soil structure and increase the plant nutrient content.

Key words: Safflower, Vermicompost, Crop Rotation, Yield

ISOLATION AND IDENTIFICATION OF Bacillus spp. FROM SOIL AND THEIR EFFECTS ON THE YIELD AND QUALITY PARAMETERS OF SUGAR BEET (Beta vulgaris L.) UNDER DROUGHT STRESS IN CENTRAL ANATOLIA

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ABSTRACT

In this research, the effect of Bacillus spp. applied under drought stress on the yield and quality of sugar beet was examined. Bacillius spp. were isolated and identification as16S rRNA gene sequence analysis from rhizosphere of sugar beet root in Kayseri, Konya, Sivas, Yozgat, Nevşehir and Niğde in Central Anatolia of Turkey. The research was conducted for 2 years in 2021 and 2022 in Gemerek, Sivas, Central Anatolia of Turkey. The experiment was set up according to the "Random Blocks Split Plots" trial design with 3 replications, with the main plots being irrigation and the sub-plots being bacterial applications. Bacillus halotolerans (B1), Bacillus subtilis (B2), Bacillus pumilus (B3) and Bacillus magatorium (B4) and their mixture (BMX) were applied under 4 irrigation levels (25%, 50%, 75%, 100%) in experiment. In addition, the experiment included positive control (K1) plots where no chemicals were applied and negative control (K2) plots where only chemical fertilizer was applied. In the experiment, each plot had 6 rows and the planting density was 25 x 45 cm. Living bacteria were sprayed into the plots at a density of 1x109 CFU/ml and 25 ml into the soil during the seedling period. According to the results obtained; Bacillius spp. in both years significantly increased beet yield and quality in sugar beet at low irrigation levels.

Key words: Sugar Beet, Bacilus spp., Yield, Quality, Irrigation, Drought Stress

OPTIMIZING FODDER PEA YIELD: IMPACT OF PLANTING DENSITY AND ROW SPACING

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ABSTRACT

The aim of the study was to evaluate the influence of the number of plants and the distance between the rows on the production of fodder pea. The experiment was conducted in 2020-2023. Fodder pea "Voskopoja" (landrace with the greatest spread in this area of Korçë district, Albania), was studied by applying three sowing densities (60, 80 and 100 seeds per 1 m2), with three row spacings (20, 30 and 40 cm), in four replicates in 24 m2 plots. The R factor, row spacing showed statistically significant influence on the number of seeds per pod, seed weight per pod and seed yield of fodder pea. Factor D planting density showed statistically significant effect on number of pods per plant, number of seeds per pod, seed weight per pod and seed yield of forage pea. The R x D interaction showed statistically significant effects on the number of seeds per pod, seed weight per pod and seed yield of forage pea. The number of plants and the distance between rows did not reflect significant changes in the weight of 1000 seeds. These factors did not reflect significant changes in protein content. This study showed that the interaction between the factors plant number and row spacing in winter pea modifies the yield of green mass, seeds, plant height and seed yield.

Key words: Forage pea, Number of plants, Row Spacing, Yield, Protein.

THE ANTAGONISTIC EFFECTS OF BACILLUS MEGATERIUM AGAINST SOME PHYTOPATHOGENS BACTERIA

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ABSTRACT

This study was conducted to investigate the antagonistic effects of Bacillus megaterium on Clavibacter michiganensis subsp. michiganensis (Cmm), Erwinia amylovora (Ea), Xanthomonas euvesicatoria (Xe), X. arboricola pv. juglandis (Xaj), Pseudomonas syringae pv. tomato (Pst), P. syringae pv. phaseolicola (Psp). B. megaterium was obtained from vermicompost. The phytopathogens bacteria were isolated different diseased plants from the production areas in Tokat. The study was conducted in vitro. In the antagonistic effect study, B. megaterium were planted in three spots on the King's B medium. The media were incubated at 27 °C during 24 hours, then the phytopathogens bacteria suspension were sprayed on media. As a positive control, only phytopathogens bacteria were applied to the medium without B. megaterium. At the end of incubation period, zone values were formed around the isolated in medium. B. megaterium was suppressed the growth of Cmm, Pst and Xe in the medium and formed the zone at different rates. However B. megaterium wasn't inhibited the growth of Psp, Xaj. This study revealed that B. megaterium is effective on some plant pathogens bacteria. In addition to petri experiment, determining its effectiveness at the plant is important for biological control.

Key words: Bacillus megaterium, biocontrol, in vitro

ANTAGONISTIC OF ESSENTIAL OILS AGAINST GRAPEVINES SOIL-BORNE FUNGAL DISEASE AGENTS DETERMINATION OF EFFECTS

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ABSTRACT

Grapevine root and crown rot causes significant losses, especially in newly planted vines. The use of chemical fungicides has many negative effects on beneficial soil organisms, soil fertility, and human and environmental health. The morphological and molecular identification of Fusarium solani (von Martius) Saccardo and Phytium viniferum B. Paul fungi isolated from the samples taken from the nurseries in the central district of Manisa province were completed and selected for the tests. The antifungal effects of peppermint (Mentha piperita L.) and thyme (Thymus vulgaris L.) oils at different concentrations (0.0, 5.0, 10.0, 15.0, 20.0, 25.0 µl petri^{-1}) on mycelial growth of F. solani and P. viniferum species were investigated under in vitro conditions. Furthermore, 50 mg L^{-1}, 100 mg L^{-1} concentrations of both essential oils were evaluated against fungal species on rooted cuttings of 1103 Paulsen rootstock under in vivo conditions. Thyme and peppermint essential oils completely inhibited the mycelial growth of F. solani and P. viniferum at concentrations of 20.0 and 25.0 µl petri^{-1}. Peppermint essential oil was found to be highly effective against the pathogens F. solani and P. viniferum at a concentration of 100 mg L^{-1} under in vivo conditions. It was concluded that essential oils can be used as an effective fungicide in the control of soil-borne fungal pathogens causing seedling losses.

Key words: Dual culture, essential oils, fungicides, grapevines, soil-borne pathogens

CHALLENGES AND EFFICIENCY IN THE BOVINE DAIRY SUPPLY CHAIN IN THE BISKRA REGION

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ABSTRACT

Our study aims to analyze the bovine dairy sector by evaluating the production chain of reconstituted milk. To achieve this, we examined various segments that form the foundation of the chain. In this context, three dairies, along with the breeders and collectors associated with them, were surveyed. The collectors delivered around 4,000 liters of raw milk per day to the dairies, produced by 14 breeders from the Biskra region and 17 breeders from Setif. Despite the increased production capacity of the dairy industry in Biskra, a number of extrinsic and intrinsic obstacles, such as genetic, climatic, and economic challenges, confront cattle farms and have led to low milk production. Additionally, issues have been identified at the collection level. The transformation process is considered the most efficient stage of the milk production chain in the region, partly due to support from state institutions. These three dairies—Amira Lait, Biskra Lait, and Djemina Lait—are capable of meeting the local demand for milk.

Key words: Dairy sector, production chain, dairy industry, breeders, BISKRA-ALGERIA, collectors.

THE INFLUENCE OF FERTILIZATION ON THE MORPHOLOGICAL CHARACTERISTICS, YIELD AND QUALITY OF SOME SWEET POTATO VARIETIES

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ABSTRACT

Although sweet potato is almost the most important crop in many Asian, African and Latin American countries, there are only sporadic research data on production in some continental European countries (Western Balkan countries). Therefore, this research presents an overview of the morphological traits, yield and sensory properties of three phylogenetically different sweet potato cultivars: Beauregard (orange flesh), Japanese (light flesh) and 414 (purple flesh) under several fertilization regimes: 1. poultry pellet fertilizer – control; 2. NP2O5K2O 100:100:100; 3. NP2O5K2O 100:100:100 + 50 N. The mentioned varieties have thin stems with a strong habitus, which cover more than 50% of the inter-row spacing by the 40th day of vegetation. Morphological characteristics of the plants: the length of the main branch, the length and number of side branches, the number of leaves varies during the growing season regardless of the treatment, however, the increased dose of nitrogen (150N) contributed to a higher total leaf mass measured immediately before harvesting the tubers in all three varieties (1476. 7 - 2470.0 g/plant) compared to other treatments (1300.7-2359.3 g/plant). Treatment with an increased dose of nitrogen (150 N) had a positive effect on the growth of leaf mass in all three varieties. However, a higher dose of nitrogen only in variety 414 affected the increase in tuber yield (25.2 t•ha^{-1}) compared to other treatments. For Japanese (60.2 t•ha^{-1}) and Beauregard (38.9 t•ha^{-1}), increased nitrogen rates contributed to a decrease in total yield compared to the fertilization treatment with uniform NPK rates (66.6 t • ha^{-1}; 42.6 t•ha^{-1}). Poultry manure is not able to satisfy the plants needs for nutrients, so the tuber yields of all three varieties in this treatment are statistically lower. Regardless of the fertilizer treatment, the sensory properties of tubers depend on the characteristics of the variety. The marketable yield of Japanese (82.0-89.8%) and Beauregard (79.3-88.1%) is a quite uniform. The mentioned varieties have a significantly higher market yield compared to 414 (54.1-70.8%), and the reason is the proportion of small and tail roots, as well as tuber deformities. Based on the tasting panel, Beauregard received the highest rating, given that it is a commercial variety and is well known to consumers. After cooking, they have a soft consistency, with less fibers and veins, a pleasant aroma and a sweet taste, reminiscent of pumpkin. Japanese and 414 are less readily available for sale (mainly at local farms and markets), suggesting that advertising and tasting should attract consumers.

Key words: sweet potato, variety, fertilizer, morphological characteristic, yield

EFFECTS OF ACTIVE SUBSTANCE CHLOROTOLURON ON WHEAT

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ABSTRACT

Wheat (Triticum aestivum L.) plays a critical role in global agriculture, and herbicides used for weed control, particularly chlorotoluron, have significant effects on wheat. Although chlorotoluron is commonly used to control weeds in wheat, excessive use can lead to accumulation in the soil and toxicity in plants. Studies have shown that chlorotoluron creates oxidative stress in wheat plants, disrupting photosynthesis and negatively affecting plant growth. Additionally, organic matter in the soil that influences the absorption of chlorotoluron can reduce its accumulation and toxicity in plant tissues. However, further research on the toxic effects of chlorotoluron in plants and its environmental behavior is needed to understand the effects of herbicides better and reduce environmental damage. For these reasons, this review aims to provide information on studies and general knowledge related to chlorotoluron in wheat conducted to date.

Key words: Chlorotoluron, Herbicides, Triticum aestivum L.

QUALITY ASSESSMENT AND HEALTH BENEFITS OF GUEDILA NATURAL MINERAL WATER IN THE ARID REGION OF BISKRA-ALGERIA

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ABSTRACT

Natural mineral water is water with therapeutic properties recognized by law, and its designation does not necessarily imply a high mineral content. Originating from underground sources, it is better protected as it comes from very deep aquifers, and its composition is due to the environment from which it originates or with which it has been in contact. The aim of this study is to evaluate the quality of Guedila mineral water through physico-chemical and microbiological analyses of water samples, as well as to compare the results with Algerian standards. Our results showed that Guedila natural mineral water is of very good quality and suitable for human consumption. It is particularly beneficial for athletes, as it helps to combat acidity produced by muscles during exertion. It has a high calcium content, which plays an essential role in bone growth, muscle contraction, and tooth mineralization. Its great purity also makes it perfectly suitable for preparing baby bottles and for pregnant women.

Key words: Natural mineral water Guedila, Quality assessment, Physico-chemical analysis, Microbiological analysis, Biskra

THE STUDIES ON ABIOTIC STRESS INTERACTION WITH VERMICOMPOST IN CULTIVATED PLANTS IN SOLANACEAE

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ABSTRACT

A fertilizer is a material derived from natural or synthetic origin that is mostly applied to soil or to plant tissues to supply plant nutrients. With increasing concerns about environmental pollution and human health, trust in the synthetic fertilizers has decreased and the tendency to use the natural fertilizers has increased. One of the organic fertilizers is vermicompost. This fertilizer is obtained as a result of worms processing in the soil, or the nutrients presented to them, has been included in many scientific studies. Most of these studies are on the Solanaceae family members, which is considered as vegetables, medicinal-aromatic and ornamental plants. While most of these studies were conducted on plant productivity, some were carried out to determine whether it protects the plant against biotic or abiotic problems. In the studies on plant productivity, factors such as yield, plant height, flowering, fruit set, root, stem, tuber and leaf development are measured and evaluated. In terms of plant health, beside biotic factors, the effects of edaphic factors such as salinity and nutrient deficiency, and environmental factors such as drought, undesirable cold or hot climate conditions, and their interaction with vermicompost fertilizers have been investigated. In this review study, the data on abiotic stress interactions with vermicompost usage regarding the forms, times and results of applications on cultivated Solanaceae family vegetable plants such as tomato, pepper, eggplant, potato and ornamental Solanaceae plants such as petunia were focused and compiled.

Key words: Abiotic Stres, Vermicompost, Organic Fertilizer, Solanaceae, Plant Protection, Vegetable, Ornamnetal Plants

THE EFFECT OF BACTERIAL COATING AND STRATIFICATION TEMPERATURE TREATMENTS ON THE GERMINATION OF SEEDS OF ROSE HIP (Rosa canina L.)

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ABSTRACT

This study revealed the effects of different stratification temperatures and bacterial inoculation on the germination success of rosehip seeds belonging to the SRG17 genotype, which is superior in terms of fruit quality among the rosehip genotypes selected from Yozgat province. In the study, single, double and triple combinations of control, EM.A microbial fertilizer, hot and cold stratification treatments were used to increase the germination rates of seeds of the SRG17 genotype. As a result of the study, it was determined that the rosehip seeds germinated 17 days after sowing in the 4th (cold and humid stratification - 150 days), 6th (warm and humid stratification - 4 weeks and cold and humid stratification - 150 days) and 7th (EM.A microbial fertilizer + warm and humid stratification - 4 weeks + cold and humid stratification - 150 days) applications. The best result in terms of germination percentage was obtained with 9.58% from the seeds planted in the 6th application, that is, after 4 weeks of hot and humid stratification and 150 days of cold and humid stratification. In the measurements made on rosehip plants that were germinated and grown until the dormancy period, no statistical difference was found in terms of root collar diameter, stem number and shoot number. In terms of shoot length, the 6th and 7th applications (38.90±3.92 cm and 33.10±16.17 cm, respectively) were found to be statistically different from the 4th application (29.15±10.42 cm). In shoot diameter measurements, the 7th application was found to be statistically different from the other applications with the highest value of 2.49±0.57 mm. In terms of root dry weight, the 6th and 7th applications (7.27±0.65 g and 6.15±2.56 g, respectively) were found to be statistically different from the 4th application (5.46±1.87 g). At the end of the study, it was concluded that the best results on the germination success of different stratification temperatures and bacterial inoculation in the germination of seeds of the SRG17 rosehip genotype were obtained from the combination application of 4 weeks of warm and humid stratification and 150 days of cold and humid stratification.

Key words: Rosehip, Seed, Stratification temperatures, Bacterial inoculation

FIELD RESISTANCE OF BARLEY VARIETIES TO LEAF RUST

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ABSTRACT

Leaf rust is an economically important disease on barley in Bulgaria. Since cultivated barley Hordeum vulgare is considered nonhost or an intermediate type of host of leaf rust on wheat P. triticina and is to some extent attacked by this heterologous fungus as well, our studies were carried out in an infection field of Dobrudzha Agricultural Institute – General Toshevo, Bulgaria, where wheat, triticale and barley materials were planted. The study was conducted in three consecutive harvest years, and the infection load included the natural population of P. hordei and the artificial and natural population of P. triticina. Thirty-four barley varieties of Bulgarian and foreign breeding were subjected to screening for resistance to leaf rust. The final disease attack, the average coefficient of infection and the resistance rate of these varieties were measured. The varieties were divided into four groups depending on the manifested resistance to the pathogens. The four groups of varieties demonstrated different variations within the resistant type. Therefore, all investigated Bulgarian barley varieties, including also three varieties of foreign breeding, can be involved in breeding programs for developing of improved cultivars, which carry resistance to leaf rust.

Key words: Barley, cultivars, field resistance, P. hordei

EFFECT OF IRRIGATION REGIME, NITRATE NITROGEN FERTILIZATION, APPLICATION PHASE AND GENOTYPE ON QUALITATIVE AND QUANTITATIVE PARAMETERS IN COMMON WHEAT FOR INCLUSION IN AN ALGORITHM OF THE SYSTEM FOR INTELLIGENT MANAGEMENT OF AGRICULTURAL PROCESSES

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ABSTRACT

The drip irrigation has been used in recent years as a water and fertilizer saving technology. A three-year field experiment was conducted in the selection field of IPGR, Sadovo, in the period 2021-2023. The response of the two varieties of wheat to different irrigation rates and levels of nitrate nitrogen fertilization was tested. Eighteen fertilizing treatments were used in the experiment, including one-time, two-time and three-time application of the nitrogen fertilizer rate (17 kg N) in combination with a different irrigation regime - 10, 20 and 30 mm. Fertilizer and irrigation rates were applied in the stages of tillering, end of tillering, beginning of stem elongation and stem elongation. Grain virtuousness response and wet gluten yield were monitored. The obtained results show that the highest values of the virtuousness trait were obtained in the varieties Geya 1 and Sachets with an irrigation rate of 20 mm in combination with single and double application of nitrogen fertilization. In the wet gluten yield and its quality characteristics, the best results are available with the Sachets variety in the version with three times the application of the fertilizer and the maximum irrigation rate. The greatest influence on the traits of vitreousness and gluten relaxation is exerted by the interaction of genotype x the tested factors, with the rest - yield of wet gluten, dry gluten yield - the influence of the genotype is the leading factor. The year of cultivation is decisive for the number of baker's strength. Quality traits in wheat are controlled by a smaller number of genes, and the influence of nitrogen fertilization and irrigation rates in the set periods is weaker on their expression. The mathematical processing of the data was carried out using the program Microsoft Excel for Windows. The obtained results will be integrated into an algorithm of the system for intelligent management of agricultural processes.

Key words: smart farming, common winter wheat, quality, vitrification, wet gluten yield

STABILITY OF QUALITY TRAITS IN COMMON WINTER WHEAT GENOTYPES GROWN UNDER DIFFERENT NUTRITIONAL AND IRRIGATION REGIMES FOR INCLUSION IN AN ALGORITHM OF THE SYSTEM FOR INTELLIGENT MANAGEMENT OF AGRICULTURAL PROCESSES

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ABSTRACT

In the experimental field of the IPGR, Sadovo town. A three-year experiment with two varieties of common winter wheat grown under different nutritional and irrigation regimes was conducted in the field of IPGR, Sadovo, in the period 2021-2023. Eighteen fertilizing treatments were used in the experiment including single, double and triple application of nitrogen fertilizer (17 kg N) in combination with different irrigation rates of 10, 20 and 30 mm. The fertilizer and irrigation rates were applied at the tillering, end-tillage beginning-tillage and tillering phases. Grain vitreousness, wet gluten yield, gluten release, baking strength number and dry gluten were used to assess grain quality. The stability of the studied traits of two wheat cultivars, Geya 1 and Sashets, was evaluated by the stability variants σ^2_i and s^2_i according to Shukla (1972), the ecovalance Wi according to Wricke (1962) and the phenotypic stability criterion (Ysi) according to Kang (1993). IPCSSVKYSI (Interactive program for calculating Shukla's stability index (Ysi)) developed by Kang and Magari (1995) was used to determine the stability index. The most stable value for the parameters vitreousness, gluten release and dry gluten was characterized by the cultivar Sashetz under the variation with double fertilizer application rate and irrigation rate of 10 mm. Stability of the trait baking strength number was reported in Geya 1 in combination with double nitrogen application and minimum irrigation. Cultivar Sashets realized the highest stability of the trait wet gluten yield in the variant with single fertilizer application and maximum irrigation rate. The obtained results are useful from the breeding point of view for increasing the stability of quality traits. The data obtained from the different nutrient regimes can be incorporated into the algorithm of the intelligent agricultural process control system to achieve a consistency in the values of the studied parameters.

Key words: smart farming, common winter wheat, stability, quality indicators

HYDROCHEMICAL WATER QUALITY USE IN AGRICULTURAL ACTIVITIES IN THE NORTH-EAST OF ALGERIA: EL EULMA CITY.

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ABSTRACT

The study area is located at 25 km to El Eulma City, in the North - East of Algeria, where there exists a strong demand for water due to the socio-economic development of region. The development of agricultural has led to a notable use of water resources and lead farmers to use groundwater for irrigation of crops, which may affect the physico-chemical quality of groundwater and soil. In 2022, a sampling campaign conducted to assess the quality of groundwater for irrigation purposes. To achieve this objective, twenty groundwater samples were collected and analyzed for physical (pH, EC, TDS) and chemical (Na+, K+, Ca2+, Mg2+, HCO3−, Cl−, SO42−, NO3) parameters. The analysis results are processed using hydro-chemical and multivariate statistical methods. These analyses show that the tendency of the cations in the most samples are in the order of **Ca++ > Na+ > Mg++ > K+.** However, tendency of anions is in the order of **HCO3- > SO4-- > Cl-.** Evaluation of the water types using stabler diagram, show that the majority of the samples represents the **HCO3- Ca++** type of water. The suitability of groundwater for irrigation was determined according to a number of parameters such as salinity, sodium adsorption ratio, sodium percentage, residual sodium carbonate, permeability index, Kelly's ratio, potential salinity and magnesium hazard. The study concluded that the water from the study area is good and suitable for irrigation with few exceptions.

Key words: Groundwater, irrigation water quality, agricultural activities, facies, El Eulma City.

PRELIMINARY STUDIES ON THE FALL ARMYWORM SPODOPTERA FRUGIPERDA (J.E. SMITH, 1797) (LEPIDOPTERA: NOCTUIDAE) IN THE EAST MEDITERRANEAN REGION OF TÜRKIYE

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ABSTRACT

The fall armyworm, Spodoptera frugiperda, is an invasive and destructive pest insect that spreads to more than 100 countries within eight years. This pest was reported for the first time in Adana, Türkiye, in 2022 and, it has since spread to other regions of the Türkiye. To map the distribution of S. frugiperda, survey studies were conducted in both first and second-crop maize fields in the East Mediterranean Region of Türkiye in 2023-2024. For this aim, the provinces of Adana, Hatay, Mersin, and Osmaniye were divided into subregions, with particular consideration given to areas where maize cultivation is most concentrated. A total of 100 plants per field were inspected for infestations. The surveys revealed that this pest infested the first crop of maize grown in Adana and Hatay; for the second crop, the infestations extended to Adana, Mersin, Osmaniye, and Hatay. In the first crop maize, the infestation rate varied between 1% and 10%, but in some parts of the region, it can reach up to 100% in the second crop. Notably, S. frugiperda poses a significant economic threat to second crop maize in the East Mediterranean Region of Türkiye. This study is part of the Tübitak project, supported by grant number 1230957.

Key words: Fall armyworm, distribution, invasive pest, Türkiye

DETERMINATION OF MIXTURE RATIOS OF HUNGARIAN VETCH AND FORAGE PEA WITH OAT AND ITALIAN RYEGRASS

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ABSTRACT

Background: The suitable mixing ratios of annual legume forage plants, Hungarian vetch (Vicia pannonica Crantz.) and forage pea (Pisum arvense L.), which can be planted in winter and can be included in crop rotation, with oat (Avena sativa L.) and Italian ryegrass (Lolium multiflorum Lam.) from the forage grasses were investigated. In addition to determining the amount of fresh forage yield and hay yield, the study aimed to determine the quality of roughage. **Methods:** This research was carried out in the field of Thrace Agricultural Research Institute in Edirne conditions with three replications in a randomized block design for three years. In the experiment, Hungarian vetch (Vicia pannonica Crantz.) and forage pea (Pisum arvense Lam.), oat (Avena sativa L.) and Italian ryegrass (Lolium multiflorum L.) mixture ratios were used. Differences between physiological and morphological observations and yield and quality values in the experiment were made with variance analysis, and the subjects were classified with LSD test. JMP computer-aided statistics program was used in the statistical analysis of the research. **Results:** According to the study results; In legumes, plant height was found to be 30.80–96.80 cm and leaf/stem ratio was found to be 1.70–2.04. Total fresh forage yield was 752.19–5888.42 kg/da, dry forage yield was 151.24–1543.78 kg/da, crude protein ratio was 10.84–22.62%, crude protein yield was 30.63–208.51 kg/da, ADF was 22.93–40.56%, NDF was 31.33–58.88%, relative feed value was 92.23–210.73%. The highest yield for fresh and dry forage was obtained from the mixtures of 67% forage pea - 33% oat and 33% forage pea - 67% oat. **Conclusion:** As a result of three-year studies, when the mixture ratios are taken into account, higher yields were determined in the 33% forage pea - 67% oat mixture, 67% forage pea - 33% oat mixture and 33% Hungarian vetch - 67% oat mixtures, respectively. Legumes stood out in terms of roughage quality, while forage grasses stood out in terms of yield. Mixtures should be preferred to obtain high yield and quality roughage.

Key words: Hungarian vetch, forage pea, oat, italian ryegrass, mixture

THE POTENTIAL OF ALGAE BIOMASS AS AN AGRICULTURAL PRODUCT WITH AN INTEGRATED BIOREFINERY BUSINESS MODEL.

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ABSTRACT

Reconciling economic development with environmental sustainability is a key objective for the Baltic Sea regions, particularly in the context of sustainable agricultural practices. This study, based on the commitment to a sustainable, climate-neutral future as set out in the Smart Specialisation Strategy (RIS3), explores the potential of Baltic seaweed biomass as a renewable resource in sustainable farming. The aim of the study is to investigate the use of Baltic seaweed extract to improve the sustainability of organic farming practices, with a particular focus on its impact on plant growth in an integrated biorefinery business model. The study was conducted in two phases and preliminary results show the beneficial role of Baltic Seaweed Extract in sustainable agriculture. The extract shows promising effects on seed germination, root system quality, yield quality with longer shelf life, nutrient use, soil properties and overall plant health and growth. A notable finding is that the 12% seaweed extract concentrate significantly accelerated seed germination and improved drought stress tolerance, suggesting that the effectiveness of the concentrate starts at the 12% extract concentration. The study also investigates the bioenergy potential of seaweed biomass within an integrated biorefinery business model. Anaerobic digestion of algae for biogas production was shown to be a viable way to produce sustainable energy, improving the value chain by providing a renewable energy source while using the by-products of one process as feedstock for another. In particular, the experiment confirms that a fermentation system using Furcellaria lumbricalis algae detritus and waste from wine production is a promising project for biogas production. However, it also highlights the limiting environmental and social aspect related to the availability of algal detritus and seasonal inoculum. This study highlights the need for further research into the liquid by-products of seaweed processing and their use in sustainable agriculture. The results contribute to the broader goal of developing sustainable and climate-neutral agricultural practices by exploiting the untapped potential of Baltic seaweeds. By integrating algal biomass into the agricultural sector through a biorefinery business model, this study highlights the opportunity to create sustainable, economically viable solutions that contribute to sustainable food security for a growing population. Integrating biogas production from algal biomass into this model further improves the value chain, provides a renewable energy source and exemplifies circular economy principles. The results of the study justify the need for further research and development to fully exploit the potential of algae in agriculture, paving the way for a greener and more sustainable future.

Key words: Algae biomass, agricultural product, integrated biorefinery business model, algae extract.

THE ECTOPARASITES OF THE COMMON ANCHOVY ENGRAULIS ENCRASICOLUS L. 1758 CAPTURED IN THE ALGERIAN EASTERN COAST.

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ABSTRACT

The main objective of this study is to identify and inventory the ectoparasites of the common anchovy Engraulis encrasicolus Linneus 1758 captured on the Algerian east coast (El Kala) and the determination of their epidemiological index. To do this, we carried out a descriptive study of the parasitic fauna for a total of 202 individuals captured during December 2023. The epidemiological parameters (P: prevalence, I: average intensity and A: abundance) were calculated after identification of the collected specimens. The identification of the parasitic fauna of E. encrasicolus reveals the presence of 3 different categories of metazoans: monogeneans, copepods and crustaceans. Concerning infestation rates, monogeneans were the most dominant group (18.4%) followed directly by crustaceans (16.4%) while copepods represented only 8%. In terms of parasite loads and abundance, it is always the monogenean group that predominates.

Key words: Engraulis encrasicolus, epidemiological index, parasite, Algeria

THE ORGANOLEPTIC QUALITY OF THE EUROPEEN EEL ANGUILLA ANGUILLA CAPTURED IN TWO DIFFERENT ECOSYSTEMS (TONGA LAKE AND EL MELLAH LAGOON-NORTH EST OF ALGERIA)

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ABSTRACT

This study was carried out to investigate on seasonal variation some biochemical parameter in the muscle of Eel from Tonga lake (freshwater) and El Mellah lagoon (brackish water) in Algeria. Analysis of the various macronutrients showed that in both sites, total lipid levels are between 19.4% and 22.15% with a maximum in winter at Eels El Mellah. Findings indicated also that the two sites protein, ash, moisture and carbohydrate levels of Eel from Tonga present the maximum in spring and higher than in El Mellah. Qualitative analysis of fatty acids by gas chromatography revealed that the Eels captured in both lakes contain 23 fatty acids. The maximum rate of SFA observed for Eel El Mellah is 35.87% in winter and the maximum rate of UFA is 54.848% for Eel Tonga in spring. Among the saturated fatty acids, palmitic acid is majority and the maximum was observed in winter at Eels from El Mellah. Regarding the unsaturated fatty acids, the most dominant MUFA is oleic acid with a maximum rate of 36.968%for Eels of El Mellah in winter. At the level of PUFA, we only note the presence of linoleic acid and linolenic acid with a maximum observed 4,599 % (AL) and 2.872 % (ALA) for Eel from Tonga in winter and higher than in El Mellah. The n-3/n-6 ratio of Eel from Tonga is more important than El Mellah.

Key words: Anguilla anguilla,seasonal variation,fatty acids,Tonga,El Mellah

COMPARISON OF THE ANTIBACTERIAL EFFECTS OF SOME SOLVENTS OF COMMERCIAL ASTAXANTHIN ON AEROMONAS HYDROPHILA

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ABSTRACT

Aeromonas hydrophila is an important fish pathogen and causes serious economic losses especially in freshwater and brackish water under culture conditions. The aim of the present study was to determine the antibacterial effect of astaxanthin on the strains of A. hydrophila. The MIC values of astaxanthin were compared using different solvents. These included ethanol, water, and 2-propanol. Sick rainbow trout (Oncorhynchus mykiss) samples used in the study were obtained from a commercial trout farm. Body weights of the fish varied between 56 g and 225 g. After external findings observed in the fish were recorded, necropsy was performed on the fish and the findings detected in the internal organs were recorded. For bacteriological studies, liver, spleen, and kidney were inoculated onto petri dishes containing Brain Heart Infusion Agar (BHIA). After 72 h of incubation at 24 ± 2 °C, subcultures were made from the bacterial colonies that grown in the dishes. According to the morphological, physiological, and biochemical test results and API 20E rapid diagnostic kit results, 6 strains were identified as A. hydrophila. In the study, the commercial form of astaxanthin was used for the determination of its antibacterial effect. For this purpose, astaxanthin solutions were prepared using water, ethanol, and 2-propanol. The value at which bacterial growth was not observed was evaluated as Minimal Inhibition Concentration (MIC). According to the results of the study, it was determined that the solution of astaxanthin prepared with 2-propanol was effective on A. hydrophila, while the solution prepared with water did not have effective.

Key words: Aeromonas hydrophila, Rainbow trout, Oncorhynchus mykiss, Astaxanthin, Antibacterial effect

THE INFLUENCE OF HERBS AN ADDITIVE IN FEEDING TROUT FARMING IN A RECIRCULATING SYSTEM

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ABSTRACT

Plant supplements have been proven as particularly effective in improving both the composition and nutritional properties of feeds, and hence the growth and quality of the meat of the cultivated fish. Recirculating systems allow for a higher stocking density than other aquaculture systems, improve the conditions for growing aquatic organisms, and increase the efficiency of the farming process by removing undigested food, excrements, and external contaminants. In their research, authors use various plants, parts of plants, and extracts in different forms (water and alcohol extracts, essential and base oils) to find the beneficial effect on rainbow trout. Their results confirm the effect of garlic, ginger, oregano, and echinacea phytoadditives on growth indices and the feed coefficient in rainbow trout: better food assimilation, improved growth, and increased survival. The addition of dandelion extract to the extruded feeds for rainbow trout, grown in a recirculating system, reduces the lipid content by 18.7% and increases the protein content by 2.4% in the meat of the test group trout, compared to the values of these indicators in the control group fish. The addition of the algae increased the omega-3 fatty acid content in the fish meat. Despite the increasing number of these studies in different fish species, they are still insufficient and do not provide the necessary information in many aspects.

Key words: growth, feed, phytoadditives, trout

JUVENILES OF SCAD (Alepes djedaba) USING THE UMBRELLA OF THE JELLYFISH Rhopilema nomadica AS A SHELTER

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ABSTRACT

Rhopilema nomadica is considered one of the most dangerous invasive species in the Mediterranean. This species negatively affects the Mediterranean ecosystem, fishing, industrial facilities, tourism, and human activities in coastal waters. It has been determined that some juvenile fish are hiding under the umbrellas of these medusas drifting westward from the coast of Antalya during the winter and spring months. Thirty-three juvenile fish were detected on the R. nomadica sample having a bell diameter of 33 cm and weight of 6550 g in April. In identifying the species, it was determined that these juveniles belonged to Alepes djedaba. The average length and weight of these juveniles were determined as 44.54 mm and 1.38 grams, respectively. The smallest juvenile was found to be 23 mm in length and 0.14 g in weight, and the largest juvenile was 74 mm in length and 4.89 g in weight. According to these results, it can be said that in the Mediterranean ecosystem, R. nomadica contributes to the population increase of this fish by providing shelter to the juveniles of A. djedaba, which is also a Red Sea migrant.

Key words: Rhopilema nomadica, jellyfish, Alepes djadaba, shelter

ABUNDANCE AND BIOMETRIC CHARACTERISTICS OF RHOPILEMA NOMADICA (GALIL, SPANIER & FERGUSON, 1990) PASSING FROM GULF OF ANTALYA TOWARDS THE WEST.

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ABSTRACT

Rhopilema. Nomadica (Galil, Spanier & Ferguson, 1990) was initially observed in the Mediterranean Sea in the 1970s near the shores of Israel. It is classified as a Lessepsian jellyfish species. From the early 1980s onwards, these jellyfish have begun to gather in significant numbers near the shores of Israel, resulting in negative impacts on fisheries, tourism, the environment, thermal power plants, and human health. R. nomadica was not only found along the shores of Israel, but its presence also expanded to the coasts of Egypt, Palestine, Lebanon, Syria, Turkey, Greece, and Italy due to prevailing winds and current systems. The first detection on the Turkish coastline was on the eastern shores of the Göksu River between 1980 and 1982. R. nomadica, known for its crowd populations along the coasts of Israel, Lebanon, Syria, and the Gulf of Iskenderun, is shifting westward from the Gulf of Antalya coast between March and May. This movement is attributed to factors like global warming, eutrophication, overfishing, and a decline in its predators. Some of these jellyfish also enter the shallows of the gulf and cause concerns. In 2024, the first migration passings in the Gulf of Antalya started in late January and were completed in late April. The population density in the Gulf increased for 1 individual per 10 m2 between March and April. In 2 samplings carried out between February and April, a total of 44 individuals were taken and transported to the research laboratory in Akdeniz University Faculty of Fisheries. The average weight of the R. nomadica species migrating through Antalya Bay was found to be 3780.11±304.85g, with a mantle diameter (mean±SE) of 37.25±1.40cm.

Key words: Rhopilema nomadica, biometric characetistics,

BIO-ECOLOGY OF THE BLEU CRAB CALLINECTES SAPIDUS RATHBUN, 1896 (DECAPODA: BRACHYURA: PORTUNIDAE) CAPTURED IN MELLAH LAGOON (ALGERIA)

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ABSTRACT

Callinectes sapidus is a coastal species that can be considered a catadromous, often found in freshwater. The analysis of the metric characteristics of C. sapidus allowed us to determine the nature of the allometry between the width and the weight of the crab. Generally, the variation in sex ratio shows an apparent dominance of females, with an overall ratio around 64,28 % in favor of females. The study of the distribution of sexes and the size-weight relationship of the specimens reveals interesting trends. For the entire population, the length-weight relationship is described by the equation: $y = 4.436x + 0.48$; however, when examining the sexes separately : females exhibits a length-weight relationship characterized by the equation $y = 1.005x + 0.818$, while this relationship is represented by $y = 8.107x + 1.047$ for males. These results suggest disparities in growth and development between the sexes. It is possible that these differences are related to reproductive strategies and specific energy needs of each sex. further study could shed light on the underlying mechanisms of these variations and their implications for crab population dynamics.

Key words: alien species, growth, PNEK, south mediterranean

AGE AND GROWTH OF THE DEEP-WATER PINK SHRIMP PARAPENAEUS LONGIROSTRIS (LUCAS, 1846) CAUGHT OFF THE EASTERN ALGERIAN COAST.

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ABSTRACT

The age and growth of the deep-water pink shrimp Parapenaeus longirostris (Lucas,1846) from the Eastern Algerian coast (Gulf of Annaba) were studied to address the lack of data concerning the exploitation of this species in the region. During the period from November 2022 to January 2024, we analyzed a total of 899 individuals, 593 females and 305 males (64 ≤ TL ≤ 153 mm, 12 ≤ CL ≤ 45 mm, and 2.6 ≤ TW ≤ 15.6 g). According to Bhattacharya' s method (1967), the lifespan of the shrimp, regardless of sex, was estimated to be 5 years. The three Von Bertalanffy parameters were: $L\infty$ = 47.25 mm with K = 0.59 year^{-1} and t_o = -0.21. The length-weight relationship revealed a negative allometric growth, where weight increases less rapidly than length (b = 2.47). The asymptotic weight $W\infty$ was estimated at 20.77 g.

Key words: Parapenaeus longirostris, age, relative growth, weight growth, Gulf of Annaba

COMPARISON OF ORIGINAL EQUIPMENT MARKET FILTER AND UNORIGINAL AFTERMARKET FILTER PERFORMANCES FOR THE DRINKING WATER PURIFICATION SYSTEMS: FROM THE PERSPECTIVE OF ACCUMULATIONS OF POTENTIALLY TOXIC ELEMENTS

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ABSTRACT

Household Drinking Water Purification Systems (WPS) enable us to produce healthy and high-quality water in our homes. However, in this application, it is very important to maintain our device and change its filters periodically. Original equipment market (OEM) filters are those that are manufactured and sold by the same manufacturer as the original equipment piece. On the other hand, unoriginal aftermarket (UAM) filters are those that have not been made by the same manufacturer but have been fashioned to fit as well as the original parts. In this study, the performances of OEM filter and UAM filter for one of the most popular WPS in Türkiye were evaluated. Unpurified and purified tap water samples were taken from İstanbul Province in winter season of 2021. Four significant potentially toxic elements including nickel (Ni), arsenic (As), cadmium (Cd) and lead (Pb) were measured in drinking water samples and how much the WPS with OEM and UAM filters improves these parameters were determined. As a result of this research, it has been clearly demonstrated that the OEM filtered WPS significantly improved the drinking water quality by decreasing the total elemental content approximately 50%, while the UAM filtered WPS did not improve the water quality, and even increased the levels of many pollutant parameters in the water (total elemental content increased by approximately 30%).

Key words: Water purification systems, OEM – UAM filters, Potentially Toxic Elements

RESPONSE OF ARTEMIA PARTHENOGENETICA FED ON DIFFERENT FEEDS

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ABSTRACT

Artemia is a necessary live food for a successful larval culture of many fish and crustaceans which has good adaptability with a broad food spectrum. Information on the response of Artemia to different feeds on a laboratory scale provides basic information, especially in enrichment cases. The present research was conducted at the CNRDPA Laboratory under standard conditions. Artemia parthenogenetica were fed on three different diets, Micro-algae with Dunaliella sp, the second treatment were fed on yeast, and the last on the Ulva lactuca powder. A statistical analysis was used to compare Artemia growth between various feed treatments. a significant difference in total length was observed between the three treatments for the juvenile stage and the adult stage where the yeast-fed nauplii became adults after only 15 days of culture with an average total length of 7.2 mm compared to the individuals from the 2nd batch (fed by the algal powder) with an average total length of 4.5 mm and individuals from the 3rd batch (fed by the micro-algae) with an average total length of 5.3 mm. The growth rate of Artemia individuals fed with yeast was more important for the juvenile and adult stages with values of 1.9 mm/Day and 0.3 mm/Day, respectively unlike the individuals fed with Ulva powder (0.3 mm/Day and 0.09 mm/Day for juveniles and adults, respectively) and individuals fed with micro-algae (0.7 mm/Day and 0.28 mm/Day for juveniles and adults, respectively). Regarding the survival rate, individuals fed with micro-algae have an important final survival rate (75%) compared to individuals fed with yeast (45%) and individuals fed with Ulva powder (20%). Artemia adopts a strategy of responding to different food conditions, it takes more time to reach an adult size for a high survival rate.

Key words: Dunaliella sp, growth, Micro-algae, Survival rate, Ulva lactuca, yeast

EVALUATIONS OF THE BIOLOGICAL ASPECTS OF THE EUROPEAN EEL (ANGUILLA ANGUILLA) LOCAL STOCK AND THE SILVERING PROCESS, IN THE KARAVASTA LAGOON, ALBANIA.

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ABSTRACT

The European eel, Anguilla anguilla, is currently facing a critical endangerment primarily due to fishing activities and the numerous obstacles it encounters on its journey to its breeding area. Initiated in 2022, this research is a component of a thorough three-year study and serves as the primary exploration of the European eel population in the South-Eastern area of the Adriatic Sea. The present research was conducted in the Karavasta lagoon, in the Albanian territory, where a total of 140 eel specimens were collected by the end of December 2023 using a fyke-net barrier placed both upstream and downstream of the fish barrier, a common method used to capture this species in Albanian lagoons. This phase of the study focuses on biological aspects such as the distribution of length and weight frequencies, as well as the sex ratio of the eels. Furthermore, parameters like eye diameter, pectoral fin length, and Hartmann's index were analyzed to determine the maturity stage of the eels. At the same time, the health status of migratory silver eels was assessed, with special attention paid to parasitic infestations with the nematode Anguillicola crassus. The results from this part of the research indicate a negative allometric growth and a bimodal distribution among the samples. It is worth noting that the eels did not display any signs of parasitic infestions, as none of the 140 individuals were found to be infested with the nematode Anguillicola crassus. As the study progresses to include additional parameters for future examination, it is expected that valuable insights will be obtained regarding this specific area of the Adriatic Sea, which has not been thoroughly investigated in relation to the European eel.

Key words: European eel; length frequency; stock; growth.

DETERMINATION OF THE WATER FOOTPRINT OF KINOA PLANT UNDER NEVŞEHİR CONDITIONS

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ABSTRACT

Quinoa is an annual crop known for its resistance to various stress factors such as drought, frost, salinity and high radiation. However, its high protein content and antioxidant properties make quinoa an important human food. Nevşehir does not have a very high potential considering its climate and water resources. The region receives an average annual rainfall of 300-400 mm. This makes it impossible to grow the majority of crops with rainfall alone. Irrigation is necessary in most cases. However, insufficient water resources and low water quality limit irrigation. The main crops grown in Nevsehir (wheat, potatoes, dry beans, dried beans, and pumpkin) are crops that need irrigation. The agricultural production potential of the region can be increased with an efficient irrigation and plant diversity planning. In this sense, quinoa is a plant with high potential for Nevşehir. Quinoa cultivation can be beneficial in irrigated or marginal agricultural areas of Nevşehir. The amount of land suitable for agriculture but not used in Nevşehir is 234 455 decares. In this study, it was investigated how much water footprint the cultivation of quinoa in Nevşehir conditions would cause. For this purpose, the amount of land that is suitable for agriculture and cannot be used in Nevşehir was considered as quinoa cultivation area. In the study, the green and blue water footprint of quinoa was calculated. The amount of water required to produce 1 ton of quinoa in Nevşehir was found to be 1575 m3 ton-1. As a result, the total water footprint of quinoa was determined as 110 900 m3. The fact that quinoa has a low water requirement and water footprint in Nevşehir compared to other crops suggests that its cultivation in the region would be beneficial. Currently, there are no studies on the cultivation of quinoa in Nevsehir and it is not produced by producers. This study has shown that the production of quinoa in Nevsehir would be very productive for marginal and arid fields in the region. Quinoa cultivation is recommended for producers in the region.

Key words: Green water footprint, blue water footprint, effective rain, virtual water content

CURRENT STATUS AND POTENTIAL APPLICATION OF MICROALGAE PRODUCTION

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ABSTRACT

Microalgae production has garnered significant attention across various industries due to its diverse applications and potential benefits. This study explores the current status and potential applications of microalgae production, focusing on its role in biodiesel production, cosmetics, thalassotherapy, bioremediation, and feed materials. The high lipid content of certain microalgae species makes them a promising source for sustainable biofuels, while their utilization in cosmetics and thalassotherapy underscores the value of microalgae-derived compounds in high-value products. Microalgae are also being explored for bioremediation purposes, particularly in treating textile wastewater, showcasing their versatility in environmental applications. Genetic engineering strategies are being developed to enhance biofuel production by increasing lipid accumulation in microalgae strains.

Key words: Microalgae, feed, food, biofuel, treatment, waste

THE AGRICULTURAL USE OF BIOMASS: TRANSFORMING WASTE INTO RESOURCE

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ABSTRACT

The agricultural use of biomass represents a vital strategy for enhancing sustainability, improving waste management, and reducing greenhouse gas emissions in farming practices. Biomass, derived from organic materials such as crop residues, animal manure, and dedicated energy crops, can be converted into renewable energy, soil amendments, and other valuable products. This approach not only mitigates environmental impacts but also supports the transition to a circular economy by repurposing agricultural waste. Technologies such as anaerobic digestion, pyrolysis, and fermentation play a crucial role in efficiently converting biomass into bioenergy and bio-based products, contributing to the resilience and productivity of agricultural systems. Furthermore, the adoption of biomass technologies promotes rural economic development, creating jobs and stimulating local economies. However, to fully realize the potential of biomass in agriculture, ongoing research, technological advancements, and supportive policies are essential. This abstract provides an overview of the benefits, challenges, and future prospects of biomass utilization in agriculture, highlighting its role as a cornerstone in the transition towards more sustainable and climate-resilient farming practices.

Key words: Biomass, agricultural, use, energy

THE ECTOPARASITES OF THE COMMON ANCHOVY ENGRAULIS ENCRASICOLUS L. 1758 CAPTURED IN THE ALGERIAN EASTERN COAST.

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ABSTRACT

The main objectives of this study is to identify and inventory the ectoparasites of the common anchovy Engraulis encrasicolus Linneus 1758 captured on the Algerian east coast (El Kala) and the determination of their epidemiological index. To do this, we carried out a descriptive study of the parasitic fauna for a total of 202 individuals captured during December 2023. The epidemiological parameters (P: prevalence, I: average intensity and A: abundance) were calculated after identification of the collected specimens. The identification of the parasitic fauna of E. encrasicolus reveals the presence of 3 different categories of metazoans: monogeneans, copepods and crustaceans. Concerning infestation rates, monogeneans were the most dominant group (18.4%) followed directly by crustaceans (16.4%) while copepods represented only 8%. In terms of parasite loads and abundance, it is always the monogenean group that predominates.

Key words: Engraulis encrasicolus, epidemiological index, parasite, Algeria.

EVALUATING THE EFFECT OF VARIOUS TREATMENTS ON THE DIATOM HASLEA OSTREARIA (SIMONSEN, 1974) FOR ACHIEVING AXENIC CULTURES

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ABSTRACT

Axenic microalgae cultures are needed for several applications: genetic research, chemical exploration, aquaculture, and the study of interactions between microalgae and bacteria. Eliminating bacterial contamination while preserving the vitality of microalgae remains a considerable challenge. In this study, we focused on Haslea ostrearia, a highly coveted diatom known to produce the valuable blue pigment "marennine", responsible for oyster greening. To establish axenic cultures of the diatom Haslea ostrearia, we cultivate the strain NCC 527 (HoB4) in ASW medium at 19 °C with a 16-hour light and 8-hour dark photoperiod. Various treatments were tested: sonication, centrifugation, filtration, the use of detergent, and antibiotics. We evaluated the diatom response to these treatments and estimated the elimination of bacterial contamination. The results showed that physical treatments are moderately efficient. The sonication treatment effectively eliminates bacterial aggregates, but it also affects cell survival; 15 minutes of sonication reduced bacterial aggregates, but only 21.6% of cells remained motile and alive. Repeated centrifugation two times for 10 minutes allowed a moderate 49.9% reduction of bacteria. Treatment with Triton-X100 had a lethal effect on Haslea ostrearia. Filtration treatments decreased bacterial contaminants by only about 5%. We performed an analysis of variance (ANOVA) to compare diatom densities after treatments and bacterial removal. We also investigated the diatom's growth after physical treatments and performed a comparison test between densities according to culture days. Repeated centrifugation and supernatant renewal appear to be less aggressive treatments on the diatom, with high bacteria removal without severely impacting the diatom cell density or growth. However, these physical treatments were not enough to produce total bacterial elimination. Combining antibiotic treatment with centrifugation and rinsing proved to be more effective, decreasing bacterial contamination while preserving diatom cells. We controlled the removal of bacterial contamination by using molecular techniques targeting 16S rRNA, along with colony counting and liquid medium inoculation. This work establishes the foundation for the development of an optimal protocol for Haslea ostrearia axenic culture in the future.

Key words: axenic cultures, growth analyses, decontamination, DNA, molecular test.

CHEMICAL AND BIOLOGICAL CONTROL OF LEUCOSTOMA PERSOONII CAUSING CANKERS AND DRYING IN APRICOT

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ABSTRACT

Leucostoma persoonii (Leucostoma Canker) is a highly significant fungal disease worldwide, causing reduced yield, cankers, and tree mortality in areas where stone fruit production occurs. Studies conducted in Turkiye have demonstrated significant losses in various stone fruit species, including apricots, attributed to this disease. This study was conducted in Malatya province, which is the most intensive area for apricot production in Turkiye, during the years 2021-2022. This research aimed to test the efficacy of certain chemical and biological preparations against L. persoonii, which causes significant economic losses due to cankers and drying in apricot trees, both in vitro and under field conditions. To achieve this goal, pathogenicity tests were initially conducted using the Hacıhaliloğlu apricot variety according to the cut branch test method, and the most virulent L. persoonii isolate was identified. Subsequently, the efficacy of 10 chemical and two biological fungicides against the most virulent L. persoonii isolate was tested both in vitro and under field conditions. The biological fungicides included in the study were only tested under field conditions in terms of their efficacy. In the in vitro tests conducted for disease control, the fungicides that most effectively inhibited the mycelial growth of L. persoonii were tebuconazole (99.11%), floupyram + tebuconazole (99.03%), thiophanate-methyl (88.79%), cyprodinil + fludioxonil (85.66%), and azoxystrobin + difenoconazole (76.76%). In comparison, metalaxyl-m + acibenzolar s-methyl (5.20%) did not show significant success in inhibiting the mycelial growth of L. persoonii. Other fungicides exhibited success rates ranging from 29.62% to 61.05% in inhibiting mycelial growth. The top four fungicides showing high efficacy under in vitro conditions were selected for their potential to prevent infections caused by L. persoonii in apricot seedlings under field conditions. Additionally, Bacillus subtilis and Trichoderma harzianum Rifai KRL-AG2 commercial biopesticides were included with these selected fungicides, and their efficacy against L. persoonii under field conditions was tested. Efficacy studies of the fungicides were conducted using two different methods, both before and after pathogen inoculation. Among the chemical fungicides, tebuconazole and the commercial biopesticides of B. subtilis and Trichoderma harzianum Rifai KRL-AG2 were effective in disease control both before and after inoculation. In contrast, thiophanate-methyl, floupyram + tebuconazole, and cyprodinil + fludioxonil were effective only before inoculation.

Key words: Biocontrol, chemical control, canker, Leucostoma persoonii

FLORA AND VEGETATION OF VJOSA RIVER, PROTECTED LANDSCAPE

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ABSTRACT

The Vjosa river flows from the Pindus mountains in Greece, to the river mouth in Albania. The river stretches for 270 km in total and 200 km are flowing in the Albanian area. Vjosa valley is a well-known area for its unique flora and habitat diversity. The floristic composition of Vjosa valley consists of 228 species belonging to 67 families, Lamiaceae and Asteraceae were the dominating families in the study area. According to the Raunkiaerian life form H-hemicriptophytes (40 %) were dominant followed by P-phanerophytes (26 %). Chorological characteristic of the recorded flora showed that Mediterranean and European are dominat. In this study we figure up the riverine vegetation highlighting current conservation status, there are 26 plants that have statues regarding IUCN. Some species in this area are very rare for Albania; others have important scientific value, some of them are widely used in economics as medicinal, aromatic, industrial and ornamental plants. The vegetation is characterized by associations typically of wetlands, riverbanks and forests. However, our results should be complemented with: (i) studies on other techniques of riverbank protection (ii) hydro biological surveys to evaluate the influence of the riverbank protection type in order to assess the ecological functions of these restored ecosystems.

Key words: Vjosa river, pindus mountain, raunkier, ornamental plants, riverine

TAILORED ELECTRON BEAM-IRRADIATED HYDROGELS FOR SUSTAINABLE AGRICULTURE

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ABSTRACT

Water resource depletion, reduced rainfall, and soil desertification due to excessive exploitation are critical factors contributing to the degradation of agricultural lands [1]. The connection between water scarcity and plant water stress is well-known, leading to impaired plant growth and reduced crop productivity [2-4]. Hydrogels represent a viable solution for mitigating water stress in crops under drought conditions by enhancing water use efficiency, reducing losses, and restoring soil quality [1,5]. The purpose of this study is the development of natural-inspired hydrogels through cross-linking and grafting reactions induced by electron beam irradiation. Solutions containing 0.5% sodium alginate, 20% acrylic acid, and 0.1% poly(ethylene oxide) were prepared, with the initiator of potassium persulfate at different concentrations (0.1-0.3%). These monomeric solutions were irradiated using an electron beam of 5.5 MeV in range doses of 5 to 20 kGy at a dose rate of 0.9 kGy/min. The influence of irradiation dose and initiator concentration on hydrogel structure, morphology, and network formation was investigated by sol-gel analysis, network parameter evaluation, Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). The study identified that a concentration of 0.1% initiator combined with irradiation doses of 5 and 10 kGy yielded hydrogels stable in the swollen state, with the most suitable gel fraction, cross-linking densities, and mesh sizes for agricultural water management.

Key words: hydrogels, electron beam irradiation, potassium persulphate

POTENTIAL OF NATURAL-INSPIRED HYDROGELS IN AGRICULTURE: A FOCUS ON DIFFUSION MECHANISMS

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ABSTRACT

Hydrogels used in agriculture require specific properties, including high water absorption capacity, low soluble content, swelling stability, biodegradability, and reusability across multiple swelling-desorption cycles. Hybrid hydrogels synthesized by electron beam cross-linking of sodium alginate grafted with acrylic acid hold promise for long-term plant water stress reduction. This research investigates the swelling capacity and water diffusion mechanisms of such hydrogels in three water types: distilled water, tap water, and rainwater. Thus, the influence of swelling media pH and content of macro- and micro-element content of each water on the swelling degree and diffusion mechanism of hydrogels was explored. The results revealed that the order of decreasing swelling was: tap water > distilled water > rainwater. The swelling exponent values (ranging from 0.61 to 0.99) indicated a non-Fickian diffusion mechanism, characteristic of cross-linked hydrogels. The diffusion coefficient depended on the sodium alginate concentration, irradiation dose, mesh size, and pH of the swelling media.

Key words: diffusion mechanism, electron beam irradiation, hydrogels, swelling kinetics

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THE EFFECT OF PHOSPHORUS FERTILISATION ON ESSENTIAL OIL YIELD OF LAVENDER PLANT (LAVANDULA ANGUSTIFOLIA MILL.) IN CALCAREOUS SOILS

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ABSTRACT

The primary purpose of our study is to determine the effects of different doses of phosphorus fertilization on the development and essential oil yield of lavender and to determine the phosphorus doses required to obtain the best yield in the Lavandula Angustifolia mill. variety. The study was established and conducted in Niğde Ömer Halisdemir University, Faculty of Agricultural Sciences and Technologies, medicinal plants application area according to the randomized blocks experimental design with three replications. The experimental area established with lavender Angustifolia Sevtapolis species was divided into plots as P0: 0 kg P2O5/Da, P6: 6 kg P2O5/Da, P12: 12 kg P2O5/Da, P18: 18 kg P2O5/Da, P24: 24 kg P2O5/Da, and phosphorus fertilization in the form of triple superphosphate (42-44%) was applied twice before lavender planting and in March 2023 in accordance with the experimental design. The average plant height of lavender was 59,997cm, and the longest plant height was 61,522cm in the P6 group. The shortest plant height was 56,289cm in the P0 group. In our study, the average fresh and dry flower yields of lavender plants were 131.48kg/ha and 111.22kg/ha, respectively. The highest fresh and dry flower yields were 144,49kg/da and 121,60kg/da in P6 group, while the lowest yields were 122,33kg/da and 102,87kg/da in P0 group. In lavender plants with an average essential oil yield of 3,757kg/da, the highest essential oil yield was found in P6 group (4,550kg/da) and the lowest essential oil yield was found in P0 group (3,182kg/da) and the difference between the groups was significant ($p<0,001$).

Key words: Lavender, Angustifolia Sevtapolis, phosphorus fertilization, essential oil, yield.

PRECISION APPLICATION TECHNIQUES: ENTOMOPATHOGENIC NEMATODES

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ABSTRACT

Entomopathogenic nematodes are biological control agents that actively participate in alternative, integrated pest management methods, effectively targeting nearly all underground pests. Unlike chemicals, entomopathogenic nematodes are living organisms, necessitating consideration of specific parameters during application due to their non-homogeneous suspension. Improper applications result in both time and financial losses. A precise application becomes crucial because entomopathogenic nematodes are more expensive than chemicals. Precision agriculture involves applying the right input, in the right amount, to the right place, at the right time, and in the right manner. With advancing technology, robotic systems have proliferated and are being increasingly utilized across all aspects of agriculture. While traditional methods for applying entomopathogenic nematodes are recommended, numerous instances of incorrect application exist. This study compiles various application techniques for entomopathogenic nematodes alongside contemporary technologies and interprets the results. The aim of this study is to highlight biological control and promote the widespread adoption of entomopathogenic nematodes.

Key words: Biological control, Entomopathogenic nematode, Precision agriculture

OBSERVATION AND MEASUREMENT OF DIFFERENT BUD STAGES ON NIĞDE APPLE

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ABSTRACT

Apple (Malus domestica Borkh.) is an important species for agricultural production both for Niğde and Türkiye. Niğde is the third province in Türkiye and Türkiye is the second in the world to apple production quantity after China. Niğde apple has grown for years in the Niğde region and public awareness and scientific research in the past 5 years has increased related to it. Deciduous fruit trees pass through a series of definite growth steps or stages in the spring. The stages of buds are an important element to determine the growth steps. Apart from determining to time of agricultural practices, it also served to indicate the earliness status of varieties, cultivars, or genotypes. In this study, we observed different bud development stages of the 48 Niğde apple genotype under the same environmental conditions for three years. Seasonal developments of buds are divided into 9 different stages: Dormant (1), silver tip (2), green tip (3), half-inch green (4), tight cluster (5), pink (6), bloom (7), petal fall (8), fruit set (9). Each genotype was evaluated separately. 'Green tip' is important due to the first stage for the opening of the bud as well as the "bloom" is important thus it indicates the emergence of the flower and flowers tend to be more vulnerable after blooming to lower temperatures. According to the results of statistical analysis, genotypes showed 6 groups in the green tip stage and 11 groups in the bloom stage.

Key words: Niğde Apple, malus domestica, bud stages, apple, genotypes

ARTIFICIAL INTELLIGENCE IN AGRICULTURE: TRANSFORMING AGRICULTURAL PRACTICES WITH INTELLIGENT SYSTEMS

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ABSTRACT

Artificial intelligence is the function of transferring the human brain's function of thinking, understanding, perceiving and inferring from past information to machines and systems. With the rapid development of technology, artificial intelligence applications are used in many fields such as health, finance, education, security and especially agriculture. The increasing demand for food with the continuous increase in the global population, the gradual decrease in natural resources and changing climatic conditions make the use of artificial intelligence in agriculture inevitable. Traditional agricultural practices are gradually being replaced by modern agricultural technologies supported by artificial intelligence due to their high costs, low productivity and environmental impacts. In this new era, AI applications come into play in a number of critical issues such as optimization of agricultural inputs, increasing crop yields, efficient use of water resources, protection of biodiversity and combating climate change. AI also plays an important role in areas such as the efficient use of scarce resources, sustainability and ensuring food security. Artificial intelligence offers many innovative solutions in agriculture, especially using machine learning and deep learning algorithms. These algorithms process large datasets to predict crop yields, diagnose plant diseases, manage smart irrigation systems, classify plant species and determine optimum temperature conditions. It also analyzes agricultural risk factors, optimizes intervention times, classifies crops by quality, adjusts variable rate spraying and fertilization schedules, and develops data-driven decision support systems. Supply chain optimization and agricultural robots are also important applications of AI. For example, agricultural robots collect data on plant health through GPS and sensor technologies, automate harvesting processes and manage field operations more efficiently.
In this study, the use of agricultural artificial intelligence in the sector and in the literature was semantically scanned and categorized according to their usage areas. According to the information obtained, the advantages provided by artificial intelligence increase the sustainability of agricultural production and strengthen the security of food supply. However, the applicability of these technologies depends on the existence of the necessary infrastructure and technical knowledge. Countries need adequate technological infrastructure, trained workforce and investment to integrate AI-enabled agricultural technologies. In this process, collaborations between governments and the private sector, the development of innovation ecosystems and regulations for these new technologies are of great importance. The effective use of AI and related technologies in agriculture is critical for future food security and environmental sustainability. These technologies enable us to increase agricultural productivity while at the same time reducing our environmental footprint and supporting a greener, more sustainable future. Therefore, the deployment of AI applications in the agriculture sector plays a vital role in securing the global food supply and tackling global challenges such as climate change.

Key words: Agricultural artificial intelligence, Machine learning, Deep learning, intelligent systems

EFFECT OF COTYLEDON LEAF DAMAGE ON SEEDLING GROWTH IN COTTON

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ABSTRACT

Cotyledons are the first photosynthetic organs of plants and play an important role in seedling growth. However, various biotic and abiotic factors can damage cotyledons shortly after seedling emergence. In this study, which was conducted to determine the effect of cotyledon damage on seedling development in cotton plants, one (50% damage) and two (100% damage) of the cotyledons were removed from 15-day-old seedlings grown under laboratory conditions (when the first true leaf was just beginning to appear). No cotyledon leaf damage was applied to the control group. Three weeks after the cotyledon removing, shoot length, root length, stem diameter, number of leaves, shoot fresh and dry weight, and root fresh and dry weight were measured. The results showed that shoot length, root fresh and dry weight increased in seedlings with a single cotyledon, while root length, stem diameter, shoot fresh and dry weight decreased. There was a significant decrease in the measured characteristics except for the number of true leaves in seedlings with both cotyledons removed. This decrease was 25% in shoot length, 21% in root length, 59% in shoot fresh weight, and 41% in root fresh weight. The number of leaves was not affected by cotyledon removing. It was concluded that cotton seedlings could relatively tolerate the loss of one of the cotyledonary leaves, but seedling development without cotyledons was significantly depressed.

Key words: Gossypium hirsutum L., cotyledon damage, seedling development

A DNA-BASED APPROACH FOR DUS TESTS: MOLECULAR MARKERS

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ABSTRACT

Plant variety protection was implemented initially by registration of seeds by the Distinctness, Uniformity, and Stability (DUS) testing criteria. Since the late 90s, discussion of DUS criteria inefficiency and searching for a novel DNA-based method has shown up. The inefficiency of DUS criteria with the amount of time and cost needed for every step of field testing regarding the thousands of plant registrations every year makes the process debated. Also defining, characterizing, and distinguishing plants solely based on phenotypic and biochemical standards are not reliable. Recent advancements in the biotechnology area have led to the registration system in another way. The International Union for the Protection of New Varieties of Plants (UPOV) has proposed the use of molecular markers to address these constraints. Contrary to traditional DUS tests, the application of molecular markers pointed to significant advancement. Some molecular markers such as Single Nucleotide Polymorphisms (SNP) and Simple Sequence Repeats (SSRs) provide greater precision and annihilate one of the main hesitations; what if the chosen marker is not related to phenotype? There are case studies so far in crops like corn, wheat, rice, and others that have shown better performance than standard DUS traits to distinguish and fit pedigree information. Despite these advancements, adoption of molecular markers in DUS testing faces several challenges, including the need for standardized protocols and the development of robust marker-trait associations. Additionally, the cost and infrastructure requirements for these technologies pose significant barriers, particularly in developing countries. Continuous research and international collaboration are essential to harmonize protocols and ensure the reliable use of molecular markers in DUS testing across different crops and regions. This review provides a comprehensive overview of the current practices, challenges, and future directions for molecular marker utilization in DUS testing, emphasizing the need for ongoing innovation and collaboration in this field.

Key words: DUS test, molecular marker, UPOV, plant variety protection

MEETING THE ENERGY NEEDS IN LIVESTOCK ENTERPRISES WITH HYBRID RENEWABLE ENERGY SYSTEMS AND ITS ENVIRONMENTAL EFFECTS

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ABSTRACT

The most important way to combat global climate change is to use renewable energy sources as much as possible instead of traditional energy. Using renewable energy sources instead of fossil energy makes a significant contribution to countries' energy policies in every field. Due to our country's location in the world, it is in a very good situation in terms of solar energy and wind energy in coastal areas. It is suitable for generating electrical energy with wind turbines and solar panels. In this context, in the Marmara Region, renewable energy sources can be used in livestock enterprises that are far from settlements and the electricity grid. A fan-pad system will be applied to ensure appropriate environmental conditions in animal barns. For this reason, an evaporative fan-pad system was designed in animal barns in Tekirdağ conditions. There are 70 cattle in the barn where the project will be carried out and the dimensions of the barn are 10.4 x 46.1 (479.4 m2). To cool this barn, a pad area of 19.2 m2 is required and a 0.2 kWh circulation pump is required to cycle the water to evaporate. The number of aspirators to be used in ventilation is 9 and their efficiency is 9500 m3 h-1. Electricity consumption is 0.75 kWh. The power value calculated in the ventilation and cooling system is 6.95 kWh. However, solar and wind energy production systems change throughout the day. For this reason, a system of 9-10 kWh, which is 25-30% more than the calculated power, should be installed. 5 kWh of this should be solar panels and 5 kWh should be wind turbine systems. With a 5 kWh solar panel system, 10.035 kWh of electrical energy can be obtained per year, and with a wind turbine system, 9.125 kWh of electrical energy can be obtained per year. With this hybrid system, a total of 19.160 kWh of electrical energy can be produced annually. This will prevent the release of 18010.4 kg (19160 x 0.94 = 18010.4 kg) of CO2 gas into nature. A 10 kWh hybrid energy system in Tekirdağ conditions prevents significant CO2 gas emissions into the atmosphere.

Key words: Hybrid energy, Animal barn, Wind turbine, Solar panel, Fan-pad system

STOMATA AND PHYSIOLOGICAL PARAMETERS IN TWO AND SIX-ROWED BARLEY (HORDEUM VULGARE L.) GENOTYPES

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ABSTRACT

Barley is one of the important field crops used in producing malt and food and feed for human and animal food. It is widely produced in different regions of the world because it adapts well to various environmental conditions. Spike types in barley are an important character taken into consideration in feed and food production. The experiments were carried out in the 2016-2017 growing cycle and composed of 36 two-rowed and 36 six-rowed barley genotypes in alpha-lattice blocks with three replications. There was a significant difference ($p<0.01$) among the genotypes. It was determined that genotypes G15, G24, G13 and G5 had lower values in terms of stoma width, length, area and perimeter in two-rowed barley genotypes. It is possible to state that these two-rowed genotypes with smaller stomatal areas may be more tolerant to drought. In six-rowed genotypes, it was determined that genotypes G11, G35 and G12 had lower values in terms of stoma width, length, area and perimeter. It has been observed that G12 can be selected as a tolerant genotype to drought conditions with its lower stomatal dimension and high yield potential from six-rowed genotypes. In two-rowed genotypes, G24, G23, G6 and G9 with high NDVI values and G1 and G13 with high chlorophyll content were the genotypes to be considered in selection. It has been determined that G5, G2, G4 and G1 genotypes, with low canopy temperature measurements, may be highly tolerant to drought stress conditions. In six-rowed genotypes, G11, G12 and G27 with high NDVI values were selected for further evaluation in barley breeding study. Genotypes G19 and G30 with high chlorophyll content were the genotypes to be considered in selection in breeding studies. It has been determined that G30, G31, G32, G26 and G27 genotypes, with low canopy temperature measurements, could be tolerant to drought stress conditions.

Key words: Barley, genotype, spike types, stomata parameters, physiological parameters

ENVIRONMENT EFFECT ON BIOTIC STRESS FACTORS IN BREAD WHEAT (TRITICUM AESTIVUM L.) GENOTYPES UNDER RAINFED CONDITION

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ABSTRACT

Global climate change is a determining factor in the infection rate of biotic stress factors in cereals. Therefore, the effect of environmental factors determines the severity of infection in diseases in susceptible genotypes. The experiment compared the biotic stress factors and yield under various environmental conditions of advanced bread wheat genotypes under rainfed conditions. A total of four experiments (RYT1, RYT2, RYT3, RYT2) composed of 25 bread wheat genotypes were examined during the 2023-2024 growing cycles at two locations in the Trakia region, Türkiye. The experiment was conducted in a randomized complete block design (RCBD) with four replications. Grain yield, leaf rust, stripe rust, and septoria tritici were tested. The results of the study showed various relations among genotypes for biotic stress factors. Significant differences in infection severity were determined between locations. While stripe rust did not cause infection in the Edirne location, it showed significant differences among the genotypes in the Lüleburgaz location. It has been determined that genotype effect is greater than environmental effect in leaf rust infection. Septoria leaf disease caused moderate infection in genotypes. According to these results, the correlation coefficients between grain yield and leaf disease parameters showed differences. Grain yield was negatively correlated with leaf rust (r=-0.439*) and stripe rust (r=-0.403*) in RYT1 in Lüleburgaz location. In RYT2, grain yield was negatively correlated with septoria tritici (r=-0.409*) and stripe rust (r=-0.588**) in Lüleburgaz, and significantly negatively correlated with leaf rust (r=-0.608**) in Edirne location. In RYT3, grain yield significantly negatively correlated with septoria tritici (r=-0.757**) in Lüleburgaz location, and negatively correlated with leaf rust (r=-0.428*) in Edirne location. In RYT4, grain yield significantly negatively correlated with stripe rust (r=-0.712**) and negatively correlated with septoria tritici (r=-0.499*) in Lüleburgaz location. These results showed the importance of genotype-environment interaction in biotic stress factors.

Key words: Bread wheat, genotypes, biotic stress, environmental effect

STUDIES ON PESTS OF ECONOMIC IMPORTANCE IN HAZELNUT CULTIVATION

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ABSTRACT

Hazelnuts have been an important export product grown in the eastern Black Sea region of Türkiye since ancient times. Although Türkiye is the world leader in hazelnut production, there are many factors that affect yield and quality. Pests can lead to significant losses in yield and quality. In order to maintain high hazelnut yield and quality in Türkiye and worldwide, pests identified in hazelnut production areas that cause economic losses are control using Integrated Pest Management (IPM) methods. In studies conducted in hazelnut orchards in Türkiye, a large number of insects and mites have been identified. While the main pest of hazelnuts in previous years in Türkiye was the Hazelnut weevil (Curculio nucum), recent surveys have shown that the Brown marmorated stink bug (Halyomorpha halys (Stål)) has become the primary pest. The Bark beetles Xyleborus dispar F. and Xylosandrus germanus B. Xyleborinus saxesenii R.) and the Green shield bug (Palomena prasina) are also other significant pests. This review summarizes several studies conducted in Türkiye and around the world.

Key words: Hazelnut, pest, control

DETERMINATION OF REACTIONS OF OAT VARIETIES DEVELOPED BY TRAKYA AGRICULTURAL RESEARCH INSTITUTE AGAINST OAT COVERED SMUT (USTILAGO KOLLERI) DISEASE

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ABSTRACT

In this study, resistance of 9-oat cultivars of developed by Trakya Agricultural Research Institute (TARI) against covered smut [Ustilago kolleri] has been checked in field experiments. The experiment was established as a randomized complete block design with three replications in the TARI experimental field, during the 2023/24 growing seasons. Each replication was planted in a row of 1 m long, 30 cm between rows. The inoculum was applied to the seed as dry spores. Disease assessments were made at the flowering period of the oat to determine the reactions of the cultivars to smut. In the evaluation of the disease, the ratio of panicle showing signs of disease among all panicle was examined. The resistance scale classifies 0–5% infected plants as a "resistant" reaction, >5%-10% infected plants as a "moderately resistant" and >10% as a "susceptible reaction." In the experiment, Kaymaklı oat cultivars was found to be most resistant, the infected panicle rate was zero and no disease development was observed. Kınalı oat variety was found to be most susceptible variety with 26.8% infected panicle rate. A significant positive correlation (r=0.9814**) was found between the mean number of infected panicle and the mean rate of infected panicle. When evaluated in terms of all genotypes, infected panicle rate were 26.8%, 12.5%, 10.9%, 10.1% 9.4%, 6.4%, 5.9%, 4.4% and 0% in Kınalı, Kahraman, Küçükyayla, Hasköy, Elmas, Halkalı, Kuşak, Kırklar and Kaymaklı, respectively. It has been observed that there is a wide variation in terms of disease resistance within oat varieties.

Key words: Covered smut, Oat, Ustilago kolleri, Resistant, Susceptible

GPCRS AS PIONEERING TARGETS FOR NEXT-GENERATION PESTICIDES

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ABSTRACT

Introduction: G-protein coupled receptors (GPCRs) are integral membrane proteins involved in a range of signaling pathways and are well-established drug targets. Among them, the Allatostatin receptor type-C (AstR-C), a class A GPCR, plays a critical role in regulating Juvenile Hormone (JH) levels in insects. JH is essential for insect growth, development, metamorphosis, and reproduction. Currently, only the AST-C peptide has been identified as a natural ligand for this receptor. Thus, AstR-C emerges as a promising target for developing pesticides, particularly against the Pine processionary moth, which poses a significant threat to Mediterranean pine forests. This study aims to identify novel, potent agonists for AstR-C that could be used in next-generation pesticide development. **Strategy for Next-Generation Pesticides Methods:** Virtual screening was conducted on an established orthosteric pocket using ChemDiv libraries to identify potential AstR-C agonists. Molecular dynamics (MD) simulations and MM-GBSA calculations were performed on promising hits. Biological evaluation of these agonists was carried out using TGF-shedding assays and in vivo lethality tests on larvae. **Results and Discussion:** Docking studies and MD simulations revealed specific interactions between the orthosteric pocket and various compounds, particularly involving ECL-2 residues. From the in-silico analysis, ten agonist candidates were identified, and four were selected for biological testing. Lethality tests on larvae demonstrated that these candidates exhibited activity, with LC50 values ranging from 406.121 to 1000 mg/L. **Conclusions:** Through a combination of in silico, in vitro, and in vivo methodologies, 25 new AstR-C agonists were identified, with four novel compounds demonstrating significant activity. These newly discovered agonists hold potential as next-generation pesticides against Thaumetopoea pityocampa.

Key words: GPCRs, Allatostatin, Pesticides, Homology modelling and simulation

EFFECT OF VALORIZED CASSAVA WASTE ON PRODUCTION AND HEALTH INDICES OF BROILER CHICKENS

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ABSTRACT

The current high in prices of conventional feedstuffs seems to warrant intensified efforts to find sustainable alternatives to the major feed inputs (maize or soyabean) that would support performance without compromising health of birds. Cassava peel is an abundant agro-waste in tropical regions, including Nigeria. A processed cassava waste is termed high-quality cassava peel meal. The present study evaluated the responses of finisher broiler chickens to the dietary replacement of maize with high-quality cassava peel meal (CPM) at 50% inclusion level. Three hundred and twenty Cobb500 broiler chickens were allocated to 4 dietary treatments on a weight equalization basis. All diets were formulated to be isonitrogenous and isocaloric. A control diet (a corn-soybean based diet), a diet containing 50% replacement of maize in the control diet with high quality CPM (Diet 2), and Diet 3 and 4 were formulated by supplementing Diet 2 with Methionine (35%, 45%, respectively) and lysine (17.5%, 22.5%, respectively) above NRC recommendation. The study lasted for 21 days. The high-quality cassava peel meal was prepared as follow. A freshly harvested cassava was peeled and grated. The grated peels were then dewatered for 24hrs (placed in woven bags) using an hydraulic press. Then, pulverized and sieved to pass through 3mm mesh (separation of coarse fraction), the resultant material was dried locally in the sun or using a flash dryer, and stored in plastic woven bags until needed. The highest body weight gain with improved feed conversion ratio ($P<0.05$) was found in birds fed with diet 4 while increased intestinal villus height/crypt depth ratio ($P < 0.05$) were recorded in birds fed with diet 3. Dietary crude protein and energy digestibility were highest in the group fed with diet 4. The histopathology examination of the tissues, however, seems to indicate lesions on the liver and intestinal tissues of birds fed the cassava peel-based diets. The control diet recorded the highest white blood cell, red blood cell and packed cell volume concentration. The serum biochemistry was not significantly influenced across treatment groups ($P>0.05$). The colony-forming units of lactobacillus and total bacteria were highest ($P<0.05$) in birds fed with Diet 4. The meat cholesterol level was reduced, and the feed cost/kg weight gain of broiler chickens was least for all CPM-based diets. The supplementation of methionine and lysine to high quality cassava peel meal-based diet increased production performances (reduced the cost of production and improved growth performance), reduced meat lipid profile, however, it seems negative morphological changes were impacted on the liver and intestinal tissues of the birds fed the cassava peel meal-based diets. This study provides evidence that high-quality cassava peel meal could be utilized at high inclusion levels to improve production performances, but caution may be required due to possible negative impact on the health of the internal organs of the birds.

Key words: Agro-waste, Cassava waste, health, performance, broiler chickens

DRUG RESISTANCE PATTERNS OF SOME ENTEROBACTERIACEAE ISOLATED FROM CHICKEN IN THE WEST OF ALGERIA

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ABSTRACT

Antibiotic-resistant bacteria may arise and proliferate as a result of the overuse of antibiotics in the chicken business. Antibiotics may be less effective in treating human illnesses if humans eat chicken products that include antibiotic-resistant bacteria or their genes. Determining the antimicrobial resistance (AMR) patterns of E. coli isolates obtained from poultry in different regions of the west of Algeria, is the goal of the current investigation. In order to isolate E. coli, samples from chicken (kidney, bones, and intestines) were gathered and prepared for culture using conventional microbiological techniques. While isolated E,coli was typed for O1, O2, and O78 antigens using slide agglutination with certain antisera, isolates were identified biochemically using API 20E. In accordance with CLSI guidelines, all isolates were identified and analyzed using the Kirby Bauer disk diffusion technique against 26 antibiotic disksTo find transferable resistance characteristics in 75 carefully chosen E. coli isolates, conjugative plasmid transfer, plasmid incompatibility, and colicin assays were employed. A total of 150 distinct species of E. coli were isolated. Fifty-two agglutinable E. coli isolates with O78:K80 (n = 28), O1:K1 (n = 15), and O2:K1 (n = 9) were found using serotyping. E. Coli resistance to nalidixic acid (95.6%), tetracyclin (79.2%), streptomycin (73.5%), nitrofurantoin (71.4%), ampicillin (53.6%), ticarcillin (39.7%), piperacillin (37.9%), and chloramphenicol (21.3%) was highly prevalent when it came to antibiotic susceptibility. Salmonella presents a resistance of 59.62% to nalidixic acid, ofloxacin and ciprofloxacin and 29.54% to streptomycin. The Klebsiella species shows no resistance for gentamicin, amikacin and kanamycin, but 73% ciprofloxacin 48% ofloxacin, and a total resistance to ampicillin and tetracyclin All the Enterobacter isolated were resistant to ampicillin, cefoxitin and cefazolin, however no resistance was observed for gentamicin, amikacin and kanamycin. Multidrug resistance, or resistance to more than four antibiotic classes, was present in 81.8%. of the isolates. The predominant plasmid-mediated resistance markers in 75 E. coli isolates, as determined by conjugative transfer, are ASTeSuTmp (25.8%) and SSuTmp (13.6%). Regarding the clustring of plasmids only 9 plasmids were not grouped out of the 67 tested (Com1 and F1). The colicin test shows that 5 transconjugants were colicin positive, these results let us suppose that colicin production and antibiotic resistance are two characters carried by the same plasmid structures. This work demonstrates that these antibiotic resistance characteristics may be easily transferred by plasmids, which has important health consequences for humans. It also confirms that meat chicken in the western region of Algeria has multidrug resistance E. coli.

Key words: Chicken, Enterobacteriaceae, multidrug resistance, plasmid, colicin

EXPRESSION REGULATION OF APOPTOSIS MODULATORS IN DIETHYLNITROSAMINE-TREATED MALE RATS AND THE THERAPEUTIC POTENTIALS OF BIOGENIC SILVER NANOPARTICLES

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ABSTRACT

Background: Dysregulation of apoptosis signaling pathways causes multiple pathological conditions including Alzheimer's disease, Huntington, 's disease, cardiac ischemia, autoimmune diseases, and cancer. Therefore, apoptosis can be used as a target while designing multidirectional therapeutic strategies. **Aim** The expression of apoptosis modulators; P53, Caspase-3, Bax, Bcl-2, mTOR, PARP 1, GSK3-β, and TLR4 molecules were studied in the liver tissues of diethylnitrosamine (DEN)-treated male rats as well as the therapeutic potentials of biogenic silver nanoparticles (AgNPs) were evaluated. **Methodology:** Twenty rats were equally distributed into four groups; Group 1, (Control), Group 2, DEN-treated (90mg/kg; intra-peritoneal dosage), Group 3, DEN+AgNPs-treated, and Group 4, AgNPs-treated (100mg/kg, oral dosage) having the body weight ~150-200g. After 6 weeks rats were dissected and blood samples were collected for complete blood count (CBC) and Liver function test (LFT) analyses. For histopathology examination, liver tissues were fixed in 10% formalin followed by a standard microtomy procedure to make slides with a tissue section thickness of 3-5 μm, stained with hematoxylin and eosin, and were observed under a camera-attached microscope. DNA was isolated from frozen tissues and a western blot was performed for P53, Caspase-3, Bax, Bcl-2, mTOR, PARP 1, GSK3-β, and TLR4 proteins. **Results:** No significant changes were found in body weight among different experimental groups. A significant increase was observed in AST and ALP of DEN-treated rats, however, no changes were found in the levels of bilirubin, serum albumin, and total proteins compared to the control group. AgNPs attenuated the DEN-induced increase in ALT and AST. The disruption of liver architecture by the formation of nodules with focal loss of the central vein was found in DEN-treated rats. However, AgNP treatment reduced the hepatic lesions and showed recovery against the DEN. Furthermore, DNA damage was observed in the DEN-treated group, however, intact DNA was observed in DEN+AgNPs and AgNPs groups. The expression of P53, Caspase-3, and Bax was downregulated, while Bcl2-2 and GSK3-β were upregulated in the liver tissue of DEN-treated rats. AgNPs treatment controls the expression regulation of target molecules in DEN-treated rats. **Conclusion:** Altogether, the current results show that AgNPs have the potential to regulate the apoptosis signaling disrupted in the liver tissues of DEN-treated male rats.

Key words: Diethylnitrosamine, hepatotoxicity, AgNPs, apoptosis, western blot

RESEARCH REGARDING THE IMPACT OF DAMS-CALVES' RELATED TRAITS ON DYSTOCIA INCIDENCE IN SIMMENTAL

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ABSTRACT

The aim of the current research was to evaluate the effects of dam - calf related factors on calving ease in Simmental cows. Data from 1250 births were collected between 2019 and 2023 regarding calving ease calves' body weight and dams' biometrics. Comparison between calves' body weight according to calving ease was assessed using one–way ANOVA protocol with the categorical factor being "calving ease". Differences were tested using Tukey's test. The analyzed data were expressed as least square means and standard error of mean. Decisions about the acceptance or rejection of statistical hypothesis have been made at the 0.05 level of significance. Mean incidence of dystocia in herd was 19.6%. Calves' body weight at birth significantly influenced the calving ease. Significant differences ($p \leq 0.001$) were recorded in respect with calves' body weight of eutocic compared with dystocic calves (31.19±0.68 kg vs. 33.24±0.12 kg). Small size of cows' pelvic area significantly increased the occurrence of dystocia. Significant differences ($p \leq 0.01$) were recorded related to cows' body weight (647.23±9.21 kg vs. 621.17±6.26 kg) for eutocic and dystocic births, respectively. A similar tendency was recorded in respect to rump length (51.19±0.28 vs. 47.31±0.29, $p \leq 0.01$), width at ilium (49.22±0.67 cm vs. 44.36±0.19 cm, $p \leq 0.01$) and width at ischia (14.26±0.11 cm vs. 11.84±0.71 cm, $p \leq 0.01$). Calving ease proved to be significantly influenced by calves' body weight at birth and dams biometric traits. Breeding programs in order to avoid extra-large calves and judicious management of heifers could decrease the risk of dystocia and increase the calves' welfare.

Key words: Key words: biometrics, calves, dystocia, Simmental, welfare

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LEGUME GRAIN AS ECONOMIC ALTERNATIVE TO SOYA BEAN MEAL IN RUMINANT DIETS

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ABSTRACT

Tunisia, suffer from a forage deficit and a nutritional imbalance. Thus, raw materials especially soybean meal characterized by fluctuations in their prices are imported. Several attempts to replace these foods, including soybean meal, have been considered by researchers. Local legumes (sweet lupine, vetch, pea and faba beans) are the better alternative. However, despite their good nutritional quality, the use of lupine, pea and vetch in animal nutrition is limited. The tackled objective is a comparative evaluation of the nutritional quality of lupine, vetch, pea and soybean meal (SBM) as protein resources for ruminants. The comparison of lupine to SBM showed that even SBM is higher in crude protein (48 vs 39 % DM), their digestibility were similar, thanks to the higher organic matter and fibre contents of lupine. Consequently, the intake of their digestible organic matter and crude protein were similar. In other hand, we compared the nutritional value of four varieties of peas and soybean meal, and we studied the economic importance of using peas as a substitute to soybean meal (Arfaoui et al., 2020). Results highlighted the richness of soybean meal in crude protein and fat compared to peas (48 vs 23 % DM). All pea species are high in fiber compared to soybean meal. Despite their significant variation, secondary metabolites content of peas and SBM are low (Abidi et al., 2023). The economic study showed that the pea varieties, lupine and Faiza had a higher sustainability index than soybean meal. Faiza variety has the highest sustainability index compared to other varieties (Abidi et al., 2023). The FAIZA variety, which is a Narbonne vetch, is known by its interesting nutritive value. Therefore, we investigated the biochemical composition and the antioxidant activity. Results showed that Faiza is relatively rich in DPPH (0.69 %), flavonoids (0.76 mg éq.cat/g DM) and secondary metabolites concentration (total phenols, tannins and saponins) compared to SBM. High crude protein content was also recorded among accessions (23.6-32.6 % DM). Correlations between antioxidant activity (DPPH) and phenolic compounds and between antioxidant activity and crude protein were founded. The present study revealed that the introduced accessions such as VN3, VN10, VN12, VN13 and VN15 had the highest contents of phenols, saponins and flavonoids, ADF, DPPH and CP respectively. While the local populations such as 545 and 856 had the highest level of ADF and NDF (Abidi et al., 2023, (Bouabid et al., 2023)), respectively. In conclusion, high nutritious crushed grains of Narbon vetch are a potential alternative protein source for ruminants in a sustainable agriculture ensuring a feed security and reducing feeding cost.

Key words: Soybean, lupine, vetch, pea, Crude protein.

HUMAN RABIES IN SKIKDA STATE

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ABSTRACT

Rabies is one of the most dangerous diseases in the world, an animal disease caused by a virus of the genus Lyssavirus, affects the central nervous system of humans and animals with warm blood. Where the disease is transmitted from one animal to another and from animal to human through saliva. In order to assess the presence of human and animal rabies in Skikda State between 2017 - 2018, we conducted a statistical study of data taken from medical files of patients at the State Public Health Organization of Skikda State. One of our goals is to provide an overview of the reality of rabies in one of the most affected states. The results show that rabies is still present in Skikda state to this day and continues to cause significant human and animal losses. Dogs and cats represent the highest proportion of rabies-infected animals and cause deaths due to infection with the virus. This calls on the State to intensify its efforts and to put in place an effective and organized program of action to hasten the eradication of this serious disease, which continues to alarm Algeria in spite of the beginning of the decline in recent years compared to previous years. Recently, Algeria is determined by the World Health Organization's recommendations to eradicate rabies completely by the beginning of 2030, as planned by the World Health Ministry to eradicate the disease in the world.

Key words: Lyssavirus virus, animal and human rabies, deadly encephalitis, rabies in Skikda 2017 - 2018, bite, vaccinations, prevention, hot-blooded animals.

DIETARY EFFECTS OF ALGERIAN SODIUM BENTONITE ON GROWTH PERFORMANCE AND BIOCHEMICAL PARAMETERS IN BROILER CHICKENS

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ABSTRACT

The present experiment was conducted to investigate the effect of supplementing poultry feed with graded levels of Algerian sodium bentonite (Na-B) on growth performance and the development of villus height in jejunum and some biochemical parameters during 50 days in broiler chickens. A number of 420 one-day old broiler chicks (Arbor Acres) were obtained from a commercial hatchery. The birds were randomly allocated into six groups (A, B, C, D, E and F). The treatments were 0 (control), 1%, 2%, 3%, 4% and 5% of Algerian Na-B levels. The results obtained indicate clearly that weight gain in the chickens fed treatments containing 4% Na-B had greater weight gain than the chickens fed different treat- ments (0, 1%, 2%, 3% and 5% Na-B). Feed conversion rate (FCR) was lower birds supplemented with Na-B 4% (2.45) than control group (3.06). Maximum feed consumption was observed in the birds' control (5,655.3 g), while the lowest was noted in the chickens with diet added 4% Na-B (5,009.5 g) ($p< 0.05$). The weight of duodenum, jejunum and ileum was decreased for the Algerian Na-B supplemented group, compared with the control group. The villus height was affected by dietary treatments (1%, 2%, 3% and 5%) on days 18 and 50 ($p< 0.05$). Feeding the supplemented graded levels Na-B resulted in an increase in plasma cholesterol, triglyceride and HDL concentrations at 50 days of age, compared with the control group. These results showed clearly that the Na-B from Algeria can improve the growth performance in broiler chickens. Thus, dietary inclusion of Na-B had positive effect on plasma triglyceride, cholesterol and HDL values in broiler chickens at the end experiment.

Key words: Algeria, clay, growth performance, feed supplementary, poultry.

EFFECT OF SACCHAROMYCES CEREVISIAE FEED SUPPLEMENTATION ON HAEMATOLOGY AND REPRODUCTIVE PARAMETERS FOR ALGERIAN RABBITS

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ABSTRACT

This study aims at investigating the effect of Saccharomyces cerevisiae (SC) supplementation on reproductive performance, haematological parameters and fertility of rabbits under Algerian conditions. The animals were divided into three groups and received the same feed ration during the experimental period. The control group received a basal diet without feed additives (Group#0) and the two yeast SC groups received 0.3 and 0.6 g/day per head (Group#1 and Group#2, respectively). Semen and blood samples were collected for determination of semen parameters and haematology. The weights of rabbits treated with SC 0.3 g/day were statistically significantly different ($P< 0.05$) from the control groups and group treated with SC 0.6 g/day. There were significant differences between the treatment groups for (RBCs), haemoglobin (HGB), haematocrit (HCT) and mean corpuscular haemoglobin (MCH) values, with higher values in rabbits supplemented with SC 0.3 g/day and 0.6 g/day, compared to those in the control group. The scrotal diameter did not differ between the dietary treatments. When compared with the control group, feeding rabbits graded levels of SC resulted in an increase in the average semen volume, mass motility and individual motility at day 51 of the experiment. On the other hand, the sperm concentration was significantly lower ($P< 0.05$) in rabbits supplemented with SC 0.3 g/day and 0.6 g/day during the two months compared to that in the control group. The spermatozoa mortality rate was lower for the rabbits supplemented with SC 0.3 g/day and 0.6 g/day (15.7% and 11.4%, respectively), compared to that in the control group (24%). In conclusion, this study has shown that inclusion of SC 0.3 g/day and 0.6 g/day in the diets of rabbit has positive effects on body weight and sperm analysis. Moreover, it increases the level (RBCs), haemoglobin (HGB), haematocrit (HCT) and mean corpuscular haemoglobin (MCH).

Key words: Saccharomyces cerevisiae, feed, haematological parameters, sperm, rabbits.

SIZE AT FIRST MATURITY AND REPRODUCTIVE POTENTIAL OF PROSPECTIVE CRABS BROOD STOCK (PORTUNUS PELAGICUS) IN PARE-PARE BAY, SOUTH SULAWESI, INDONESIA

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ABSTRACT

Background. Blue Swimming Crab (Portunus pelagicus) is one of the crab species that have significant economic value in Pare-Pare Bay, South Sulawesi. However, knowledge of the reproductive potential of crabs in the region is still limited. Therefore, it is necessary to search for quality broodstock to support hatchery activities. Aim. This study was conducted to analyze the size at first maturity and Quality of prospective crab broodstock in Pare-Pare Bay, South Sulawesi to find a source of quality crab broodstock for hatcheries. Methods. Collection of female crab samples was conducted at the crab landing in Watang Suppa Village, Suppa District, Pinrang Regency from July to November 2023. There were 150 Male, and 220 female crabs observed carapace width, body weight, gonad maturity level, and fecundity to analyze the size of the first mature gonad and determine reproductive potential. Results. The results showed that the range of carapace width was between 80-135.7 mm, with body weight ranging from 25-166 grams. The size at first maturity is 86 – 94 mm and the female is about 95-102 mm carapace width. The highest reproductive potential of crabs in Pare-Pare Bay was found in the size range of 121-130 with the highest fecundity at in average of 500.000 eggs. However, the number of prospective broodstock at that size is relatively small. The largest number of prospective broodstock is in the size range 101- 110 but has a relatively lower fecundity. Conclusion. Based on the results of this study by considering the size of first maturity gonads, parent abundance, and fecundity in each size range, it is concluded that the use of prospective broodstock from Pare-Pare Bay is still possible with the provision of selecting prospective broodstock with carapace size above 100 mm.

Key words: Size at First Maturity and Reproductive Potential of Prospective Crabs Brood Stock (Portunus pelagicus) in Pare-Pare Bay, South Sulawesi, Indonesia

DIVERSITY OF INVERTEBRATE FAUNA INVOLVED IN THE CULTURE OF Vicia faba L. var. major (LEGUMINOSAE) IN GREAT KABYLIA (ALGERIA)

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ABSTRACT

This study of the diversity of invertebrates dependent on the bean Vicia faba L.var. major (Seville) was carried out in the region of Tizi-Ouzou in Kabylia (Algeria). Three sampling methods applied made it possible to draw up a list of invertebrates encountered on the bean crop. As a result, the inventory shows the presence of 54 species distributed in 4 animal classes: Gastropoda, Crustacea, Arachnida and Insecta. The insect class is the best represented. These species are distributed among 11 systematic orders, the most important of which are Coleoptera, Hymenoptera and Homoptera. From the point of view of total richness of trapped invertebrates, the Barber pot method seems the richest with 47 species with a total of 248 individuals, Messor barbarus is the most noted with 24 individuals in total (Fc% = 9.67%). The numbers of invertebrates captured are greater in the yellow plates, a total of 269 individuals, 40 species are thus recorded and Aphis fabae is the most noted with 48 individuals (Fc% =17.84%). Concerning the sweep net, 22 species were captured, Bruchus rufimanus was the most noted with a total of 14 individuals (Fc% = 14.58). The results showed that the diversity fluctuates between 4.95 bits for Barber pots; 4.6 bits for the colored traps and 3.08 bits for the sweep net. Through this list of invertebrates and depending on their eating habits, 27 species are phytophagous and live at the expense of the cultivation of the V. faba bean. Auxiliaries are represented by 15 species.

Key words: Diversity, Invertebrates, Vicia faba L.var. major, Tizi Ouzou, Kabylia

CONTRIBUTION TO THE STUDY OF INTESTINAL PARASITES IN FOUR WILD MAMMALS IN THE ZÉRALDA HUNTING RESERVE (ALGIERS, ALGERIA)

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ABSTRACT

The aim of this study was to investigate intestinal parasites in wild wild rabbits (Oryctolagus cuniculus), cape hares (Lepus capensis), wild boars (Sus scrofa) and red deer (Cervus elaphus barbarus) living in the Zéralda hunting reserve. Sampling was carried out over 4 months, between 04 February and 10 May 2021, and coprological analysis of the faeces was carried out in the laboratory using two techniques: flotation and Ziehl Neelsen staining. The first method consists of concentrating parasitic elements from a very small quantity of faeces, which enabled us to record and identify 5 genera in rabbits (Graphidium, Trichostrongylus, Nematodirus, Strongyloides and Hymnolepis), 3 genera in hares (Graphidium, Trichostrongylus and Obeliscoides), 5 genera in wild boar (Ascaridia, Trichostrongylus, Haemonchus, Strongyloides and Fasciola) and 8 genera of parasites in deer (Eimeria, Cooperia, Trichostrongylus, Nematodirus, Ostertagia, Bunostomum, Oesophagostomum and Moniezia). The second technique enabled us to detect Cryptosporidium oocysts in all four mammal species. The presence of cryptosporidia was confirmed in rabbits, hares, wild boar and deer at different times during the four months of sampling. The parasites identified belong to 4 classes of parasites. These were nematodes (85.71% in rabbits, 100% in hares, 93.48% in wild boars and 36.95% in deer), cestodes (14.29% in rabbits and 62. 56% in deer and absent in hare and wild boar), trematodes (6.52% in wild boar and absent in the other three mammals) and sporozoa (0.49% in deer and totally absent in the rest of the hosts). This confirms that these four mammals can indeed be serious parasite reservoirs.

Key words: Mammals, Coprology, Intestinal parasites, Zéralda hunting reserve, Algiers

STUDY OF THE MARE'S ESTRUS BEHAVIOUR INTENSITY DURING THE BREEDING SEASON

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ABSTRACT

The present study aimed to diagnosis the mare's sexual activity during the breeding season. One hundred and seventy (170) of Arabian mares, aged between 04-27 years and reared in the National stud farm of Sidi Thabet, were followed during the official breeding season, from February to May 2022, while they were submitted to a natural mating (NM) service. Estrus monitoring was carried out daily through a teaser test, and if positive, the female went through an ultrasound examination starting at the 3rd day of estrus for the follow up of the follicular activity. During the estrus period, the behavioral expression in females was assessed and its intensity recorded, then the natural mating was performed every 48 hours as soon as the ovulatory follicular diameter reached 35 mm, and stopped when the corpus luteum was detected. Mares with a delay of resumption of ovarian activity or with cyclicity problems were treated with hormonal injections. The results showed that mares showing a clear estrus behaviour during the breeding season could be distributed into a typology, represented as following: i) according to their age, 78% of mares were older and 22% were young, ii) according to their status, 88% of mares were multiparous (barren and mares with foal, 41% and 47% respectively) versus the maiden ones (12%). A total of 26% of the observed mares showed a problem of resumption of ovarian activity and did not show any estral behaviour, and were thus treated with GnRH (14%) and prostaglandin F2a (12%). The average estrus and diestrus duration were 8.2 and 13.8 days, respectively. The estrus behaviour intensity varied during the breeding season and was higher during March and April, and started to decrease in May ($p<0.05$). Estrus behaviour intensity was weak in foaling estrus compared to the cyclic estrus. The results suggested that the estrus behaviour intensity depends on the mare's type estrus and tends to decrease at the end of the breeding season. The weak estrus intensity shown in mares during their foaling estrus and at the end of the breeding season leads to mare's rigorous monitoring of their follicular activity using ultrasonography in order de secure pregnancy.

Key words: sexual activity, estrus intensity, breeding season, Arabian mares

EVALUATION OF MARE'S CONFORMATION PARAMETERS AND ITS RELATIONSHIP WITH PREGNANCY RATE

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ABSTRACT

The objective of the study was to determine mare's conformation parameters and their pregnancy rate. Thirty (30) Arabian and twenty (20) Thoroughbred mares were used in this study, and their conformation parameters were determined. The mare's weigh was calculated from the chest circumference which was noted using a horse specific tape measure. The mare's vulva conformation was studied by the determination of the Caslick index. ANOVA showed that chest circumference and the weigh varied according to the breed, age and status of mares ($p<0.05$). However, the Caslick index varied only according to the breed ($p<0.01$), and it was lower in Thoroughbred mares compared to the Arabian mares (129±20 vs 147±32). The results showed that the pregnancy rate was higher in Thoroughbred mares compared to the Arabian ones ($p<0.01$). According to these findings, the conformation parameters were improved in Thoroughbred mares and which explains their higher pregnancy rate compared to the Arabian mares. These differences could be due to the breed's genetic traits.

Key words: mares, conformation, chest circumference, Caslick index, pregnancy rate

THE SEROPREVALENCE OF TOXOPLASMA GONDII INFECTION IN CAPTIVE ANIMALS IN ALGERIA

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ABSTRACT

Toxoplasma gondii is one of the world's most widespread polyxenic protozoan parasites that affect all warm-blooded animals, including humans. This survey aims to study, for the first time in Algeria, the seropreva-lence of Toxoplasma infection in zoo animals. The study included eight animal species of which 54 serum samples. were collected from 30 Australian goats (Capra hircus), four bulls (Bos taurus), one dromedary (Camelus drom-edarius), three cuffed sheep (Ammotragus lervia), seven donkeys (Equus asinus), one pony (Equus ferus), four bearded horses (Equus ferus caballus) and four rabbits (Oryctolagus cuniculus). The presence of antibodies toT. gondii was determined using the ID Screen® Toxoplasmosis Indirect Multispecies ELISA kit (IDVet, Grabels,France). A total of 8/54 (14.8%) samples were seropositive, including 5/28 (17.9%) males and 3/26 (11.5%) females. The seroprevalence was 6.7%, 50%, 25% and 75% in Capra hircus, Bos Taurus, Equus ferus caballus, and Oryctolagus cuniculus, respectively. No cases were observed in Camelus dromedarius, Ammotragus lervia, Equus asinus, and Equus ferus. This study indicates, for the first time in Algeria, the seroprevalence of T. gondii in zoo animals.

Key words: Toxoplasma gondii, seroprevalence, Zoo animals, Algeria

PROSPECTS OF USE OF BUFFALO BREED BULGARIAN MURRAH IN UKRAINE

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ABSTRACT

The development of buffalo breeding is extremely promising for Ukrainian agriculture. In particular, the prospects are good for the dairy industry: Murrah buffaloes have better milk yields than other buffalo breeds. Buffaloes are quite durable and cheap in feed consumption. They are highly resistant to blood-borne diseases. They have satisfactory slaughter qualities - 48-55% meat yield. Indicators of fat, protein and dry matter content in buffalo milk show us that it can become the basic basis for children's nutrition and production of food products of high biological quality, which are highly valued abroad. The meat productivity of Murrah buffaloes is also quite high. We have an excellent example of using this breed of buffalo in Bulgaria, which gives us a fair right to repeat their success, adapting it to the realities of the Ukrainian agricultural market. Thus, all these advantages can be used to improve the level of the export market, which will also have a positive impact on Ukraine's economic potential. To do this, a number of changes should be made. In particular, it is necessary to create scientific and production breeding and genetic state associations for buffalo breeding in Ukraine, it is necessary to separate buffaloes from the cattle population into a separate group, to set a standard and a wholesale price for buffalo products. In addition, it is necessary to create special programs to preserve the buffalo gene pool, with the allocation of appropriate state funding and attraction of foreign investment. The perspectives for the use of Bulgarian Murrah buffaloes in Ukraine are very high, but only if appropriate steps are taken. Otherwise, unfortunately, we should expect t he gradual extinction of buffaloes in Ukraine, and along with them the potential to improve the condition of a rather important part of our agricultural industry.

Key words: buffalo breeding, Bulgarian Murra, buffalo selection in Ukraine

GENETIC VARIATION AND PHYLOGENY OF BLACK RAT (RATTUS RATTUS LINNAEUS 1758) POPULATIONS BASED ON CYTOCHROME-B MARKER

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ABSTRACT

Black rat (Rattus rattus Linnaeus 1758) is one of the most common synanthropic rodent species in the World. Black rats originated from Asia and spread to other continents both naturally and due to the transportation by humans. As well as being a disease vector, they feed on food sources and pollute them, black rats are important organisms in terms of public health and economy. In this paper, mitochondrial Cytochrome-b gene analyses were conducted to evaluate the genetic variation of black rat populations from Türkiye, Europe, Asia, Africa, North and South America, and Australia. In the Bayesian Inference tree and Median-joining network, Australian samples and most Asian samples were closely located and separated from other populations whereas Turkish, European, African, and American samples and one Asian sample formed a common lineage. Besides, mean genetic distance values between these populations were calculated as 0.1-4.4%; the highest genetic distance values were found between Asian/Australian and other populations. In addition, genetic diversity values were determined as highest in the Asian population. Accordingly, it could be inferred that Asian and Australian populations have diverged from other populations, and the Asian population also has higher genetic variation compared to non-Asian populations.

Key words: Rattus rattus, black rat, Cytochrome-b, phylogeny

EFFECT OF PARTIAL SUBSTITUTION OF SOYBEAN MEAL BY FENUGREEK SEEDS FENUGREEK SEEDS ON ZOOTECHNICAL PARAMETERS AND SEMEN QUALITY OF RAMS

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ABSTRACT

The objective of this work was to study the effect of partial substitution of soybean meal by fenugreek "Trigonella fænum græcum L." on the zootechnical parameters and fertility of rams of the Queue Fine de l'Ouest breed. Fourteen rams aged between 3 and 4 years were divided into two homogenous groups. The first group control (n=7) group received a feed ration composed of wheat straw (ad libitum) and 600g of farm concentrate (80% barely, 17.5% Soyabean meal and 2.5% CMV). The second group received the same ration but the soybean meal in the concentrate was partially substituted by fenugreek (9.5%). The results showed that fenugreek did not appear to improve the weight, average daily gain, body condition score and testicular diameter of the rams. No significant difference ($p>0.05$) was recorded between the two groups during the whole experimental period. For the spermogram parameters, fenugreek slightly improved sperm motility and ejaculate volume.

Key words: rams, fenugreek, concentrate feed, semen quality

ANATOMO-MORPHOMETRIC STUDY OF THE OVARY OF THE JAPANESE QUAIL (COTURNIX JAPONICA) DURING POST-NATAL GROWTH

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ABSTRACT

The aim of our study was to examine the evolution of biometric parameters and macroscopic changes of the quail ovary (Coturnix japonica) during the postnatal growth period. Ten quail were used at each week of age over a period of 8 weeks, beginning one day after hatching, to determine body and ovarian weights, tarsal and folded wing length and the diameter of pre-ovulatory follicles. The obtained results showed that body and ovarian weights were 8.2 ± 0.2 g and 0.002 g respectively at one day post-hatch. At 8 weeks, a significant increase of 2314% and 363,900% was observed in body and ovarian weight respectively. There was a positive correlation between body weight (r= 0.99), ovarian weight (r=0.86), tarsal length (r= 0.91), folded wing length (r=0.94) and quail age. Macroscopic examination of the ovary revealed that follicular development was significant at 7 weeks of age with the appearance of preovulatory vitellogenic follicles hierarchised in increasing size with a diameter varying from 5.6 ± 0.9 mm to 15.0 ± 0.8 mm. In conclusion, under the rearing conditions practised at the Cynegetic Center of Zeralda (Algeria), the age of sexual maturity corresponding to the start of egg laying was observed at 7 weeks in female quail.

Key words: Japanese quail, body weight, ovarian weight, ovarian follicle, sexual maturity.

IMMUNOLOCALIZATION OF ANDROGEN RECEPTOR IN THE JAPANESE QUAIL (COTURNIX JAPONICA) OVARY

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ABSTRACT

The aim of our study was to determine the immunolocalization of androgen receptor in the Japanese quail (Coturnix japonica) ovary. Ten quails of seven weeks of age were used in our work. Immediately after slaughter, each ovary was fixed in 10% formaldehyde in phosphate-buffered saline. The immunohistochemical studies of androgen receptor (AR) were performed using the avidin-biotin complex method. AR immunostaining was observed in ovarian follicles in development. The positive stains of AR were found in the granulosa and theca cells of the ovaries. The cytoplasm was slightly positive by comparison with nuclei in all follicles. In conclusion, the immunolocalisation of AR during ovarian development shows that androgens are important steroid hormones that regulate development, follicle differentiation and the maintenance of ovarian structure.

Key words: Japanese quail, androgen receptor, immunohistochemistry, ovary.

COPROLOGICAL ANALYSIS AND HISTOLOGICAL STUDY OF THE DIGESTIF TRACT OF QUAIL COTURNIX JAPONICA ON A FARM IN ALGERIA

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ABSTRACT

Quail farming plays an important role in the poultry industry, providing an additional source of income for many farmers and contributing to the country's food security by supplying protein-rich meat. Despite the resistance of this species, parasitic infections of quail cannot be ignored and may represent a limiting factor for quail production. In this respect, work has been carried out on domestic quail Coturnix japonica at the Zéralda cynegetic center for two months (February and March 2024), with a view to identifying parasites using the flotation technique. The coprological study was carried out on quail, and droppings were collected once a week at different ages, from 2 to 7 weeks. In order to study the impact of parasites on the digestive tract, a histological study was carried out on one individual of each age. Analysis of the quail droppings, using the flotation method, revealed the appearance of parasitic infestation from the 2nd week onwards, with the presence of three categories of parasites: protozoa represented essentially by coccidia of the Eimeria genus, which were the most dominant with a prevalence equal to 83.33%; trematodes were also recorded, as were ectoparasites (Acarien spp) with the same prevalence, i.e. 33.33%. These endoparasites of the Eimeria genus caused considerable tissue damage in the digestive tract; in fact, histological findings in the duodenum and jejunum revealed histological lesions in all young quails of all ages, represented by necrotizing degenerative enteritis, characterized by the disappearance of the surface epithelium and subsequent necrosis of the villi. On the other hand, the caecal wall showed severe tissue damage.

Key words: Coturnix japonica, coprology, histology, digestive tract, Eimeria spp, lesions

THE DYNAMIC WORLD OF EQUINE FARMING IN THE DESERTIC MEDITERRANEAN: TRADITION MEETS MODERNITY

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ABSTRACT

region, with a particular focus on the area of Djerba. Equine farming is quite significant in this region, with herds occasionally reaching up to 25 mares. Typically, farms maintain between 1 and 3 horses, primarily for leisure activities and some commercial purposes.The survey revealed that all the farmers involved in equine farming are men, aged between 22 and 42 years, with an average age of 33±5 years. Notably, 67% of these farmers have received secondary education and possess agricultural training, underscoring their preparedness for the responsibilities involved in equine farming. The average total agricultural area (SAT) per farm is approximately 13.2 hectares, with a range spanning from 0 to 40 hectares. Of this, the useful agricultural area is about 4.3 hectares on average. Specifically, the area dedicated to horses is about 0.295 hectares on average, reflecting an off-ground farming system necessitated by the region's climatic conditions. The primary production system observed is mixed farming, combining agriculture with livestock and/or tourism with livestock. In addition to horses, the region predominantly raises goats, followed by cattle for milk and meat production. Regarding the breeds, the study identifies the main breeds as purebred Arabian and Arabian-Barb horses. Selection criteria for these breeds emphasize specific qualities that meet the farmers' needs for both leisure and commercial activities. The classification analysis of the equine farming systems led to the identification of four distinct groups of farmers. The first group, Traditional Small-scale Farmers, is characterized by limited agricultural land and small herd sizes, primarily engaged in traditional farming practices with minimal commercial activity. The second group, Diversified Farmers, has moderate agricultural land and diversified farming activities, including agriculture and livestock, balancing subsistence and commercial farming. The third group, Commercially Oriented Farmers, has larger agricultural land and significant herd sizes, focusing on highly commercialized farming practices with considerable investment in horse breeding and trading. The fourth group, Tourism-integrated Farmers, involves moderate to large herd sizes and integrates tourism activities with equine farming, leveraging horses for leisure and tourist attractions. These groups highlight the diversity of equine farming systems in the Médenine region, illustrating a range of practices from traditional subsistence to commercial and tourism-integrated farming. This classification provides a nuanced understanding of the different approaches and challenges faced by equine farmers in the region. Overall, the study paints a comprehensive picture of the equine farming systems in the Médenine region, highlighting the farmers' demographic profile, the farming systems' structure, the breeds and selection criteria used, and the distinct groups identified through classification analysis.

Key words: Equine, Tunisia, Farming system

THE INFLUENCE OF TAGETES VULGARIS ADDITION ON EGG PRODUCTIVITY AND EGG QUALITY OF LOHMAN KLASSIC BROWN LAYING HENS

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ABSTRACT

It was monitored the effect of addition of dried flowers from the herb Tagetes vulgaris (0.25% and 0.50%) on egg productivity, egg morphological parameters, fatty acid composition of egg yolk, cholesterol content in the blood serum and egg yolk, as well as egg fertility and egg hatchability in laying hens. An experiment was conducted with 90 laying hens and 12 cocks from Lohman Klassic Brown breed (40 weeks old), randomly divided into control and two experimental groups (n = 30 hens and 4 cocks/group/each group = 3 replications(subgroups)*14 poultry in replication). The poulty received compound feed for laying hens. To the forage of the experimental groups were added 0.25% and 0.50% dried flowers of the herb Tagetes vulgaris. The diets for all the groups were isoenergetic and isoprotein balanced. It was found a significant increase in egg yolk color ($P<0.001$) in the hens receiving 0.25% and 0.50% Tagetes vulgaris. The addition of 0.50% Tagetes vulgaris significantly decreased ($P<0.01$) content of total cholesterol in the blood serum ($P<0.05$) and the egg yolk ($P<0.01$). The content of saturated fatty acids in the egg yolk of hens receiving 0.50% Tagetes vulgaris was significantly higher ($P<0.05$) than that the control group. The layers received 0.50% Tagetes vulgaris in the diet had higher egg fertility (96%) compared to the control group (91%).

Key words: laying hens, Tagetes vulgaris, egg morphological parameters, yolk fatty acid composition , cholesterol content

CHARACTERISTICS OF DANGKE CHEESE INOCULATED BY STARTER CULTURE OF LACTOCOCCUS LACTIS SUBSP. LACTIS FNCC-0086, RIPENING AND COATING

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ABSTRACT

Dangke is a dairy product classified as a cheese type, a traditional product of the Enrekang Regency in South Sulawesi, Indonesia. Traditional Dangke has a short durability. The development of this product needs to be innovative by inoculating a bacteria starter culture to make a cultured cheese kind and to manufacture cheeses that have more extended durability by inoculating starter milk cultures. Dangke cheese was made from fresh cow's milk, then coagulated using papaya sap, diluted with aquades 1:10, and added to milk pasteurized at 85oC for 1 minute. After the curd reached 30oC, the starter culture of Lactococcus lactis subsp. lactis FNCC-0086 was added. The curd was formed using a semicircular mold with a diameter of 10 cm, pressed, placed on a cheese rack, ripening at 5, 15, and 25oC for 3, 6, 9, and 12 days, and coated with beewax. The Dangke cheese was then tested for its physical characteristics and nutritional composition and the ripening time of 12 days. The best attributes of Dangke cheese: 78.4 % curd yield, pH 4.36, 0.53% lactic acid, 21.53 % protein, 48.98% water, 13.05% fat, 13.52% lactose, and 2.92% minerals after coating with beeswax.

Key words: Beewax, coating, dangke, Lactococcus subsp. lactis, ripening

PHYSICOCHEMICAL AND BIOCHEMICAL CHARACTERISTICS OF MILK FROM INDIGENOUS GOATS IN THE SEMI-ARID ZONE OF ALGERIA.

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ABSTRACT

Goat milk has specific nutritional and functional characteristics that distinguish it from other types of milk. This study, carried out on milk obtained from indigenous goats in M'Sila, a semi-arid province of Algeria, highlights the variations in physicochemical and biochemical properties at different stages of lactation. Milk samples (40 mL each) were collected from 14 lactating goats at the first, sixth, and twelfth weeks postpartum. The samples were then labeled and stored at -20 °C. Prior to sampling, the California Mastitis Test was performed to ensure milk quality and exclude any signs of mastitis. An automatic ultrasonic analyzer (Lactoscan Farm Eco) was used to assess parameters, including density, freezing point, temperature, pH, added water, salt content, fat levels, non-fat solids (SNF), protein, and lactose content. Strong positive ($r>0.9$) and significant ($P<0.05$) correlations were observed between SNF, lactose, salt, density, and freezing point during the first and sixth weeks postpartum, indicating a concomitant increase in these parameters. Conversely, very strong negative and highly significant correlations ($r<-0.9$; $P<0.001$) revealed that added water led to a decrease in the concentrations of other parameters due to the dilution of milk components. By the twelfth week postpartum, SNF content and density were highly and positively correlated ($P<0.001$) with several variables. However, temperature and pH showed weak non-significant correlations with the other parameters. This study highlights the variations in the physicochemical and biochemical properties of goat milk at different stages of lactation and emphasizes the importance of maintaining optimal rearing conditions to increase milk production and maximize the nutritional benefits of goat milk.

Key words: milk composition, physicochemical properties, biochemical properties, lactation stages, indigenous goats, semi-arid region.

IMPACT OF THE SOIL IN THE CONSERVATION OF ENDOPARASITES IN COMMON PHEASANT (PHASUANUS COLCHICUS) NESTING BOXES IN ZÉRALDA HUNTING CENTRE

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ABSTRACT

The work carried out in semi-captive common pheasant (Phasuanus colchicus) farms in Zéralda (2022) is part of a search for endoparasites in droppings and in the soil of laying pens. The positivity index for droppings was 71.87%. The positivity rate for soil samples was 68.75%. Flotation coprology showed the highest prevalence and abundance of Eimeria spp. (P = 31.25%; AR = 44.44%). The helminth fauna came second, with the highest rate noted for Syngamus trachea (P = 28.12%; AR = 27.77%). The prevalence and abundance of other helminths was lower, at 6.94%. Soil analysis shows the opposite, with helminths including Strongyloides spp. in first place with a prevalence of 46.88% and abundance of 83.85%. Other parasites are less frequent. The chi-square test confirmed a significant difference between the parasites found on the floor of the aviary cages and those found in the droppings of the common pheasant, with a $p < 0.05$. In reality, rearing on the ground encourages the conservation and appearance of parasites. The floor is a means of dispersing parasites in the laying pens of Common Pheasants despite the precautionary measures taken.

Key words: Phasuanus colchicus, coprology, Soil analysis, Conservation of endoparasites, chi-square test

GENETIC DIVERSITY OF BALI POLLED CATTLE DEVELOPED IN SMALLHOLDER FARMS USE THE POLYMERASE CHAIN REACTION-RANDOM AMPLIFIED POLYMORPHIC DNA (PCR-RAPD)

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ABSTRACT

The study was done at two locations in South Sulawesi, Region of Barru and Region of Bone Regency. Bali polled cattle from local horned Bali cattle, which are starting to develop in South Sulawesi. The study aims to see the diversity and distance genetics level in the two development areas. Sample Cow blood has been taken, which is Bali polled / hornless from the results of mating between horned Bali cattle female and Bali polled bull; Bali cattle have horns from results mating between horned Bali cattle female with horned Bali cattle bull, and horned Bali cattle with Bali Polled /hornless bull. The technique is to take blood through the jugular vein using a tube venojet. Cattle blood samples from two areas have their DNA extracted, then amplification with the PCR-RAPD method uses six primers. Then, PCR results are visualized with electrophoresis. Diversity genetic in and between populations and phylogenetic trees is also analyzed. Diversity and differences genetically were analyzed statistically based on the Band Sharing Frequency (BSF) mark. Correlation of genetics between Bali polled cattle with Bali cattle horns using The Program Software Phylogenetics Trees (MEGA 5.0). The Mark of BSF for Bali polled cattle between individuals in the population of the district of Bone and Barru ranged from 0.8008 to 0.9025 and 0.840 to 0.9043, respectively. Meanwhile, for horned Bali cattle, BSF values ranged between 0.5745 and 0.7917 and 0.7929 and 0.9721. Genetic distance between Bali cattle populations was 5% - 20% in both livestock development areas. The results showed that the genetic diversity of Bali polled cattle was low compared to Bali cattle with horns. The genetic relationship for Bali cattle between both development areas is still near.

Key words: Bali polled cattle, genetic diversity, genetic distance, PCR-RAPD, smallholder farm

COMMON CAUSES OF EARLY DEATH IN CHICKS

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ABSTRACT

Chicks are susceptible in the days after hatching, as their digestive systems and immunity are underdeveloped and their ability to regulate their body temperature is inadequate. Failure to meet their needs during this period and adverse environmental conditions can easily cause them to get sick and die. Mortality in chicks is commonly highest in the first seven days. Mortality in the first week, up to 1%, can be considered normal. The causes of deaths exceeding this rate should be investigated and necessary precautions should be taken. Although it is not possible to completely prevent early chick deaths, the number of deaths can be reduced with precautions that can be taken when the causes of death are determined. This is very important in terms of animal health and farmer's profit. Although there are numerous reasons for early chick deaths, the most common causes are genetics, nutrition, diseases and management. Genetic disorders can cause chicks to die while incubating or after hatching. Even if chicks obtained from genetically quality flocks are used in production, it will not be possible to achieve the expected productivity if there are problems with care, feeding and management. Another important cause of chick deaths is poor flock management. Good flock management is essential to keep the animals healthy and alive. Chicks raised in poorly managed henhouses cannot show their full genetic potential. Some of the poor management is due to the practices applied to the parents before hatching and errors in storing the eggs, while others are due to incorrect practices during incubation. Other poor management is insufficient or high temperature, ventilation, overcrowding, dirty litter contact with feces, poisoning, injuries, inadequate feeders and waterers, high relative humidity, high temperature, inadequate ventilation, excessive light, stress, and presence of predators after hatching. The length of time it takes for newly hatched chicks to reach food and water can cause death in chicks. On the other hand, the quality of the feed offered to the chicks, its stale and spoiled state, and insufficient vitamin content also cause chick losses. Young chicks are very susceptible to infections and diseases due to lack of immunity in the first week. For this reason, incorrect practices in vaccination against diseases and problems with hygiene may result in chicks catching infections and increasing the number of losses as a result of mass deaths. To reduce early chick deaths, paying attention to the care and nutrition of the parents, storing eggs in suitable environments, purchasing chicks from reliable suppliers if purchased from outside, performing incubation practices per the procedure, taking the necessary precautions against diseases, using healthy and balanced rations and managing the flock well are among the precautions that can be taken.

Key words: Chick, early death, diseases, wrong breeding practices, precautions

PRODUCTIVITY AND NUTRITIONAL VALUE OF DOMINANT SPECIES IN NATURAL PASTURES BASED ON HEDYSARUM FLEXUOSUM (SULLA) IN THE CENTRAL REGION OF ALGERIA

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ABSTRACT

he Mediterranean climate that characterizes the northern region of the country allows for the establishment of the most verdant natural pastures in the country. These pastures are characterized by their floristic diversity, primarily composed of grasses and legumes, serving as feed for ruminant herbivores. However, these pastures face several challenges, such as overgrazing, desertification, and climate change. The preservation and sustainable management of natural pastures have become major issues to ensure the longevity of these valuable ecosystems. Giving pastures a significant role again could help reduce the chronic forage deficit that Algeria has been experiencing for decades. One of the solutions would be to study these pastures and their forage potential to improve them and integrate them into livestock feed. The objective of this work is to evaluate, on one hand, the floristic composition and biomass produced in the spring of a pasture in the Dellys region (Wilaya of Boumerdes), and on the other hand, to determine the chemical composition and "in vitro" digestibility of organic matter (OMD) of the dominant species in the pasture. This study reveals that spring productivity is 5.31 tons, which remains variable from year to year. The floristic study shows an abundance of legumes with an abundance rate of 50%, where Hedysarum flexuosum (sulla) is the dominant species with a total abundance of 28.6%. Grasses represent 35.7%, and other species note an abundance of 14.2%. The results of the chemical composition show a highly significant difference between species, particularly for crude protein (CP) content (8 to 20%). Hedysarum flexuosum presents the highest value for legumes (20.5%), and Allopecurus pratensis (11.8%) for grasses. The in vitro measured digestibility of OM shows average to good levels, between 60 and 66% for grasses, and 63 to 67% for legumes.

Key words: natural pastures, Algeria, floristic composition, chemical composition, in vitro digestibility.

NUTRITIVE VALUE OF SOME SPECIES OF THE ALGERIAN STEPPE (TIARET) PROTECTED BY EXCLUSION

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ABSTRACT

Our work is to study the quality of fodder resources of nutritional supports traditionally used by sheep. The study site is located in Tiaret, which is considered as a reception area for flocks and more precisely the M'kimen range. It is part of the High Plains steppes southeast of the city of Tiaret at an average altitude of 1,000 m with an area of 35,000 ha. The studied area offers more or less favourable conditions for the existence of a characteristic spontaneous flora which represents the available food source for the animals. The floristic study allowed us to identify 32 species belonging to different families represented by herbaceous and especially perennial plants. The analysis of the forage, of the total wall (**AFNOR, 1985; Van Soest and Wine, 1967**) and of the composition in phenolic substances by **SPIR** (**Bertrand, 2002**) of 7 samples among the 32 highlighted the great variability in chemical components between these different species. The dMS and dMO measured in vitro (**Tilley and Terry, 1963**) vary, for the extremes, respectively from 31 and 36% (**Artemesia Herba alba)** to 83 and 86% (**Peganum harmala**). These extreme values are explained by the extreme contents of total phenols of 9.3 and 5.0% as well as by the respective contents of MAT (10 and 23%) and ADL (20.7 and 5.2%) for these same species. These results need to be reinforced by the study of other species collected and to know their level of palatability.

Key words: livestock system, steppe, forage analysis; phenolic compounds; digestibility.

THE REPRODUCTIVE BIOLOGY OF FOUR DIPLOSTRACA (=CLADOCERA) SPECIES IN HAMSILOS BAY, THE SOUTHERN BLACK SEA

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ABSTRACT

The Diplostraca (=Cladocera) is the second-most-dominant mesozooplankton in the Black Sea coastal marine ecosystem following Copepoda. It is found in abundance from the start of spring (March) to the end of fall (December) due to its parthenogenetic reproductive ability, and it contributes significantly to mesozooplankton abundance. In this study, the population structure, embryonic stages, and fecundity of four Diplostraca species (Evadne spinifera, Penilia avirostris, Pleopis polyphemoides, and Pseudevadne tergestina) were examined in Hamsilos Bay, Sinop, between July 2015 and June 2016. The data were obtained during field studies conducted as part of a research project (title: "Determination of Zooplankton Composition of Hamsilos Bay, Sinop"; number SÜF-1901-14-04) supported by Sinop University. Samples were collected from three stations at monthly intervals through vertical hauls of a plankton net with a mouth opening area of 0.2 m2 and a mesh size of 112 µm. The maximum proportion of each individual category in the population was 100%, 23%, 33%, and 9% for parthenogenetic females, gamogenetic females, females (without embryos), and males, respectively. "Stage A," the first developmental stage of embryos carried in the brood pouches of parthenogenetic females, was mainly observed in E. spinifera, P. polyphemoides, and P. tergestina, while "Stage C," the third developmental stage, was mostly observed in P. avirostris. The last stage of embryonic development, "Stage D," was the least common in all species. The number of embryos in the brood pouches of parthenogenetic females varied between one and five embryos in E. spinifera, two and eight in P. avirostris, one and eight in P. polyphemoides, and one and six in P. tergestina. Diplostraca species reproduce through parthenogenesis during most periods in which they are found in the water column, thus contributing to the mesozooplankton community in Hamsilos Bay. The number of embryos observed in this study was lower than in observations from the Marmara Sea, the only study conducted in Turkish seas on the reproductive strategies of the Diplostraca. The present pioneering study on the reproductive biology of the Diplostraca on the Black Sea coast will serve as a reference for future studies.

Key words: Diplostraca, reproductive strategies, Black Sea

EFFECTS OF INFESTATION BY THE PARASITE VARROA DESTRUCTOR ON THE EMERGENCE WEIGHT OF WORKERS, AND LIFESPAN DIFFERENCES BETWEEN SENSITIVE AND RESISTANT HONEYBEE (APIS MELLIFERA) COLONIES

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ABSTRACT

The ectoparasite varroa destructor is the main threat responsible for the collapse of bee colonies. Thus, several methods of combating this mite exist, but they are not sustainable. Hence the importance of naturally resistant colonies. Several resistance mechanisms have been developed by the bee. In Algeria, strains of Tellian bees (Apis mellifera intermissa) are naturally resistant to varroa by exhibiting more pronounced delousing behavior than in susceptible bees. The objective of this study is to highlight possible physiological mechanisms involved in this resistance. We therefore chosed parameters that were significantly impacted by varroa infestation in susceptible colonies. We measured the weight of the bees at emergence as well as their lifespan. To do this, our sample is divided into two groups: non-infested workers (control) and workers infested by varroa during their embryonic development. Bees come from sensitive colonies and resistant colonies. Concerning the weight of the workers at emergence, we noted a significant difference ($p < 0.05$) between the two groups: $102,451 \pm 0.57$ mg for the non-infested bees and $91,987 \pm 0.55$ mg for the infested bees from the resistant colonies. Likewise, $110,539 \pm 0.65$ mg for non-infested bees and $95,968 \pm 0.76$ mg for infested bees from susceptible colonies. We also see a significant difference between uninfested workers from susceptible colonies and uninfested workers from resistant colonies. This leads us to the hypothesis that varroa is attracted much more by heavier individuals and therefore richer in fatty substances. We found a very highly significant difference ($p < 0.001$) in lifespan between susceptible and resistant workers. The average survival is $31,094 \pm 0.60$ days for resistant colonies and $23,470 \pm 0.50$ days for sensitive colonies. According to the results obtained so far, the infestation of bees by varroa presents a negative effect on their weight development during their embryonic life, not only in susceptible colonies, but also in those that are resistant. Interestingly, resistant workers live significantly longer than susceptible bees. Further research is underway to understand the physiological mechanisms linked to resistance to the ectoparasite varroa destructor.

Key words: Apis mellifera intermissa, Varroa destructor, resistance, emergence weight, lifespan.

EFFECT OF DIETARY SUPPLEMENTATION OF BLACK CUMIN SEEDS (NIGELLA SATIVA) ON GROWTH PERFORMANCE IN JAPANESE QUAILS (COTURNIX JAPONICA)

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ABSTRACT

The aim of this study was to analyse the impact of dietary supplementation with Nigella sativa seed powder on the growth performance of quails during the growth period. The number of quail used was divided into two lots of 250 animals, C (Control) and E (Experimental). Lot C received a commercial poultry feed, while lot E received a same feed supplemented by 2% Nigella seed powder. The growth performance was measured weekly from hatching until 6 weeks of age. The results obtained showed that the profile of body weight evolution was comparable, and the difference between lots C and E was not significant at 6 weeks of age ($P>0.05$). The average body weight gain and feed conversion ratio were in favor of group E. In conclusion, the supplementation of Nigella sativa seed powder has a favorable effect on feed conversion ratio in growing quails.

Key words: Japanese quail, growth performance, Nigella sativa seed powder

EFFECT OF NIGELLA SEED POWDER (NIGELLA SATIVA) SUPPLEMENTATION ON BLOOD GLUCOSE LEVELS DURING POSTNATAL GROWTH IN JAPANESE QUAILS (COTURNIX JAPONICA)

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ABSTRACT

The objective of our study was to evaluate the effect of dietary supplementation with Nigella sativa seed powder on blood glucose levels during the growth period quails. A total of 500 quail (Coturnix japonica) were used and divided into two groups, C (Control) and E (Experimental). Group C received a commercial poultry feed, while group E received a same feed supplemented by 2% Nigella seed powder. Blood glucose levels were evaluated by glucometer at 3 and 6 weeks of age. The results obtained showed for C and E groups at 3 weeks of age, blood glucose levels in males were significantly lower ($P<0.01$) compared to females. However, at 6 weeks of age, blood glucose levels were higher ($P<0.05$) in males compared to females. The blood glucose levels increased ($P>0.05$) in males and decreased ($P<0.05$) in females from the 3rd to the 6th week of age. The effect of Nigella seed added led to a decrease in blood glucose levels in both males and females in function of age. In conclusion, the supplementation of Nigella sativa seed powder shows a hypoglycemic effect in growing quails.

Key words: Japanese quail, blood glucose, Nigella sativa seed powder

MORPHOMETRY AND BIOMETRIC INDICES OF PARTRIDGE EGGS FROM WILD AND CAPTIVE HABITATS IN ALGERIA

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ABSTRACT

This study is a comparative analysis of the biometric indices of Babrbary partridge (Alectoris barbara) eggs, a game species endemic to North Africa. These eggs were collected from two distinct habitats: the Zéralda hunting Center and the Chaiba Forest in Hammam Righa. In the wild, the Gambra partridge is a very discreet bird that leaves no traces to locate its nests, most of which are built in small depressions in the ground. Indeed, 5 nests were recorded in Hammam Righa in April 2024, totaling 61 eggs. However, within the semi-natural breeding facility at the Zéralda Game Center, biometric indices were calculated on a sample of 192 eggs. Our results show that the eggs from the semi-captive breeding facility have a higher average weight (21.75 ± 1.58 g) compared to those collected in the wild (20.02 ± 2.02 g) and slightly different dimensions. Indeed, the ANOVA test shows highly significant differences ($p < 0.0001$) in the parameters of weight, length, width, volume, density, shape index, and shell index. Finally, the data collected not only contribute to the understanding of the impact of environmental factors on the biometric characteristics of A. barbara partridge eggs but also, provide valuable information for the conservation and future management of this emblematic species.

Key words: Endemic species; Zéralda hunting Center; Chaiba Forest; Biometry; Shell Index

IMPROVING NUTRIENT COMPOSITION: ENZYME-ASSISTED BLACK CARROT PULP FERMENTATION

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ABSTRACT

This study investigated the effects of exogenous enzymes on the nutrient composition of fermented black carrot pulp in the solid-state fermentation method. The research was conducted in a 3 x 2 x 5 factorial experiment. Three different fermentation periods were employed: 3-5 and 7 days. Two different enzyme additions (yes, no) were made in each period. Five replicates were conducted for each treatment group, with the total number of samples reaching 35, including the control group. Before fermentation, the black carrot pulp was ground to a particle size of 1 mm and added to the fermenter. To facilitate microbial growth, 85.5 g of nutritional salt (glucose:urea:(NH4)2SO4:peptone:KH2PO4:MgSO4.7H2O = 4:2:6:1:4:1) was added to 1 lt of distilled water. The samples were sterilized at 121 °C for 15 minutes. The enzyme used in this study was obtained from a private company and comprises a combination of phytase, xylanase, and beta-glucanase. The enzyme was then added to a quantity of 1 g to each fermentation media and sterilized via UV light. L. acidophilus was incubated in a shaking incubator at 30 °C and 120 rpm for 48 hours using MRS broth. Then, 1 ml of the L. acidophilus culture (108 cfu/ml) was added to the sterilized fermenters. At the end of the study, the nutrient composition of black carrot pulp exhibited a positive effect. Furthermore, a significant interaction between the factor of fermentation time and the enzyme was observed about the nutrient composition ($P<0.001$). The highest crude protein content was observed in the group that fermented for three days without adding an enzyme ($P<0.001$). The highest level of ash was observed in all samples that fermented for three and five days ($P<0.001$). The lowest level of crude fiber was observed in the non-fermented sample ($P<0.001$). The lowest level was observed in the fermented samples, specifically in the groups that seven days of fermentation without enzymes and three days without enzymes ($P<0.001$). The highest level of ether extract was observed in the non-fermented and Five-day fermented with enzyme addition samples ($P<0.001$).

Key words: Solid-state fermentation, black carrot pulp, L. acidophilus, enzyme

SOLID-STATE FERMENTATION OF SUNFLOWER HULLS: ENZYME EFFECTS ON NUTRIENT COMPOSITION

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ABSTRACT

This study investigated the effects of exogenous enzymes on the nutrient composition of fermented sunflower seed hulls (SSH) in the solid-state fermentation method. The research was conducted in a 3 x 2 x 5 factorial experiment. Three different fermentation times (3-5 and 7 days) and two different enzyme additions (yes, no) were made in each replicate. Five replicates were conducted for each treatment group, with the total number of samples reaching 35, including the control group. Before fermentation, the SSH was ground to a particle size of 1 mm and added to the fermenter. The samples were sterilized at 121 °C for 15 minutes. The enzyme used in this study was obtained from a private company and comprises a combination of phytase, xylanase, and beta-glucanase. The enzyme was then added to a quantity of 1 g to each fermentation media and sterilized via UV light. L. acidophilus was incubated in a shaking incubator at 30 °C and 120 rpm for 48 hours using MRS broth. Then, 1 ml of the L. acidophilus culture (108 cfu/ml) was added to the sterilized fermenters. The research findings showed that the nutrient composition of SSH was improved through solid-state fermentation with enzymes. This enhancement led to an increase in crude protein levels and a notable decrease in crude fiber levels. Notably, a significant relationship between fermentation time, enzyme utilization, and all parameters was observed ($P < 0.001$). The sample fermented for five days with enzymes exhibited the highest crude protein and lowest crude fiber levels ($P < 0.001$). Conversely, the non-fermented sample had the highest crude fat levels ($P < 0.001$). . This study confirms increased crude protein and reduced crude fiber levels after fermentation. The ideal fermentation period for SSM with L. acidophilus is five days, supplemented with enzymes.

Key words: Solid-state fermentation, sunflower seed hulls, L. acidophilus, enzyme

USE OF CINNAMON AND CHAMOMILE IN BROILER DIETS

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ABSTRACT

Increasing bacterial resistance to synthetic antibiotics and consumer awareness of health and food safety concerns have triggered restrictions or bans on the use of antibiotic growth promoters in the poultry industry. Due to the restrictions on antibiotics in poultry nutrition, the poultry industry has turned to alternatives such as plant-derived feed additives. Thus, the poultry industry, focusing on developing more sustainable feed management strategies to improve the intestinal health and growth performance of poultry, has revealed phytogenic feed additives as natural alternatives to antibiotic growth promoters and encouraged research on this issue in poultry nutrition. Phytochemicals, plant bioactive compounds in poultry diets, have gained popularity due to their potential antioxidant and antimicrobial activities. These plants improve the immune system, reduce the stress response, and positively affect health and performance. Cinnamon bark and chamomile flower are among the plants used as phytobiotics in poultry feeding. In this study, we tried to give information about the studies in the last fifteen years on the use of cinnamon, whose bark is used as tea, and chamomile, whose flowers are used, in the nutrition of broiler chickens.

Key words: Cinnamon, broiler, feed additives, nutrition

USE OF GINGER (Zingiber officinale) AND TURMERIC (Curcuma longa) IN BROILER DIETS

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ABSTRACT

The development of drug resistance has become a worldwide problem due to the hazardous use of antimicrobials in poultry feeding. Therefore, the use of biotic or natural products such as phytobiotics (phytogenics or botanicals) as a replacement for antibiotics has received great attention. In recent years, phytobiotics or their components have been recognized as a new class of natural plants that are gaining popularity and acceptability in poultry nutrition. It has been determined that the performance of animals often increases with the addition of various phytobiotic additives to poultry feed, and that phytobiotics also show great effectiveness in protecting the normal beneficial microflora population while resisting pathogenic microorganisms in the intestine. Phytobiotics can be classified as herbs obtained from flowering, non-woody and non-permanent plants, botanicals or spices obtained from non-leaf parts such as seeds, fruits, barks or roots, essential oils and extracts and oleoresins. Many phytochemical-rich medicinal herbs are now evaluated as potential antimicrobial and growth promoter alternatives. Aromatic herbs have been successfully used in the poultry sector to increase antioxidant capacity Ginger and turmeric are among the dried plant roots used as phytobiotics in poultry feeding. In this study, we tried to give information about the studies in the last fifteen years on the use of ginger and turmeric, whose dried powdered roots are also used as tea, in the nutrition of broiler chickens.

Key words: Ginger, tumeric, broiler nutrition, feed additive

EVALUATION OF BOVINE MILK PRODUCTION PERFORMANCE OF "BRUNE DES ALPES" AND "MONTBELIARDE" BREEDS REARED IN OFF-LAND FARMING IN THE SEMI-ARID AREA OF SETIF, ALGERIA.

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ABSTRACT

An experimental system on 16 primiparous dairy cows (8 of the "Brune des alpes" and 8 of the "Montbéliarde" breeds) during the first four months of lactation at a school farm located in Setif, was set up to assess the effect of a new total mixed ration formula" TMR" on milk production performance. The average milk production per breed for the first four months of lactation is 2887 ± 408 kg and 2508 ± 552 kg, with peak lactation production of 26.88 ± 3.4 kg and 20.9 ± 4.6 kg respectively for "Brune des Alpes" and "Montbéliarde". These results are encouraging, especially for cows that are in first lactation. The feed cost of production of a liter of milk varies from 32.92 to 45.10 Da/kg with an average cost price of 37.94±6.27 Da/kg. This price difference is linked to the differences recorded in the individual performance of dairy cows.

Key words: dairy cow; feed; milk production performance; total mixed ration "TMR"; Setif.

OPTIMIZING SOLID-STATE FERMENTATION OF OLIVE POMACE WITH ENZYMES FOR IMPROVED NUTRIENT CONTENT

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ABSTRACT

This study investigated the effects of exogenous enzymes on the nutrient composition of fermented olive pomace in the solid-state fermentation method. The research was conducted in a 3 x 2 x 5 factorial experiment, with three different fermentation periods (3-5 and 7 days), two different enzyme additions (yes, no) in each period, and five replicates in each group for a total of 35 samples, including the control group. Before fermentation, the olive pomace was ground to a particle size of 1 mm and added to the fermenter. Subsequently, 100 g of the ground olive pomace and 500 ml of distilled water were added to each fermenter. The enzyme used in this study comprises a combination of phytase, xylanase, and beta-glucanase. The enzyme was then added to a quantity of 1 g to each fermentation media and sterilized via UV light. 1 ml of the L. acidophilus culture (108 cfu/ml) was added to the sterilized fermenters. The inoculated samples were fermented at 30°C for the specified duration (3–5–7 days). The study concluded that the nutrient composition of olive pomace was positively affected. Overall, crude protein and ether extract levels increased significantly ($P<0.001$). Additionally, a fermentation time x enzyme interaction was observed regarding nutrient composition ($P<0.001$). At the end of fermentation, the highest crude protein level was determined in fermented samples for three days with enzyme supplementation or five days without enzyme supplementation ($P<0.001$). The lowest crude fiber level was observed in the non-fermented sample ($P<0.001$). In contrast, the second lowest crude fiber level in the fermented samples was observed in the sample fermented for seven days without enzyme supplementation ($P<0.001$). The most effective fermentation time of olive pomace with L. acidophilus was three days with enzymes.

Key words: solid-state fermentation, olive pomace, L. acidophilus, enzyme

ENHANCING NUTRIENT COMPOSITION OF ROSEHIP PULP VIA ENZYMATIC SOLID-STATE FERMENTATION

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ABSTRACT

This study investigated the effects of exogenous enzymes on the nutrient composition of fermented rosehip pulp in the solid-state fermentation method. The research was conducted in a 3 x 2 x 5 factorial experiment. Three different fermentation periods were employed: 3-5 and 7 days. Two different enzyme additions (yes, no) were made in each period. Five replicates were conducted for each treatment group, with the total number of samples reaching 35, including the control group. Before fermentation, the rosehip pulp was ground to a particle size of 1 mm and added to the fermenter. To facilitate microbial growth, 85.5 g of nutritional salt (glucose:urea:(NH4)2SO4:peptone:KH2PO4:MgSO4.7H2O = 4:2:6:1:4:1) was added to 1 lt of distilled water. The samples were sterilized at 121 °C for 15 minutes. The enzyme used in this study was obtained from a private company and comprises a combination of phytase, xylanase, and beta-glucanase. The enzyme was then added to a quantity of 1 g to each fermentation media and sterilized via UV light. L. acidophilus was incubated in a shaking incubator at 30 °C and 120 rpm for 48 hours using MRS broth. Then, 1 ml of the L. acidophilus culture (108 cfu/ml) was added to the sterilized fermenters. The highest crude protein, ash, and the lowest crude fiber were observed in the group fermented for seven days and enzyme was used ($P < 0.001$). The highest ether extract level was detected in the unfermented sample ($P < 0.001$). This research also corroborates these findings, as crude protein levels increased and crude fiber levels decreased. The optimal fermentation time for rosehip pulp with L. acidophilus was seven days, with the addition of enzymes.

Key words: solid-state fermentation, rosehip pulp, L. acidophilus, enzyme

IMPACT OF ENZYMATIC TREATMENT ON SOYBEAN MEAL FERMENTATION ON NUTRITIONAL COMPOSITION

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ABSTRACT

This study investigated the effects of exogenous enzymes on the nutrient composition of fermented soybean meal in the solid-state fermentation method. The research was conducted in a 3 x 2 x 5 factorial experiment, with three different fermentation periods (3-5 and 7 days), two different enzyme additions (yes, no) in each period, and five replicates in each group for a total of 35 samples, including the control group. Before fermentation, the soybean meal was ground to a particle size of 1 mm and added to the fermenter. Subsequently, 100 g of the ground soybean meal and 500 ml of distilled water were added to each fermenter. The enzyme used in this study comprises a combination of phytase, xylanase, and beta-glucanase. The enzyme was then added to a quantity of 1 g to each fermentation media and sterilized via UV light. 1 ml of the L. acidophilus culture (108 cfu/ml) was added to the sterilized fermenters. The inoculated samples were fermented at 30°C for the specified duration (3–5–7 days). The study concluded that the nutrient composition of soybean meal was positively affected. Overall, crude protein and ether extract levels increased significantly ($P<0.001$). Additionally, a fermentation time x enzyme interaction was observed regarding nutrient composition ($P<0.001$). The highest crude protein level was in the sample fermented for three days without an enzyme ($P<0.001$). The lowest crude fiber level was in the fermented for three or five days without an enzyme ($P<0.001$). The highest ether extract level was in the seven days with enzyme, however same sample had lowest crude protein level ($P<0.001$). The optimal fermentation period for soybean meal with L. acidophilus and without enzymes was found to be three days.

Key words: solid-state fermentation, soybean meal, L. acidophilus, enzyme

ASSESSMENT OF FEED AUTONOMY OF THE DAIRY CATTLE FARMS IN THE SEMI-ARID REGION OF SÉTIF (ALGERIA)

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ABSTRACT

This study was conducted in 128 dairy cattle farms in the semi-arid Sétif region (Algeria) to gauge their level of autonomy. Nine criteria were used: for dry matter (DM), energy, and protein, overall autonomy as well as fodder autonomy and concentrate autonomy were determined. Farms demonstrated low levels of overall autonomy (33% for DM, 26% for energy, and 29% for protein); however, they were more autonomous in their use of fodder (61% for DM) than in their use of concentrates (6% for DM). Four different types of farming systems were identified, but farming system type had a minimal effect on feed autonomy. In general, large farms (those producing grains and livestock) were more autonomous overall. System-specific differences in autonomy were explained by variables related to farming intensity.

Key words: dairy cow, feed autonomy, feeding, forage, feed value, semi-arid

FACTORS INFLUENCING MILK PRODUCTION OF COWS IN THE SEMI-ARID REGION OF EASTERN ALGERIA

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ABSTRACT

Algeria has taken many important steps to develop the dairy sector, but these have not produced the expected results. Indeed, the figures given by the Ministry of Agriculture and Rural Development (MADR) in various reports show that Algerian agriculture is dependent on the outside world. Production potential is only sufficient to cover 55% and 80% of national requirements for milk and meat respectively. This prompted us to carry out a study with the aim of diagnosing the various individual, environmental and management factors affecting milk production. Thus, Prospective surveys were carried out on 18 farms with a total of 619 head of cattle. The results show a variability in average milk production (10.00±3.56 to 17.81±2.16 kg of milk/cow/day) between the farms studied, which is linked much more to feeding techniques and the presence of technical supervision. The effect of breed is observed by a superiority in milk production of the Holstein breed compared with the Montbeliarde breed of 0.82 kg of milk/cow/day. The quantity and quality of fodder (green or dry) and concentrate distributed (2.92±0.76 kg to 10.5±1.08 kg) had a direct influence on milk production (12.56±0.29 to 17.01±0.57 kg of milk/cow/day). Also, the season of the year had very significant effects on milk production.

Key words: dairy cow, milk production, variation factors, breed, semi-arid region.

THE IMPACT OF LAVENDER HAY AND AROMATIC WATER ON IN VITRO GAS PRODUCTION, METHANE EMISSION, METABOLIZABLE ENERGY, AND ORGANIC MATTER DIGESTIBILITY IN RUMINANTS

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ABSTRACT

This study investigates the effects of varying levels of lavender hay and aromatic water on total gas production (TGP), methane (CH4) emission, metabolizable energy (ME), and organic matter digestibility (OMD) in ruminants. The experimental setup included control (0% lavender), 25%, 50%, 75%, and 100% lavender hay (Instead of straw), alongside treatments with 1 mL, 2 mL, and 4 mL of lavender aromatic water (In addition to the toral mixed ration). The control group exhibited the highest TGP at 54.04 mL/200 mg DM. Lavender hay treatments resulted in a significant reduction, with the lowest TGP observed at 42.84 mL/200 mg DM in the 2 mL aromatic water group. Methane production was significantly reduced in all lavender treatments compared to the control (16.70%). The most notable reduction was observed in the 4 mL aromatic water group, where CH4 production dropped to 7.77%. The control group recorded the highest ME at 9.92 MJ/kg DM, while the ME values decreased significantly with increasing levels of lavender. The lowest ME was noted at 8.16 MJ/kg DM in the 2 mL aromatic water group. OMD was highest in the control group (63.70%) and decreased significantly with increasing lavender levels. The lowest OMD was observed in the 2 mL aromatic water group at 52.51%. In conclusion, Lavender hay and aromatic water show promise as natural feed additives for mitigating methane emissions and improving fermentation efficiency in ruminants. Further research is warranted to explore the long-term effects and practical applications of these findings in livestock production systems.

Key words: Lavander, hay, aromatic water, total gas production, methane emission, metabolic energy, digestibility

EFFECTS OF MELISSA OFFICINALIS ESSENTIAL OIL AND AROMATIC WATER ON IN VITRO GAS PRODUCTION, METHANE EMISSION, METABOLIZABLE ENERGY, AND ORGANIC MATTER DIGESTIBILITY IN RUMINANTS

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ABSTRACT

This study investigates the effects of Melissa officinalis essential oil and aromatic water on total gas production (TGP), methane (CH4) emission, metabolizable energy (ME), and organic matter digestibility (OMD) in ruminants. The treatments included control (0% Melissa), 100 µL, 400 µL, 800 µL, and 1600 µL of Melissa officinalis essential oil, along with 1 mL, 2 mL, and 4 mL of Melissa officinalis aromatic water. The control group recorded a TGP of 48.95 mL/200 mg DM. Melissa treatments significantly reduced TGP, with the lowest value observed in the 800 µL essential oil group (42.80 mL/200 mg DM) and the 4 mL aromatic water group (42.77 mL/200 mg DM). Methane production was highest in the control group at 1550 mL. The lowest CH4 emission was observed in the 800 µL essential oil group (13.93 mL) and the 4 mL aromatic water group (14.30 mL). Although not all reductions were statistically significant, a general decreasing trend in CH4 production was noted across treatments. The control group showed the highest ME at 9.13 MJ/kg DM. ME values decreased significantly with higher levels of Melissa treatments, with the lowest value recorded in the 800 µL essential oil group (8.17 MJ/kg DM) and the 4 mL aromatic water group (8.16 MJ/kg DM). The highest OMD was in the control group (63.90%). OMD decreased with increasing Melissa levels, with the lowest values found in the 800 µL essential oil group (52.76%) and the 4 mL aromatic water group (52.73%). In conclussion, Melissa officinalis essential oil and aromatic water show promise as natural feed additives for mitigating methane emissions and improving fermentation efficiency in ruminants. Further research is needed to explore the long-term effects and practical applications of these findings in livestock production systems.

Key words: Melissa officinalis, Methane Emission Reduction, Rumen Fermentation, Organic Matter Digestibility, Metabolizable Energy

VETCH: THE IMPORTANCE OF A NEGLECTED LOCAL HIGH PROTEIN LEGUME

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ABSTRACT

Actually, the increasing population will increase the demand for animal protein, which will bring the sustainability of agriculture systems into question. In addition, in Tunisia, the forage deficit and the nutritional imbalance make the situation worse. In order to meet the increasing protein demand whilst ensuring sustainability and to cope with unpredictable climate change and the fluctuations of the prices of imported raw materials especially soybean meal, protein-rich legumes are required as they represent an environmentally sustainable option, well suited for Tunisia. Among legumes, vetch is an annual legume that grows well under Tunisian conditions. It is tolerant and resilient to changeable annual weather patterns. In Tunisia, different ways of use of vetch were developed and tested on animals. It can be used as forage or as protein grains. As a forage crop, it can be grazed in the spring, either alone or mixed with cereals (triticale, oats, and barley) or in improved weedy fallows. This feed improves the quality of the forage and enhances the performance of sheep and cattle at a low cost (Abidi et Benyoussef, CANA project). In aim to replace the oat hay, renowned for its low nutritional value, we produced vetch hay and different mixtures of hay in different regions of Tunisia. All produced hays were characterized by a high CP content compared to the oat hay. The presence of legumes in mixtures improve hay quality, intake and animal performances at a low nutrition cost (Abidi et al., 2018; Abidi et al., CLCA project). The success of forage mixture become a driver for farmers to integrate it at farm level Another innovative way of use is the summer grazing of the whole dried vetch. It is a cost-effective alternative to wheat stubbles. The grazing of dried vetch alone or alternately with cereal stubble during summer period provided a valuable alternative to cereal stubble enhancing animal performance at a low cost (Abidi et al., 2020, 2021). The animal behavior highlights the preference of the lambs of the vetch and therefore a better palatability of the vetch and its quality could explain the effect on animal performances. The last tested way of use is the the substitution of soybean meal by a variety of Narbonne vetch called Faiza, in concentrate. The partial or total replacement of soybean meal by vetch seeds has no effect on the animal response. However, the use of Narbonne vetch improves meat quality (Abidi et al., 2018, 2022). It can be concluded that vetch, native to Tunisia, with its high nutritional value, high CP content and different ways of use could convince farmers to adopt these feeding alternatives to enhance the sustainability of agriculture systems under Tunisian conditions.

Key words: Vetch, forage, stubble, forage quality, legume, animal performance, low cost

EVALUATION OF THE IMPACT OF THE FOOTPRINT OF POULTRY WASTE GENERATED DURING EGG PRODUCTION IN FARM CONDITIONS

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ABSTRACT

Poultry farming is one of the most efficient animal husbandry methods and it provides nutritional security to a significant number of the world population. Waste materials such as poultry manure can pose a serious threat to environmental and human health, and need to be managed properly. Poultry production and waste by-products are linked to NH3, N2O and CH4 emissions, and have an impact on global greenhouse gas emissions, as well as animal and human health. The main goal of the project is the research of possible emissions of methane, ammonia, nitrogen oxide and other nitrogenous compounds (Footprint), with the application of mathematical models, during the management of poultry waste obtained from poultry farms where chickens are produced and possibilities for reducing these environmental emissions.

Key words: footprint, laying hens, manure.

THE CAPACITY OF WOMEN FARMERS IN THE ADOPTION OF TECHNOLOGY FOR UTILIZING PREDATORY FISH SAPU-SAPU (Pterygoplichthys) IN TO ANIMAL FEED

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ABSTRACT

The research aims to identify the capacity of women farmers in adopting technology for using predatory sapu-sapu fish as animal feed, so that it has added value through processing technology innovation and can contribute to increasing business productivity. The research was carried out in Soppeng Regency, South Sulawesi Province. The determination of female livestock breeders as respondents was carried out using purposive sampling with the criteria that women owned livestock businesses, with a total of 30 respondents being livestock breeders. Research data was collected by conducting a survey using collection techniques, namely interviews using questionnaires, focus group discussions, and in-depth interviews with several key informants. The results of the research show that in general female breeders (80% of female respondents) do not know the technology for managing predatory fish into animal feed, and more than 60% of the respondents need technology for processing predatory fish into animal feed. However, female breeders do not yet know this technology well. This shows that the number of breeders who know the technology is still low. For this reason, efforts need to be made to improve and optimize the application of technology for the use of predatory fish as animal feed and other processed products.

Key words: capacity of farmers (women), adoption, technology, use predatory fish, animal feed

STUDY ON THE REPRODUCTIVE PERFORMANCE OF OULED DJELLAL SHEEP IN THE SEMI-ARID REGION OF SETIF (ALGERIA)

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ABSTRACT

In order to study the effect of the management mode of the sheep herd (diet, health, etc.) on the one hand, and of the region and the season of struggle on the other hand, on reproductive performance. A study was carried out in the semi-arid region of Setif in eastern Algeria, on a sample composed of 2599 ewes, raised on nine farms spread between the north and the south of the region. The results obtained show that ewes reared on farms located in the Southern region showed better fertility and prolificacy rates compared to ewes reared on farms located in the Northern region. With respectively average rates of (135.88±16.76% and 156.30±21.61%) vs (123.07±28.62% and 134.89±21.21%). However, fertility is lower in the farms in the southern region with a rate of (89.45%) vs (94±1.78%). Regarding the season of struggle, the best results are recorded in spring with rates of (118.78±48.88% vs 95.62±65.75%) for fertility, and (135.38± 57.59% vs 89.02±60.01%) for prolificacy and (76.46±34.97% vs 54.50±41.39%) for Fertility. This variation in reproduction parameters between seasons can be explained by the availability of fodder during the spring period.

Key words: sheep, Ouled-Djellal, ewes, reproduction parameters, region, season of struggle.

EFFECTS OF SOME ENVIRONMENTAL FACTORS ON GROWTH TRAITS OF BUFFALO CALVES

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ABSTRACT

The aim of this study was (i) to evaluate the growth traits of buffalo calves [Live weight (LW), Chest girth (CG) Chest depth (CD), Chest width (CW), Withers height (WH), Rump height (RH) and Body length (BL)] in the 0-6 mo period and (ii) to investigate the effects of some environmental factors such as, body condition score (BCS), calving season, gender and parity on these traits. The study was conducted in 5 farms in the Samsun province, located in the Black Sea region in Türkiye. A total of 86 Anatolian buffalo cows and calves were selected. The body condition of the cows was scored subjectively at 15–20 d before calving. Based on the statements of the owner farmers, parity, calving seasons, gender and calf birth dates were recorded. Also, LW, CG, CD, CW, WH, RH and BL of calves were measured once a month for 6 mo. Data of evaluated variables were analysed using a general linear model procedure and t-test. The LW of the calves positively correlated with other growth traits. LW values of male calves were found to be higher than female calves at birth and 30 d. LW and BL values calves of cows with high BCS were higher than calves of those with low BCS at all growth periods. Except from birth, RH values calves of cows with high BCS were higher than calves of those with low BCS at other growth periods. Similarly, other growth traits were affected by BCS in different growth periods. Calving season affected the LW and CD values of calves at birth. At birth, the LW values of the calves of cows with parity of ≥5 were higher than the calves of cows with parity of 1. At the same period, the CG and WH values of the calves of cows with parity of 4 and ≥5 were higher than the calves of cows with parity of 1. It was concluded that parity, calving season, gender and BCS of the cow may affect the growth characteristics of calves at different growth periods.

Key words: Anatolian buffaloes, Environmental factors, Calves, Growth traits

USE OF OLIVE (Olea europaea L.) AND MULBERRY LEAVES (Morus alba L.) IN BROILER DIETS

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ABSTRACT

Antibiotic growth promoters have long been used in animal nutrition. However, this widespread and intensive use has led to the emergence of antibiotic-resistant bacterial species that threaten human health and life. For this reason, antibiotic growth promoters in poultry feeding have been banned in many countries, including the European Union, since 2006. The ban on antibiotics has led to aggravation of bacterial infections and decreased performance in poultry. For this reason, research has focused on finding natural antibiotic alternatives. For this purpose, various growth-promoting alternatives such as beneficial microorganisms (probiotics and prebiotics) and herbal additives and their extracts have been tested and used in the nutrition of poultry and livestock. Herbal additives, also known as phytobiotics, are phytochemical compounds and are substances obtained from the leaves, roots, seeds, flowers, buds, bark of plants or their extracts and have pharmacological effects. Leaves of olive and mulberry trees are among the plants used as phytobiotics in poultry feeding. In this study, we tried to give information about the studies in the last fifteen years on the use of tree-shaped olive and mulberry leaves, which are used as tea, in the nutrition of broiler diets.

Key words: Olive leaf, mulberry leaf, phytobiotics, broiler

IDENTIFICATION OF WILD-SPECIES INTROGRESSIONS IN THE MI-1 REGION OF TOMATO BREEDING LINES USING A SIMPLE POLYMERASE CHAIN REACTION-BASED METHOD

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ABSTRACT

Root knot nematodes are among plant pathogens that cause serious problem to tomato in several countries, and the development of resistant varieties has become the most important breeding objective of tomato. Most disease resistance genes have been identified and introgressed into cultivated tomato from wild pecies such as Solanum chilense, S. peruvianum, S. habrochaites, S. pennellii, and S. pimpinellifolium. Selecting desirable resistance genes in the breeding program depend on the use of biological assays which are not always straightforward because results are ofen affected by environmental stress. Thus, molecular-assisted breeding is a powerfull tool to tagging resistance gene without biological assays. In this study we developed a tightly linked marker to the Mi-gene, which provides resistance to nematodes, PMIF/PMIR. PCR using these primers produced six different profiles for different tomato lines. These profiles allowed discrimination among lines of Solanum lycopersicum with no introgressions from wild species in the Mi-1.2 gene region and lines with introgressions from S. peruvianum, S. chilense and S. habrochaites. Furthermore, these PCR profiles distinguished between resistant (Mi/Mi, Mi/+) and susceptible hybrids (+/+) of root knot nematode. Sequencing data from amplified fragments have shown a 92 to 99% identity with Mi-1.2 gene, which confirmed the tight linkage of the markers to the studied locus. The information generated by these primers could be used in tomato breeding programs for detection of introgressions from wild species in the Mi-1.2 region of chromosome 6

Key words: Mi-1.2 gene, Root knot nematode resistance, Tomato breeding programs, Tomato hybrids, Wild-species introgressions

ISOLATION OF SOME COLLETOTHRICUM MORPHOTYPES ASSOCIATED TO ANTHRACNOSE DISEASE ON CITRUS IN CHLEF VALLEY, ALGERIA

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ABSTRACT

Anthracnose of citrus spread trough the main citrus areas of Algeria associated with mild to severe symptoms on leaves, fruits and twigs, likely with respect to the host susceptibility, climatic conditions and probably to species involved. The incidence rate was of about 60 % in some prospected orchards. Isolation than preliminary cultural and morphological identification of several fungal colonies obtained from infected leaves, fruit and twigs collected through the main citrus areas of the Chlef valley distinguished four different Colletothricum morphotypes (CHDZ-1, CHDZ-2, CHDZ-3 and CHDZ-4). The identified morphotypes were belonged to three complexes: C. gloeosporioides complex, C. acutatum complex and C. boninense complex. Pthogenecity tests showed that all isolates were involved in the development of the typical symptoms of the disease on tested leaves and fruits of different citrus species, additionally to their levels of aggressiveness. citrus varieties tested showed different degrees of sensitivity toward the three isolates. Sour orange leaves being the most tolerant, however pomelo leaves were the most susceptible. Clementine, orange and lemon leaves had a medium sensitivity. Regarding fruits, lemons seem to be more susceptible to anthracnose than oranges. This is the first finding of new species as citrus anthracnose agents in Algerian citrus crop. However, this morphological identification remains preliminary; it should be confirmed by a multi-locus genotypic analysis involving internal transcribed spacer ITS, β-tubulin (tub2), and glyceraldehyde-3-phosphate dehydrogenase (GAPDH). This is the first finding of new Colletothricum isolates as citrus anthracnose agents in Algerian citrus crop.

Key words: anthracnose, isolates, citrus, Colletothricum complexes, Algeria

TRANSMISSION EFFICACY OF AUTOCHTHONOUS APHIDS AND THEIR EFFECTS ON THE GENETIC STRUCTURE OF LOCAL CTV ISOLATES IN CHLEF VALLEY

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ABSTRACT

Following the observation of quick decline symptoms associated to CTV infection in several citrus trees located in the Chlef Valley, the second most important area of citrus cultivation in Algeria, a first survey to assess the status of this epidemic disease and to identify the potential aphid's vectors was carried out revealing an infection rate of 3.21% throughout the studied area. Molecular investigation using multiple molecular markers technique M.M.M.s and CP25 sequencing had showed the presence of the moderateT30 and the virulent VT genotypes. Epidemiological study on natural transmission of was evaluated by two local aphid biotypes. Aphis gossypii (Glover) and Aphis spiraecola (Patch). The experiment had shown the ability of A. gossypii and A. spiraecola to transmit moderate isolates belonged to the T30 group, with a transmission rate of 11 and 8% respectively. In contrast, the virulent isolate affiliated to the VT group was not transmissible by both aphid species. Furthermore, post molecular analysis through M.M.M.s and CP25 sequencing of CTV sub-isolates after aphids' passage did not shown any effect on the genetic structure of the experimented isolates in comparison to the parental sources. This new report of a virulent strain belonging to the VT genotype in the Chlef Valley is a matter of concern for Algerian citrus growers, even though its natural transmission did not evidenced. This situation requires a rapid implementation of a plan of action by phytosanitary services, based on the continuous surveillance of virulent strains for the eradication of primary foci in order to avoid spread to the virus-free areas and periodical investigation of possible natural spread occurring.

Key words: Citrus, Transmission, Aphids, Virulent strain, Genetic alteration

EFFECT OF TWO ESSENTIAL OILS OF THYMUS ZYGIS L. AND MENTHA PIPERITA L. (LAMIACEAE) AGAINST POPULATIONS OF BRUCHUS RUFIMANUS BOH. (COLEOPTERA: CHRYSOMELIDAE)

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ABSTRACT

Diapausing adult males and females of Bruchus rufimanus (Coleoptera: Chrysomelidae) are treated with two essential oils at different doses (2, 4, 6, 8 and 10µl), under laboratory conditions, in order to evaluate their effects on longevity of this great grain pest. Analysis of the results of the tests carried out reveals that treatments with essential oils affect very significantly the lifespan of male and female adults of the bean weevil. During the contact test, the essential oil of thyme proves to be the most effective, because with the highest dose of 10µl we recorded total mortality after 6h and 9h respectively for thyme and peppermint, in the males. For females, the total mortality of B. rufimanus is recorded after 9 hours of exposure with thyme oil, and 12 hours after treatment with peppermint oil. Similarly, the two essential oils exert a toxic effect by inhalation on diapausing bruchids with mortality reaching 100% at a dose of 10µl for thyme and peppermint, in males, after 6 hours of exposure. In females, 100% of mortality was recorded after 6h and 9h of exposure for thyme and peppermint respectively at the same dose. Repellent tests also revealed that thyme has a more marked repellent activity (class IV) compared to peppermint which has a moderately repellent effect (class III). The results obtained show us that the essential oils used have a good insecticid action against the broad bean bruchid, their toxicity varies according to the type of test (contact, inhalation or repellent) and the sex of the adults, moreover we found that males are more sensitive than females to these oils.

Key words: Bruchus rufimanus; essential oils; mortality; longevity; laboratory

ESSENTAI OIL COMPOSITION OF THE DIFFERENT POPULATIONS OF ECHINOPHORA TRICHOPHYLLA J.E. SMITH (ENDEMIC) FROM ISPARTA, TURKEY

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ABSTRACT

The fruits of Echinophora trichophylla J.E. Smith (Endemic), growing wild in Isparta, Turkey, were collected at seed maturing stage from different localities to study the essential oil composition. Fruit samples of the species were collected from three different locations (Eğirdir, Barla and Sav) during the yellow ripening period. Essential oils of the fruits were determined in the hydrodistillation apparatus, and the essential oil components were determined in the GC-MS. The fruit essential oil content in plants grown in the Eğirdir, Barla and Sav locations were determined as 0.17±0.03%, 0.50±0.09% and 0.42±0.04%, respectively. According to GC-MS results, 36, 41 and 45 essential oil components were detected in the essential oils of the samples taken from Eğirdir, Barla and Sav locations, respectively. Total of 56 different essential oil components identified in the fruits of the specie. It was determined that there were major qualitative and quantitative variations between the components of essential oils taken from different localities. The major components were sabinene (10.89%-42.13%), β-myrcene (3.73%-18.55%), Prehnitol (1.12%-15.40%), p-Mentha-1,5,8-triene (1.45%-13.06%), 4-Terpineole (0.66-7.67%), Spathulenol (2.55%-6.36%), and Limonene (2.22%-5.90%). In the study, it was found that ecological factors such as altitude and humidity in the location where the species grows significantly affect essential oil biosynthesis.

Key words: Echinophora trichophylla J.E. Smith (Endemic), Essential oil content and composition, Location, Population

PHENOTYPING OF SOME REGISTERED COMMON BEAN CULTIVARS AGAINST COLD STRESS

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ABSTRACT

In this study, the response levels of 18 common bean cultivars registered in our country to cold stress were investigated. The measurements of L, a, b, Chroma, Hue and SPAD values were taken in cultivars at 20, 15, 10, 5 and 0 degrees, and relative electrolyte leakage values calculated from EC tests were determined at temperatures of 20, 5, and 0 degrees. Additionally, the visual effect of cold stress was assessed. The results indicated that cold stress significantly affected the evaluated characteristics. L, a, b, Chroma, Hue, SPAD and relative electrolyte leakage values varied between 32.59-45.76, -14.75--3.49, 10.80-28.32, 12.91-31.55, 104.10-119.17, 32.59-45.76 and 24.91-72.00, respectively. Visual evaluations revealed that 6 bean cultivars exhibited tolerance to cold stress, 4 showed moderate tolerance, and 8 were sensitive. It is envisaged that tolerant cultivars will assist breeders in breeding efforts to develop cold-tolerant common bean cultivars.
This study was supported by TÜBİTAK 2209-A Project 1919B012205135.

Key words: Cold stress, phenotyping, common bean

DETERMINATION OF PHOSPHORUS, ZINC AND IRON FERTILIZER NEEDS OF SIYEZ WHEAT(Triticum monococcum L.) GROWN IN CALCAREOUS SOIL OF KONYA CITY

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ABSTRACT

It is known that in ancient times, wheat cultivation was first done on the hills above the Tigris River, and emmer and einkorn wheat were among the first products grown in this region. Einkorn wheat first started to be grown on Karaca Mountain in Southeastern Anatolia between 9900 and 10,600 years ago. It later spread to the Caucasus, the Balkans and Central Europe. Today, its cultivation continues in Spain, Germany, Italy, Switzerland, France, Balkan countries and Morocco.It is grown with traditional agricultural methods in a narrow area especially around Kastamonu and Sinop in Turkey. Studies conducted in our country regarding the nutrient needs and fertilization of einkorn wheat are insufficient. The aim of the research was to determine the iron, zinc and phosphorus fertilizer needs of the plant when grown in calcareous soil. In the experiment conducted under greenhouse conditions, different doses of phosphorus (0 and 4 kg P2O5 da-1), zinc (0, 4, 8, 16 mg Zn kg-1) and iron (0, 4, 8, 16 mg Fe kg-1) were applied to the siyez wheat sown in pots. According to the results obtained, the average plant height was found to be 82.67-102.44 cm, the number of ears was 21.33-29.00 pieces/pot, the spike length was 2.90-4.03 cm, the biomass yield was 18.42-25.08 g/pot, and the hulled grain yield was 4.55-6.47 g/pot. It was determined the average Fe, Zn, K, P and N concentrations in the leaf and grain. Considering the grain yield (gr/pot), the yield increased significantly with P0Fe16Zn4, P0Fe4Zn8, P1Fe8Zn4 and P1Fe0Zn16 applications. In conclusion, if there is sufficient phosphorus in the soil, application of 1 kg Fe/da and 2 kg Zn/da may be recommended or if there is not enough phosphorus in the environment, 4 kg P/da, 2 kg Fe/da and 1 kg Zn/da fertilizer application may be recommended.

Key words: Zinc, iron, phosphorus, calcareous soil, siyez(einkorn) wheat

DISTRIBUTION OF ROOT-KNOT NEMATODE SPECIES (MELOIDOGYNE SPP.) IN POTATO PRODUCTION AREAS OF SOUTHWESTERN BULGARIA

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ABSTRACT

In Europe, potatoes (Solanum tuberosum L.) are regarded as one of the principal food crops, alongside wheat. The majority of potato production in Bulgaria is concentrated in the following regions: Pazardzhik, Plovdiv, Smolyan, Samokov and Blagoevgrad. It is established that in these regions, in the recent past, agricultural areas were predominantly cultivated for tobacco (Nicotiana sp. L.), which, along with potatoes, has a number of common pests and pathogens, including phytonematodes and particularly gall nematodes (Meloidogyne spp.). This represents a significant risk for potato growers, given the established presence of these pests in these areas and their capacity to infest a diverse range of hosts. The aim was to study the distribution of root-knot nematodes of the genus Meloidogyne in potato production areas where tobacco had been grown as a monoculture for decades. The results presented in this study were obtained during the period 2022–2023. They are based on the monitoring of potato-producing areas, with a particular focus on 12 monitoring points occupied by potatoes. These points were selected due to the presence of preliminary information on root-knot nematode problems. The findings of the research indicate that root-knot nematodes are widespread in the potato fields in southwestern Bulgaria. A total of nine different genera of plant-parasitic nematodes were identified in the soil samples. The genera Meloidogyne, Globodera, Pratylenchus, Paratylenchus, Tylenchorynchus, Tylenchus, Rotylenchus, Helicotylenchus and Hemicycliophora, and those belonging to the Meloidogyne genus, were identified in 75% of the sampled fields. Potato tubers infected with nematodes of the genus Meloidogyne were found in 90% of the examined samples. The information obtained is important to predict the spread of the infection and the preparation of an effective nematode management strategy.

Key words: root-knot nematode, potato, tobacco

UNDERSTANDING OF ABA MEDIATED STRESS SIGNALING BY GENOME EDITING TO AFFECT RICE DEVELOPMENT UNDER STRESS CONDITIONS

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ABSTRACT

Absicic acid is a major plant regulator under various abiotic stress factors. It mediates several responses in plants such as seed dormancy, reduction in leaf gas exchange parameters, elongation of root length. All the ABA responses occurred as result of altered gene expression. Expression analyses of the gene related to ABA biosynthesis or catabolism indicated several changes in the architecture such as leaf angle, delayed flowering, altered growth regulators and tolerance related mechanisms such as increased ROS scavengers, low membrane leakage, vacuolar compartmentation of toxic radicals under multiple or single stress factors. All these responses may improve plant survival under stress conditions and may not increase grain yield under stress environment such as drought or salinity. However, expression of ABA was related with improvement of pollen viability and seed setting under heat stress which may be helpful in seed yield improvement. In this background, this article reviewed all the recent studies on ABA mediated gene response and expression involved in the rice plant architecture and abiotic stress conditions.

Key words: Pollen viability, electrolyte leakage, altered gene expression

COMPARATIVE TESTING OF MID-EARLY HYBRIDS CORN FOR GRAIN, CULTIVATED UNDER NON-IRRIGATED CONDITIONS IN THE NORTHEAST BULGARIA

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ABSTRACT

The experiment was conducted through the period 2021-2023 in the Northeast region of Bulgaria. The test was conducted in the block method in four repetitions with the size of the experimental plot - 20 m2. The tested corn hybrids are mid-early (FAO 300-399). The aim of the study was to establish the elements of productivity and the yield of mid-early maize hybrids, cultivated for grain under non-irrigation in NorthEast Bulgaria. All the stages of the established technology for maize growing were followed. The grain yield is determined with standard grain moisture of 13%. The indices; length of the cob (cm), number of the row per cob, number of the grains per row, mass of the cob, mass of the grains per cob (g) thousand kernel weight (g), test weight (kg), and grain yield (kg/ha) were determined. The analysis of the results showed that the production possibility of hybrids maize is determined to a great degree by the meteorological conditions of the year mostly by the precipitation quantity.

Key words: maize, hybrids, elements of productivity, yield of grain

STUDY OF HARMFUL AND BENEFICIAL ENTOMOFAUNA ON SUNFLOWER IN THE NORTHEAST BULGARIA

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ABSTRACT

The aim of the study is to establish the species composition of the harmful and beneficial entomofauna, the dominant harmful species and these entomophages, as well as the species diversity indices. The observations were carried out in the period 2021-2023 in an experimental field in the land of Tsar Samuil village. To establish the species composition of the entomofauna, the population density of the dominant harmful species and their entomophages, the classic method - mowing with an entomological bag - was used.
Surveys were carried out during the following periods: outside the sunflower growing season; from the budding phase to the flowering phase of the sunflower and from the flowering phase to the ripening phase of the sunflower.
The study of the entomofauna in the sunflower crop will support the development of good plant protection practice.
Protecting the sunflower from enemies is a good prerequisite for its cultivation.
Monitoring of the entomofauna showed differences in the quantitative and qualitative composition of harmful and beneficial insects during the three years of the study.

Key words: sunflower, entomofauna, plant protection practice

PLANT GROWTH-PROMOTING BACTERIA APPLICATION AFFECTS THE YIELD AND GROWTH OF RED PEPPERS (CAPSICUM ANNUM L.)

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ABSTRACT

The utilization of plant growth-promoting rhizobacteria has been increasing in recent years as a proper alternative to chemical fertilizers. This study aimed to determine whether using a variety of bioinoculants that include both individual and joint treatment with phosphate-solubilizing and nitrogen-fixing bacteria could reduce the need for chemical fertilizer. In the present work, a nitrogen-fixing bacterial isolate T1 and a spore-forming bacteria isolate TR3 were tested for their PGP activities and the possible effect on the growth and development of pepper. Both isolates were positive for indole-3-acetic acid (IAA) production from tryptophan. Both bacteria effectively solubilized phosphate and zinc oxide and were positive for siderophore synthesis. T1 can fix atmospheric nitrogen. TR3 and T1 were evaluated for their effects on the early growth of red pepper in pot experiments. Single and joint treatment with those bacteria significantly influenced root, leaf, and shoot length, and dry biomass of the root and the aboveground part of T1, TR3, and T1 + TR3 treated plants compared to the control plants. Joint application of T1 and TR3 resulted in significantly higher plant height (45.3%) and dry biomass (41.5%) compared to control. Inoculation with nitrogen-fixing isolate T1 significantly increased chlorophyll content, and the uptake of different macro- and micro-nutrient contents was enhanced also in red pepper shoots, in comparison with uninoculated control plants. The findings of this investigation suggest that phosphate-solubilizing and nitrogen-fixing bacteria g with plant growth-promoting traits could be applied in the development of biofertilizers.

Key words: Plant-growth-promoting bacteria, Nitrogen-fixing bacteria, Capsicum annuum L., indole-3-acetic acid, nutrient uptake

LINES DEVELOPED FROM INTERSPESIFIC CROSSES BETWEN CULTIVATED SUNFLOWER AND THE PERENNIAL SPECIES hELIANTHUS MOLLIS (M-O20) VIA EMBRYOCULTURE

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ABSTRACT

Interspecific hybridization was done between cultivated sunflower H.annuus L. and the perennial species H.mollis, accession M-020. The embryo cultivation method was used for successful performance of the crosses. Crosses were realized between this species and sterile lines 2607. Different morphological characters were investigated. As a result of self-pollination and selection, hybrid materials in both F1 and F2 were obtained, and in advanced generations as well. Morphological, phenological and biochemical studies were carried out. Some of the progenies possessed higher seed oil content. Three lines among the selected, combined complete resistance to the pathogens of downy mildew and broomrape. These were the lines 11/1, 13/2 and 15/3.

Key words: sunflower, helianthus annuus, helianthus mollis, embryoculture

USING NDVI TO DIFFERENTIATE WHEAT GENOTYPES UNDER STRESS CONDITIONS

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ABSTRACT

The development and introduction of high-yielding cultivars, which realize their quality potential under different climatic conditions, is a key factor for achieving strategic goals for higher stability and efficiency of grain production. The areas with cereal crops occupy the largest portion of the arable land in Bulgaria. Due to the difficult-to-foresee effects of the climate change, there are higher risks present, as we witness deteriorated environment, disturbed biodiversity, unstable yields, and fluctuating levels of the quality parameters. Precise agriculture is an opportunity to not only save resources but also to realize high added value. The fast development of digital equipment allowed the introduction of a large number of innovative products with a wide range of capabilities. The problem, however, is in the correct interpretation of the results and the accumulation of knowledge of how to utilize the obtained data. The aim of this investigation was to follow the dynamics of the phenological development and the formation of productivity in common winter wheat by using portable precise equipment. In three consecutive harvest years (2021-2024), in the trial field of Dobrudzha Agricultural Institute, experimental plots were allocated within a three-field crop rotation (sunflower – grain pea – wheat). An area of 30 da was divided into a network of 6 equal plots representing the replications of the experiment, each of 5 da. The soil type was leached chernozem (Haplic Chernozem). The wheat cultivar Enola was chosen, which is widely distributed in this region and its economic properties are well known. The sowing norm was in accordance with the varietal specificity and was 550 germinating seeds per м2. Pre-sowing fertilization with 7 kg active matter of P2O5 was done annually. Spring nutrition was applied at the resumed vegetative growth of the plants with 8 kg active matter of nitrogen. After emergence of the seedlings, plots of 1 м2 were marked in each replications, where filed observations and biometric analyses of the plants were done. From the end of tillering stage to physiological maturity (BBCH 30-90), additional investigations were carried out to assess the physiological status of the genotypes. Precise laboratory equipment was used to determine the leaf mass temperature (non-contact thermometer IR-G550), the relative humidity and temperature inside the crop (device for humidity and temperature measurement HTM-49), and the normalized difference vegetation index (NDVI) (GreenSeeker). The measurements were taken every 10 days within the same time interval (13:00 – 14:30 pm). As a result from the above activities, the dynamics of change of the main meteorological factors, which influenced the development of common winter wheat, was evaluated. The level and variation of the physiological parameters during the phenological development under the specific agronomy practices applied was identified. Their variation was registered as affected by the landscape, the quality of soil tillage, the use of main fertilizers and the distance from the forest shelter belts.

Key words: common winter wheat, precise agriculture, efficient grain production

INSECTARY PLANTS AS A TOOL FOR BIOCONTROL OF CROP PESTS IN BULGARIA: A REALITY CHECK

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ABSTRACT

The goal of habitat manipulation is to enhance environments for natural enemies by boosting species diversity and the structural complexity of agroecosystems. One aspect of this manipulation involves adding floral supplements, which offer parasitoids and predators nectar or pollen as extra food sources. Various plant-based management practices have been implemented to conserve and stimulate the activity of natural enemies. These include native plant field borders, temporary insectary strips, hedgerows and windbreaks, cover crops, conservation cover, and herbaceous buffer practices. Many of these practices incorporate insectary plants, which attract and sustain populations of natural enemies through their nectar and pollen, aiding in biological control. The study aimed to assess the potential of using insectary plants in conservation biological pest control in Bulgaria. This review focused solely on information from published research articles. The paper presents research-verified information about plants in Bulgaria that could serve as insectary plants. Our findings indicated that, although there is a wealth of information on plants that attract beneficial organisms, studies mainly targeted aphid and thrips control through hoverflies and other predators. Most of the data on potential insectary plants for conservation biological control in Bulgaria were related to Lobularia maritima (L.) Desv., Achillea millefollium L., Coriandrum sativum L., and Sinapi's alba L.

Key words: enhancement, conservation biocontrol, plant diversity, habitat manipulation

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A STUDY OF THE RESPONSE OF EINKORN AND COMMON WINTER WHEAT PLANTS TO TREATMENT WITH PLANT GROWTH REGULATOR AND CONTRASTING LEVELS OF NH_4NO_3 FERTILIZATION

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ABSTRACT

The aim of the study was to investigate plant responses to the application of plant growth regulator 4PU-30 (phenylurea type cytokinin) and ammonium nitrate through physiological, morphological and phytopathological approach. During the 2023-2024 growing season, field experiments were conducted with common winter wheat (Triticum aestivum) and einkorn (Triticum monococcum) crops. The experimental scheme consisted the following variants which apply to both cultures: Control plants – not-fertilized with ammonium nitrate NH_4NO_3 and not-treated with plant growth regulator throughout their vegetation development. 2. Fertilized plants with NH_4NO_3 during the tillering phase and not-treated with plant growth regulator; 3. Not-fertilized plants with NH_4NO_3 and twice treated with plant growth regulator 4PU-30 in the phases of stem elongation and grain filling; 4. Plants fertilized with NH_4NO_3 and treated with plant growth regulator 4PU-30 in the phases of stem elongation and grain filling.
A higher values of chlorophyll index, fresh and dry leaf mass and leaf area were obtained after fertilizer + 4PU-30 treatments. Less positive effect of the applied growth regulator 4PU-30 was found in einkorn and a strong positive effect in the common winter wheat Enola. The same correlations were found for yield, with the highest yield recorded under combined fertilization and treatment with plant growth regulator. The causative agent Blumeria graminis f. sp. tritici significantly damaged the leaves (40.0-50.0 % infected leaf area), but only in the wheat variant not-treated with 4PU-30. No damages were found in all einkorn variants and in wheat treated with growth regulator. Funding: This research was funded by Bulgarian National Scientific Fund (BNSF) grant KP-06-N56/15 (КП-06-Н56/15)

Key words: einkorn, winter wheat, phenylurea type cytokinin 4PU-30

INFLUENCE OF EFFECTIVE MICROORGANISMS AND MINERAL FERTILIZERS ON SOIL BIOGENICITY PARAMETERS AND SOYBEAN YIELD

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ABSTRACT

The aim of the research was to determine the effect of the application of effective microorganisms (EM) on the basic microbiological parameters of soil biogenicity and the height of soybean yield. The research was conducted in the period from 2016-2018 (Factor A). Factor B soybean genotype Galina, Sava, Rubin and factor C application of EM: variant 1 - control, variant 2 - EM in the soil 20 lha-1 and foliar treatment in the phase of plant development from three to four trefoils and the budonization phase, (5 lha-1); variant 3 - NPK fertilizer (8:15:15), 300 kgha-1, and variant 4 - EM in the soil 20 lha-1 and foliar treatments in the stage of plant development from three to four trefoils and the budonization stage + NPK of 300 kgha-1. During full flowering, the basic parameters of soil biogenicity, the total number of microorganisms (TNB), the number of azotobacter (AZB) and actinomycetes (ACT) were determined. At the end of the growing season, the grain yield was measured. The results showed that all the factors had a very significant effect on all the examined traits. Application of EM had a significant impact on all investigated parameters. The parameters of soil biogenicity in Variant 4 EM+NPK were statistically significantly ($p<0.01$) higher than the control and Variant 2 and 3. In the rhizosphere of the Rubin genotype, the highest number of all tested parameters was determined. The variety Rubin had the highest grain yield of 4105.03 kgha-1. Variant 2 with EM increased the yield by 13.29% compared to the control, which was at the level ($p<0.05$), and with the application of EM+NPK variant 4, the yield was higher by 15.95%, which was at the ($p<0.01$) level of significance.

Key words: effective microorganisms, soybean, soil biogenicity, yield

SCREENING OF PHYTOCHEMICALS AND IN VITRO EVALUATION OF ANTIBACTERIAL AND ANTIOXIDANT ACTIVITIES OF LEAVES, ROOT BARK AND ROOT EXTRACTS OF ZIZYPHUS LOTUS (L.) DESF.

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ABSTRACT

The infusion and the decoction of Zizyphus lotus (L.) Desf. are used traditionally by the population in Algeria for its hypoglycemic, antidiarrheal, hypotensive, and anti-ulcer proprieties (**1**). The objective of this study was to assess the phytochemical content, antibacterial activity and antioxidant activity of leaves, bark and roots of Z. lotus. The leaves, the stem bark, and the root aqueous extracts were prepared and evaluated for radical scavenging activity (RSA) on 2,2-diphenyl-1-picrylhydrazyl (DPPH) and ferric reducing antioxidant power (FRAP). The extracts were also appraised for its antibacterial activity against Escherichia coli, Staphylococcus aureus by the broth microdilution assay. Total content of phenolics (TPC), and flavonoids (TFC) was also determined spectrophotometrically. The results indicated that all parts of the plant, but especially root barks, were effective in inhibiting the growth of antibiotic resistant strains of Escherichia coli and Staphylococcus aureus species obtained from clinical isolates. All the extracts has significant and high RSA and FRAP activities compared to the Trolox. The aqueous extract of the root bark has a strong antioxidant activity with half maximal inhibitory concentration (IC50) of 09.14 ± 0.29 µg/mL using 1-diphenyl-2-picrylhydrazyl (DPPH) and IC50 of 08.8 ± 0.3 µg/mL For ferric reducing/antioxidant power (FRAP) assay. Moreover, the root bark represents a high antibacterial activity with MIC of 0.625 mg/mL and 2.5 mg/mL against Escherichia coli and Staphylococcus aureus, respectively. The stem bark extract was found to be rich in total phenolic and total flavonoid contents as compared to the leaves and the root extracts. It was concluded that all studied parts of Z. lotus had antibacterial and antioxidant activities. These properties might be due to the presence of high total phenolic content and flavonoids. Hence the different parts of the tested extracts represent a potential

source of antibacterial and antioxidant compounds that may be used in food, agriculture and/or pharmaceutical products.

Key words: Zizyphus lotus (L.) Desf., Antioxidant, Antibacterial, Radical Scavenging activity, phenolics, Flavonoids

MULTI-TRAIT SELECTION INDEX FOR SIMULTANEOUS SELECTION OF WINTER BARLEY GENOTYPES

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ABSTRACT

This study aims to assess winter barley genotypes for the selection of desirable ideotypes based on their grain yield and yield-related characteristics. Field trials were conducted using a Complete Block Design with four replications at the Institute of Agriculture – Karnobat, Bulgaria, during the 2021/2022 and 2022/2023 growing seasons. The traits measured included spike number per m², plant height, lodging, spike length, spikelet number per spike, grain number per spike, grain weight per spike, 1000-grain weight, and grain yield. A significant effect of genotype, year, and their interaction was observed ($p < 0.01$) for the performance of 21 barley advanced breeding lines and varieties across the nine traits. Moderate to high broad-sense heritability ($30\% < H^2 \leq 60\%$) was noted for all traits except for lodging and grain yield ($H^2 < 30\%$). The ranking of genotypes by the multi-trait genotype–ideotype distance index (MGIDI) varied between the two years. The advanced line G12 was identified as a promising genotype in both years, indicating its potential for inclusion in multi-environment trials for testing as a candidate variety. The promising genotypes selected based on their performance for multiple traits closest to the ideotype could be further utilized in winter barley breeding programs targeting grain yield improvement.

Key words: Hordeum vulgare H., multi-trait genotype–ideotype distance index, yield and yield-related traits

GRAIN YIELD AND QUALITY TRAITS OF RECOMBINANT INBRED LINES (RILS) OF WINTER BARLEY

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ABSTRACT

A set of recombinant inbred lines (RILs) of winter barley was evaluated for grain yield and quality attributes, including 1000-grain weight, protein content, lysine content, fat content, ash content, fiber content, and carbohydrate content. The RILs, along with the parents (variety Mahigan and advanced line KT3027) and the national standard variety Veslets, were grown in the experimental field of the Institute of Agriculture – Karnobat, Southeast Bulgaria. The experiments were conducted using a block method with four replications on 10 m² plots over two growing seasons, 2021/2022 and 2022/2023. Pearson correlation analysis revealed that protein content was negatively associated with lysine and carbohydrate content. Additionally, carbohydrate content showed a negative association with ash content. There were no significant correlations between grain yield and the studied grain quality traits, indicating the potential to simultaneously improve grain yield and key grain quality attributes. The genotype-by-yield trait (GYT) biplot approach was employed to select RILs with the best combination of grain yield and quality attributes. RILs 15/20, 13/20, and 6/20 demonstrated superior performance compared to the parent genotypes and the standard variety Veslets, as indicated by the superiority index. These results highlight the high potential of the GYT biplot method for selecting lines with simultaneous improvements in grain yield and important grain quality characteristics in winter barley.

Key words: Hordeum vulgare L., correlation, genotype-by-yield trait (GYT) biplot, superiority index

DIFFERENTIAL RESPONSE OF HETEROTROPHIC AND AUTOTROPHIC SPRING TRITICALE SEEDLINGS TO WATER DEFICIT AND EARLY REHYDRATION

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ABSTRACT

Climate change poses serious challenges for global agriculture, causing more frequent extreme weather events, such as prolonged periods without rainfall leading to soil droughts. Agriculture must address these sustainably by reducing chemical usage and growing species capable of effective water management. Spring cereals have gained importance due to their shorter vegetative period, making them less exposed to deacclimation, freezing, or typical winter cereal diseases. However, spring cereals face significant challenges from early-stage droughts. Research focuses on identifying reliable indicators of physiological and genetic responses to soil water deficits. Drought was applied at two stages of the seedling growth, that is heterotrophic growth, when they are tolerant to water shortage and autotrophic growth, when they are drought-sensitive. Measurements and analyzes were carried out on the fourth day of drought and after 24 hours of rehydration. Leaf water content (LWC), electrolyte leakage (EL) and chlorophyll content (Chl) were measured. Gene expression was analyzed for HVA1 and SRG6. Drought accelerates plant senescence, visible as leaf yellowing due to chlorophyll degradation. Rehydration can limit or accelerate drought-induced aging. Significant correlations were observed between physiological parameters only in cv. ‘Milkaro,’ indicating a strong relationship between water content, chlorophyll levels, and membrane condition. SRG6 transcript level is a reliable indicator of effective plant regeneration during early rehydration. The importance of HVA1 in activating defense mechanisms in autotrophic growth phases is highlighted. SRG6 transcript level can indicate effective plant regeneration during early rehydration after drought. Twenty-four-hour rehydration did not inhibit drought-induced senescence, maintaining low chlorophyll levels in drought-sensitive autotrophic seedlings. HVA1 transcript level changes suggest its role in defense mechanism activation in drought-sensitive phases. These findings enhance understanding of spring cereals' adaptive mechanisms to drought and rehydration, crucial for improving their tolerance to water stress and minimizing yield losses.

Key words: Drought, Seedling, Triticale, Rehydrataton

EFFECT OF GROWING CONDITIONS ON THE PHENOLOGICAL DEVELOPMENT OF BARLEY VARIETIES

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ABSTRACT

The research was conducted at the Institute of Agriculture - Karnobat, Bulgaria. The aim of the study is to determine the influence of growing conditions on the phenological development of barley varieties. In a Polish multifactorial experiment, four varieties of winter barley - Kuber, Saira, Zemela and Bozhin - were grown under four fertilization options (N0, N8, N12, N16) and three sowing rates (250, 350, 450 germinating seeds). According to the BBCH barley development scale, the development phases of the varieties are recorded. Significant differences were found between the duration of the individual phases in the two-row and multi-row varieties. The role of the conditions of the year on the duration of the development phases is highlighted. It is most strongly manifested during the germination phase and the twining phase. In addition to the conditions of the year, fertilization also has a big impact, since in dry years in the variants with higher fertilizer rates, the plants are difficult. Under conditions of drought and high temperatures, the phases are shortened and pass more quickly.

Key words: winter barley; growing conditions; phenological development

EFFECT OF COMPOUND FERTILIZERS AND GROWTH REGULATORS ON THE PRODUCTIVITY OF SUNFLOWER HYBRIDS

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ABSTRACT

The influence of combined fertilizers and growth regulators on the productivity and quality of sunflower seeds of the hybrids Prometei, Baikal and Sunny IMI, created at DAI, was studied by applying a four-factor analysis of variance on the characters seed yield, weight of 1000 seeds and oil content. The F criterion was applied, which shows high statistical reliability of influence of the investigated factors on the studied characters. The highest seed yield, regardless of the trial variants, was achieved by the hybrid Prometei (390-464 kg/da), followed by hybrids Baikal and Sunny IMI. Depending on the influence of seeding density, all hybrids realized the highest yield in the variant with the highest seeding density. Depending on the tested fertilization options, the products Ecolist oilseeds, Ecolist micro S and Ecolist micro Mg stand out with the most positive effects on yield.

Key words: fertilization, growth regulators, sunflower hybrids, analysis of variance

GROWTH AND DEVELOPMENT OF SPRING AND WINTER TRITICALE UNDER SPEED BREEDING AND ARTIFICIAL CONDITIONS

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ABSTRACT

The creation of new triticale varieties is an extremely complex and dynamic process that requires continuous improvement of breeding programs and methods. This is related to the rapid provision of reliable genotypes in the conditions of sudden and permanent changes in climate. Speed breeding makes it possible to grow more than one generation of a given crop within a year. In order to evaluate the suitability of triticale to be grown under the conditions of speed breeding, 64 varieties of winter and 30 accessions of spring triticale were grown in artificial conditions within one calendar year. In the spring triticale samples, 2.5 growth periods were realized in one calendar year, with a total of three vegetations taking one year and 4 months. The shortest vegetation period (71 days) was recorded in the first selection cycle, and the longest (141 days) in the second. This is associated with lower temperatures in the second cycle (15-25ºC) than in the first (25-35ºC). Heading in the first cycle takes an average of 6 days (51-57 days), and in the second cycle, 25 days (42-67 days). In winter varieties, after 30 days of vernalization at 5ºC, 59 samples survived, of which 56 were headed, and seeds were formed in only 54 of them. Despite the high growing temperatures (25-35ºC), heading is extremely uneven, covering a period of 40 days. The obtained results show that the spring accessions are to a greater extent adapted to the conditions of speed selection. In the case of winter forms, only those with a shorter growing period and less sensitivity to the photoperiod are suitable for speed breeding and artificial conditions.

Key words: Speed breeding, Triticale, Growing period

DISTRIBUTION AND RACE STRUCTURE OF PLASMOPARA HALSTEDII (DOWNY MILDEW) IN THE 2023-2024 PERIOD IN BULGARIA

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ABSTRACT

Downy mildew/Plasmopara halstedii Farl. Berlese et de Toni is one of the major problems in sunflower production and is distributed all over the world. In Bulgaria, the pathogen is very important especially in the last few years, as changes in weather conditions and the emergence of new races have created an opportunity for the pathogen to become more widespread. Increasingly, scientists report the emergence of new, more virulent races in Europe. As a result of the 2-year study, 7 races of Plasmopara halstedii were isolated – 374/7, 564/7, 724/7, 726/7, 764/7, 774/6, 774/7. The distribution area and percent in the pathogen population of each of them varied during the years, which is related to the fast changing hybrid structure of the sunflower crop.

Key words: Downy mildew, Sunflower, Races

AGROBIOLOGICAL CHARACTERISTICS OF TWO-ROW BARLEY VARIETIES (Hordeum vulgare L.)

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ABSTRACT

In the period 2020-2023, an agrobiological characterization of double-row barley varieties created at the Institute of Agriculture - Karnobat, Bulgaria was made. Cold tolerance and drought tolerance of 13 barley varieties were studied. The cold resistance of the breeding materials was determined by freezing at temperatures of -10, -12 and -14 C. Through a complex of physiological indicators the biological drought resistance of the tested varieties was determined and the coefficient of drought resistance was calculated according to Valchev, 1995. The yield results and some elements of productivity were reported - umber of productive brothers per m2, plant height (cm), length of spike (cm), number of grains in spike, weight of grain of one spike (g), weight of 1000 grains (g). The quality of the grain was determined according to the parameters mass per 1000 grains (g), hectoliter mass (кg), protein content, grain uniformity (%), extract content. Data were analyzed by principal component analysis, calculated on the basis of the mean values of the signs. The software products JMP and SPSS were used for the statistical processing of the data. Two-row barley cultivars were found to have high cold tolerance and very good to moderate drought tolerance, making them suitable for areas with variable weather conditions. They were highly yielding and significantly exceeded national yield standards. With the highest yield from the group of barley varieties was the Kuber variety - on average 755 kg/da, Odyssey - on average 738 kg/da and Devinia - 722 kg/da. The grain quality of cultivars identified Kuber, Devinia, Odyssey, Daria and Lardea cultivars as good for brewing grain. The varieties Zagorets, Imeon and Achille were suitable for fodder production.In the period 2020-2023, an agrobiological characterization of double-row barley varieties created at the Institute of Agriculture - Karnobat, Bulgaria was made. Cold tolerance and drought tolerance of 13 barley varieties were studied. The cold resistance of the breeding materials was determined by freezing at temperatures of -10, -12 and -14 C, calculating the average % of living plants, the critical temperature and the cold resistance group according to the method of Koch (1975). Through a complex of physiological indicators - water content in the leaves, exoosmosis of electrolytes, residual water deficit and water-holding capacity, the biological drought resistance of the tested varieties was determined and the coefficient of drought resistance was calculated according to Valchev, 1995. The yield results and some elements of productivity were reported - umber of productive brothers per m2, plant height (cm), length of spike (cm), number of grains in spike, weight of grain of one spike (g), weight of 1000 grains (g). The quality of the grain was determined according to the parameters mass per 1000 grains (g), hectoliter mass (кg), protein content, grain uniformity (%), extract content. The software products JMP and SPSS were used for the statistical processing of the data. Two-row barley cultivars were found to have high cold tolerance and very good to moderate drought tolerance, making them suitable for areas with variable weather conditions. They were highly yielding and significantly exceeded national yield standards. With the highest yield from the group of barley varieties was the Kuber variety - on average 755 kg/da, Odyssey - on average

738 kg/da and Devinia - 722 kg/da. The grain quality of cultivars identified Kuber, Devinia, Odyssey, Daria and Lardea cultivars as good for brewing grain. The varieties Zagorets, Imeon and Achille were suitable for fodder production.

Key words: barley, varieties, productivity, quality

BIOLOGICAL AND PHYSIOLOGICAL STUDIES ON BARLEY VARIETIES AND LINES

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ABSTRACT

The purpose of the trial was to determine the relationship between some biological and physiological indicators and productivity. In the period 2021-2023, 30 varieties and lines of winter barley were studied in the experimental field of the Institute of Agriculture - Karnobat, Bulgaria. The trial was sown in 10 m2 plots in 4 replicates. The chlorophyll content of leaves in two phases of plant development was reported. The microclimate in which each variety and line was developed was characterized, according to the indicators temperature of the surface of the crop, temperature inside the crop, humidity of the air in the crop, albedo. The yield was reported and the results were statistically processed. The software products JMP and SPSS were used. A strong correlation was found between physiological parameters and productivity of cultivars and lines, as well as between chlorophyll content and yield.

Key words: barley, chlorophyll, microclimate, yield

ROOT NODULE FORMATİON ABİLİTY OF LEGUMES İN ANNUAL MİXTURES

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ABSTRACT

The nodule formation potential of legume components in annual grass-legume forage mixtures was investigated. Pea and vetch sown alone (100%), in double mixtures with oats in the legume:grass ratio (70:30%), and in triple mixtures in the legume:legume:grass ratio (35:35:30%) were tested in a pot trial under semi-controlled conditions. Spring forage pea variety Crystal and spring vetch variety Obrazets 666 were used. Based on plant morphometry - root mass, nodule characteristics, some biometric indicators of nodule formation were calculated. Pea plants (100%) showed greater specific nodule-forming ability compared to vetch (100%). The same tendency was found for the mixtures with oats (70:30%). In the triple mixtures (pea-vetch-oat - 35:35:30%), the specific nodule-forming ability of both leguminous crops decreased, weaker for pea (5.22%) versus vetch (13.66%).

Key words: Pea, Vetch, Nodulation, Mixtures

YIELD STABILITY OF MAIZE DEPENDING ON HYBRID AND AGRO-METEOROLOGICAL CONDITIONS

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ABSTRACT

The study aimed to determine the effect of hybrid and agro-meteorological conditions on grain productivity of maize. During the period 2020-2023, a comparative variety trial with maize hybrids of maturity group FAO 300 to FAO 600 was conducted at the experimental field of the Maize Institute - Knezha. The hybrids Kneja 310, Kneja 435, Kneja 561 and Kneja 683 A, grown under standard technology and non-irrigated conditions, were tested. Grain yield was recorded and Stability Yield Index (SYI) was calculated. Two-factor analysis of variance was used to find the influence of hybrid and environment factors. Over the four-year study period, the amount of rainfall per growing season varied from 199.8 to 316.1 mm/m2, and grain yield averaged for the hybrids tested varied from 863.4 to 1095.2 kg/da. The highest average grain yield over the period was recorded from the hybrid Kneja 561 (1075.1 kg/da) and the lowest from Kneja 683A (874.3 kg/da), respectively. However, these hybrids also showed low Stability Yield Indices, 0.618 and 0.720 SYI values, respectively. Relatively high and stable yields were obtained from Kneja 310 (900.3 kg/da, SYI value 0.875) and Kneja 435 (940.6 kg/da, SYI value 0.831), respectively. Two-factor analysis of variance showed a higher influence of the environment factor compared to hybrid on the grain yield of maize.

Key words: Maize, Stability Yield Index, Grain yield

HERBAL METHODS USED FOR PAIN

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ABSTRACT

Introduction: Pain is a distressing feeling that limits a person's daily activities and activities. Often, it serves to alert you that something is wrong with your body. The widely accepted definition of pain was developed by the International Association for the Study of Pain: "Pain is an unpleasant sensation and emotional experience resulting from, or described as, actual or potential tissue damage." As pain is the main cause of many diseases, many methods are used to relieve pain. Purpose: In this study, the aim is to find answers to the questions about which plant is used by the society for which pain and whether it is beneficial or not by scanning the plants mentioned in the literature. Method: For this purpose, the sample of the study consists of 50 people. A short and understandable data form was prepared as a data collection tool. The data collection form consists of 15 questions, 6 of which are about personal data, and the remaining 9 questions are about the definition of plants and methods used in pain. Conclusion: As a result of the study, it is concluded that personal variables such as age, gender, and educational status are quite important. The level of education ensures that they are aware of the effectiveness of the method used. It has been concluded that the work done and working hours affect the methods used in pain, and the plants preferred by the ages of the individuals vary. As a result, pain affects individuals in terms of physical, mental and social aspects. It reveals the fact that individuals prefer herbal methods from non-pharmacological methods in order to better control the pain.

Key words: Pain, Phytotherapy, Plants, Nonpharmacology

VARIABILITY OF QUANTITATIVE TRAITS AND SEED YIELD OF SMALL SUBSET OF COMMON BEAN (PHASEOLUS VULGARIS) GERMPLASM COLLECTION

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ABSTRACT

The study was carried out during 2022-2023 with 20 accessions of common bean (Ph. vulgaris L.) with medium and late maturity. The variation of quantitative characters was studied: plant height, height of the first pod, number of pods and weight of the pods per one plant, pod length, pod width, number of seeds per pod, seed length, seed width and seed thickness, total weight of seeds per plant and 100 seed weight. The results showed that number of pods per plant and 100 seed weight are positively correlated with total weight of seeds per plant. Selection should be done for more pods per plant, seeds per pod, 100 total seed weight to get high grain yield per genotype and use these results for future breeding activities.

Key words: common bean, characterization, evaluation, collection

DIFFERENCES IN VEGETATIVE AND REPRODUCTIVE TRAITS BETWEEN COMMON BEAN (PHASEOLUS VULGARIS L.) AND COWPEA (VIGNA UNGUICULATA L.)

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ABSTRACT

The study was carried out with 10 accessions of common bean (Ph. vulgaris L.) and 10 accessions of cowpea (Vigna unguiculata L.) to find differences in growth and plant development of the two grain legumes. Different phenological stages and elements of yield were analyzed. The accessions of common bean were sown during first decade of April, while the cowpea accessions were sown in the last decade of April. The flowering stage occurred with average number of 44 days in common bean and 48 days in cowpea. The duration of the vegetation cycle in cowpea was with 5 days longer (79 days) than in common bean (74). The yield components, number of pods per plant, weight of pods and seeds per plant and 100 seed weight were quite different between two crops. The mean number of pods per plant was 9,6 in common bean and with mean values of 11,7 in cowpea. The weight of 100 seeds was higher in common bean with value of 28,3g against to 18,0g for cowpea, respectively. Cowpea showed more stable yield production compared with common bean, resulting in bigger number of pods per plant and weight of seeds per plant under growth conditions of Central Southern Bulgaria

Key words: common bean, cowpea, differences, growth, development

THE EFFECTS OF ATTAPOULGITE ALONE PLUS OLIVE MILL WASTE ON OLIVE YIELD, OLIVE OIL QUALITY, LEAF NUTRIENT STATUS AND SOIL PROPERTIES

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ABSTRACT

The olive oil industry is considered one of the most important sectors in agriculture, especially for the countries in the Mediterranean basin. One of the key challenges the sector faces is the recycling and use of olive mill wastes. The aim of this trial was to investigate how a mixture of a soil amendment with olive mill waste can be utilized in olive groves. Olive mill waste derived from a two-phase olive mill was mixed with attapulgite and applied as a soil amendment to mature, bearing olive trees of the cultivar "Megareitiki," grown under rainfed conditions. The application was made in early spring, and the two constituents were mixed in a 1:1 ratio. The mixture was applied at a rate of 8 kg per tree. Untreated trees served as controls, while a third treatment involved the soil application of attapulgite at a rate of 4 kg per tree. At harvest in early November, the length of annual shoot growth was measured, and the trees were individually harvested and their yield measured. A sample of approximately 1.5 kg of olive fruits was used for oil extraction in an Abenchor-type laboratory olive mill to determine oil percentage. The olive oil produced was assessed for acidity, peroxide number, UV absorbance (K values), polyphenols, and antioxidant capacity. At the same time, soil samples were taken from 0-30 cm and 30-60 cm depths to assess soil physicochemical properties, and leaf samples were taken to assess tree nutrient status. The treatments did not have any significant effect on shoot growth (ranging from 15.2 to 16.4 cm), yield, olive oil percentage, or oil quantity per tree. Olive oils produced under the different treatments were all classified as Extra Virgin Olive Oil based on the measured variables, with none of the treatments having a significant effect on them. The addition of attapulgite resulted in higher concentrations of N-NO3, B, and Na in the soil (0-30 cm), while the mixture of olive mill waste and attapulgite resulted in higher P and Mn concentrations. At the depth of 30-60 cm, higher P concentrations were found in the control and attapulgite treatments, while higher Fe concentrations were found in the control. Attapulgite addition to the soil resulted in higher B and Mn, while the application of the mixture of olive mill waste plus attapulgite increased the concentration of N-NO3. In the leaves, the addition of the mixture resulted in a significant increase in P and Mg, with no other differences observed. It seems that olive mill waste can be used in a mixture with attapulgite to increase some minerals in the soil without affecting olive tree production or olive oil quality. However, a longer experimental period is required to fully understand the possible effects of this mixture on both soil properties and leaf mineral nutrient concentration, yield, and olive oil properties.

Key words: nutrients, olive oil, phenolics, soil properties

CHERRY FRUIT PHYSICAL, ORGANOLEPTIC AND PHYTOCHEMICAL CHARACTERISTICS OF TWELVE CULTIVARS GROWN IN ARNISSA, CENTRAL MACEDONIA, GREECE

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ABSTRACT

Cherry fruit is a drupe which is highly appreciated by consumers. Many cultivars have been developed around the world, based mainly on physical characteristics, such as size and color. Not all cultivars are suitable for a specific region and trials should be made before deciding which cultivar is best suited for this specific pedoclimatic conditions. Tweleve cultivars grown in the same are, Arnissa, Western Greece, were assessed for their physical, organoleptic and phytochemical characteristics. Fruits were provided by the Co-operative of Arnissa and were harvested at the commercial maturity of each cultivar. Cultivars assessed were “Samba”, “Kordia”, “Lapins”, “Germesdorfer”, “Grace Star”, “Durone Nero III”, “Crystallina”, “Regina”, “Skeena” and local ones such as “Opsimi”, “Tragana Edessas” and “Evlogimeno” while samples of “Regina” (REGA) from a specific location in the area were also assessed. Physical characteristics measured were fruit weight and size (diameter (wide and narrow), length and flesh weight, as well as skin color, expressed as Hue angle and Chroma indexes). Furthermore, total soluble solids, pH and titratable acidity were assessed in the pulp as well as total phenols, total flavanols, total flavonoids and antioxidant capacity, based on Diphenyl picryl hydrazyl (DPPH) and ferric reducing antioxidant power (FRAP) assays. Results indicated that there were significant among cultivars regarding the measured parameters. Principal component analysis indicated that “Tragana Edessas” as well as “Durone Nero III” were distinguished from the other cultivars based mainly on their phenol content and antioxidant capacity. The highest fruit weight was determined in “Durone Nero III” and “Crystallina” fruits, while “Durone Nero III” also presented the highest total soluble solids, in contrast to “Evlogimeno” and “Germesdorfer” which presented the lowest. These significant differences among cultivars should be taken into account, along with the maturity period and tree load when someone needs to select the proper cultivar or cultivars for specific pedoclimatic conditions.

Key words: antioxidant capacity, cherry, organoleptic characteristics, phenolic compounds

RAPID EXPANSION OF THE ASIAN WALNUT MOTH, GARELLA MUSCULANA (ERSCHOV, 1874) (LEPIDOPTERA, NOLIDAE), IN THE REGION OF SOFIA, THE CAPITAL OF BULGARIA

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ABSTRACT

The Asian walnut moth, Garella musculana (Erschov, 1874), is a significant pest of walnut trees (Juglans regia L.), causing damage to young shoots and fruits. The pest was first detected in Bulgaria in 2016 and officially reported in 2018. Since then, no published data on its presence in Bulgaria has been available. However, in September 2023, the moth was detected in four different localities in both urban and suburban areas of Sofia. The study aimed to identify the current distribution of the moth in the region of Sofia. Between June and August 2024, a detection survey was conducted in 45 locations in urban and suburban areas of Sofia. Walnut tees located in streets, parks, and suburban areas were surveyed. The presence of the moth on walnut trees was confirmed by detecting damaged young shoots, larvae within dissected fruits, and pupae in dissected cocoons. The species was found on all surveyed walnut plants in the region of Sofia. Larvae were primarily found in the pericarp of fruits, although they also penetrated the nut, similar to Cydia pomonella (L.). A mixed population of G. musculana and C. pomonella was identified in most localities where G. musculana is present. Infestation rates by G. musculana ranged from 50% to 90% among the fruits on surveyed plants. It is likely that the moth is more widespread in Bulgaria than currently recorded. Given the rapid spread of the moth in the region of Sofia and the increasing interest in walnut production, further investigations into the distribution and impact of this pest in Bulgaria are necessary.

Key words: Alien, distribution, Juglans regia, pest

MULTI-TRAIT SELECTION INDEX FOR SIMULTANEOUS SELECTION OF WINTER BARLEY GENOTYPES

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ABSTRACT

This study aims to assess winter barley genotypes for the selection of desirable ideotypes based on their grain yield and yield-related characteristics. Field trials were conducted using a Complete Block Design with four replications at the Institute of Agriculture – Karnobat, Bulgaria, during the 2021/2022 and 2022/2023 growing seasons. The traits measured included spike number per m², plant height, lodging, spike length, spikelet number per spike, grain number per spike, grain weight per spike, 1000-grain weight, and grain yield. A significant effect of genotype, year, and their interaction was observed ($p < 0.01$) for the performance of 21 barley advanced breeding lines and varieties across the nine traits. Moderate to high broad-sense heritability ($30\% < H^2 \leq 60\%$) was noted for all traits except for lodging and grain yield ($H^2 < 30\%$). The ranking of genotypes by the multi-trait genotype–ideotype distance index (MGIDI) varied between the two years. The advanced line G12 was identified as a promising genotype in both years, indicating its potential for inclusion in multi-environment trials for testing as a candidate variety. The promising genotypes selected based on their performance for multiple traits closest to the ideotype could be further utilized in winter barley breeding programs targeting grain yield improvement.

Key words: Hordeum vulgare H., Multi-Trait Genotype–Ideotype Distance Index, Yield, Yield-Related Traits

A COMPARATIVE STUDY OF THE SOIL MICROBIOME FROM LOCALITIES OF WILD LEGUME SPECIES IN SRANDZHA, RHODOPE AND KALIAKRA

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ABSTRACT

Due to the highly varied climate, soil conditions and relief, Bulgaria is extremely rich in biological diversity. The Bulgarian biota includes a significant number of endemic species and subspecies. In three habitats, Strandzha Mountain, Rhodope, and Kaliakra, wild leguminous species were found grown in unique soil communities and ecosystems, which are very valuable in terms of biological diversity. This study aimed to compare the soil microorganisms that live in the rhizosphere of legumes such as Cicer montbretii Jaub. & Spach, Lupinus albus L., and Vicia incisa L. They were found in 12 different localities (four in each region) Standzha.SV, Strandhza.GP, Strandhza.BR, Strandhza.TR, Kaliakra.Cap, Kaliakra.Bol, Kaliakra.J1, Kaliakra.J2, Rhodopi.MJ1, Rhodopi.MJ2, Rhodopi.NAD, Rhodopi.OZ. New localities of Vicia incisa were found in the Rhodopes, near the village of Madzharovo. Cicer montbretii was also found around the area of Bolata and Jalata part of Kaliakra Reserve with red limestone rocks due to the iron oxides in the clay soil. Lupinus albus grows in acidic soils in The Great Pazvalk in Strandhza.GP. A total of 12 rhizosphere soil analyses were conducted by assessing the 16S rDNA metagenomics technique used to generate 775,745 raw reads. The most significant number of observed species 2185 was found in Kaliakra.J1, followed by 1777 in Standzha.SV and 1697 in Rhodopi.MJ1. The α-diversity analysis revealed variation in Shannon indices ranging from 4.972 in Kaliakra.Bol to 10.274 in Kaliakra.J1. The analyses revealed that 75% of Strandhza.BR microbiome were Firmicutes. Actinobacteria dominated with a total of 45-65% in Strandhza.GP, Strandhza.TR, and Rhodopi.MJ1. Standzha.SV has the largest composition with Proteobacteria at 52% and luck Firmicutes. The determination of the microbiological status of the soils associated with wild leguminous and the annual monitoring of the species in Strandzha Park, Kaliakra and Rhopodi will determine their in situ preservation and cultivation outer the natural habitat.

Key words: Soil metagenome; wild leguminous species; Strandzha; Kaliakra; Rhodopi

ACETYLCHOLINESTERASE INHIBITORY AND ANTIBACTERIAL ACTIVITY OF MENTHA PIPERITA ESSENTIAL OIL.

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ABSTRACT

Extraction of the essential oil of Mint (Mentha piperita) was carried out by hydrodistillation, the yield was estimated at 0,76 %, the molecular characterization by chromatography made it possible to identify two main compounds: Menthol and Menton, the evaluation of the Acetylcholinesterase activity by the anticholinesterase method showed significant efficacy in the inhibition of acetylcholine (IC50 = 189.98 ± 2.27 µg.mL-1) compared with Galantamine (IC50 = 6.27 ± 1, 15 µg.mL-1). And finally, the study of antibacterial activity by the agar diffusion method (Antibiogram) was studied on two reference bacterial strains: Escherichia coli (ATCC 25922) and Staphylococcus aureus (ATCC 25923). microbiological results obtained during this study shows that the essential oil of Mint tested have a very important antibacterial activity.

Key words: Mint, Mentha piperita, essential oil, chemical composition, anti-acetylcholinesterase activity, antibacterial activity.

CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITIE OF ROSMARINUS OFFICINALIS ESSENTIAL OIL

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ABSTRACT

The extraction of the essential oil of Rosemary (Rosmarinus officinalis) was carried out by hydrodistillation, the yield was estimated at 0.86%, the molecular characterization by chromatography made it possible to identify 58 main compounds, ie 70.21% of the oil essential, In a second step, the study of the antibacterial activity by diffusion on agar medium on 05 gram negative strains: Escherichia coli, Proteus mirabilis, Pseudomonas aeruginosa, Salmonella spp, Shigella and 02 gram positive: Staphylococcus aureus ATCC, Staphylococcus aureus MRSA. The set of microbiological results obtained during this study shows that the essential oil of Rosemary tested have a very important antibacterial activity.

Key words: Rosemary, Rosmarinus officinalis, essential oil, chemical composition, antibacterial activity.

ANTISTAPHYLOCOCCAL STUDY OF THE ESSENTIAL OIL OF DAUCUS CAROTA L. (EL-TAREF -ALGERIA)

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ABSTRACT

Antimicrobial resistance is a huge threat against the public health sphere and is a major cause of global mortality and morbidity. Antibiotic misuse and overuse have led to the development of many resistant bacterial strains. One particular bacterium of concern is methicillin-resistant Staphylococcus aureus (MRSA), which is the most common resistant bacteria in humans. Antibiotic development has been unable to keep up with the rapid evolution of antibiotic-resistant organisms, and there is an urgent need to identify alternative agents to combat this problem. Antimicrobial properties of plant essential oils (EO) have been investigated through several observations and clinical studies which purpose them as potential tools to overcome the microbial drug resistance (MDR) problem. Eucalyptus globulus L. commonly called in eastern Algeria (Kalitous) is a medicinal plant belonging to the Myrtaceae family, widely used by the population, especially for respiratory disorders. The aim of this research was to study the antibacterial effect of a traditional plant EO, Daucus carota L., against clinical isolates of methicillin resistant Staphylococcus aureus (MRSA) through disk diffusion method. The EO showed very effective bactericidal activity towards the majority of the tested bacterial strains with inhibition zone diameters in the range of 10.42mm -17.08mm. These results suggest that the essential oil of Daucus carota L. may be a useful alternative to antibiotics for the control of the infections caused by Staphylococcus aureus.

Keywords : Daucus carota L., Essential oil, Antibacterial activity, Staphylococcus aureus MRSA.

ANTISTAPHYLOCOCCAL STUDY OF THE ESSENTIAL OIL OF MENTHA PIPERITA L. FROM ALGERIA

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ABSTRACT

Mentha piperita is found everywhere in Algeria in humid places, commonly called Naanaa is a medicinal plant belonging to the Lamiaceae family. It is an excellent digestive, as well recognized for their traditional use to treat fever, anti-viral, anti-fungal and oral mucosa and throat inflammation. Infectious diseases which are one of the main causes of global mortality and morbidity. Pharmacological industries have produced number of new antibiotics in the last three decades, but microbial resistance to these antibiotics has increased because of genetic ability of the bacteria to acquire and transmit the resistance against therapeutic agents. One particular bacterium of concern is methicillin-resistant Staphylococcus aureus (MRSA), which is the most common resistant bacteria in humans. Antibiotic development has been unable to keep up with the rapid evolution of antibiotic-resistant organisms, and there is an urgent need to identify alternative agents to combat this problem. Antimicrobial properties of plant essential oils (EO) have been investigated through several observations and clinical studies which purpose them as potential tools to overcome the microbial drug resistance (MDR) problem. The aim of this research was to study the antibacterial effect of a traditional plant EO, Mentha piperita L., against clinical isolates of methicillin resistant Staphylococcus aureus (MRSA) through disk diffusion method. The EO showed very effective bactericidal activity towards the majority of the tested bacterial strains with inhibition zone diameters in the range of 17.06 - 24.50mm. These results suggest that the essential oil of Mentha piperita L. may be a useful alternative to antibiotics for the control of the infections caused by Staphylococcus aureus.

Keywords: Mentha piperita L., Essential oil, Antibacterial activity, Staphylococcus aureus MRSA.

TREATMENT WITH HONEYBEE VENOM

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ABSTRACT

bees are of great importance in the medical field, as bee therapy refers to the use of beehive products and is generally considered part of traditional or alternative medicine, and our study has focused on the treatment of eczema by relying on bee venom to see how effective it is in treating the disease, which is a complex liquid for several biochemically active ingredients with therapeutic benefits that affect the body's immune system such as mellitin, phospholipase enzyme, apamine, some of which work on dilation of blood vessels, analysis of cell membranes, some of which have an anti-inflammatory and anti-tumor property, which made it possible to use it in the treatment of the most difficult diseases as an alternative to surgery and various medical drugs, the most important of which are cancer, alzheimer's disease, parkinson's disease, multiple sclerosis and bee venom has become an important source for the production of effective natural medicines such as ointments, including what is used directly through injections at the level of the skin using the bee in the application of treatment or extraction in various ways and its use, and the ways of using it vary depending on the type and severity of the disease. but despite the great and effective role played by bee venom in the treatment of various diseases, this does not mean that there are no complications that may occur when used for treatment, including pain, allergies, itchy skin, redness, swelling and swelling, and because of some side effects, it is forbidden for some people to use it in treatment, such as people with autoimmune diseases, and we have reached after conducting a case study suffering from eczema disease that the treatment was applied bee poison on them to results identical to the theoretical study where a significant decrease in the symptoms experienced by the patient was observed.

Key words: Lyssavirus virus, animal and human rabies, deadly encephalitis, rabies in Skikda 2017 - 2018, bite, vaccinations, prevention, hot-blooded animals.

ASSOCIATION BETWEEN PRO-INFLAMMATORY MEDIATORS ANS OXIDATIVE DAMAGE INDICATORS DURINNG DRY SYNDROME

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ABSTRACT

Introduction/Objective: Dry syndrome (DS) is a systemic autoimmune disorder characterized by focal lymphocytic infiltration of the exocrine glands causing dry eyes and dry mouth. Oxidative stress (OS) is a phenomenon occurring as a result of an imbalance between the production of free radicals and antioxidant defenses system. Therefore, our aim was to determine OS and inflammatory response status. Malondialdehyde (MDA), nitric oxide and Interleukin-33 (IL-33), were examined in this context. We also assessed the potential correlation between MDA and nitric oxide (NO) levels, as well as between MDA and CRP levels during DS. **Patients and Methods:** 53 pSS patients were included in the research. Griess method was used to determine NO levels. On the other hand, thiobarbituric acid reactive substance measurements were used to evaluate MDA levels. Additionally, IL-6 measurement was evaluated using the enzyme-linked immunosorbent assay. **Results and discussion:** NO, MDA, and IL-6 levels were all considerably elevated in our patients. There was no discernible variation in the CRP measurement. Additionally, a substantial positive significant association between plasma NO and MDA levels was found in our data. Notably, we observe with interest a significant correlation between MDA, NO, and IL-6. **Conclusion:** Collectively, our findings indicated that DS patients showed altered oxidant mediators which could alter oxidant-antioxidant balance. Moreover, a strong association exists between inflammation and OS during DS condition.

Key words: Dry syndrome, Inflammation, Oxidative stress

ESSENTIAL OIL OF ERINACEA ANTHYLLIS LINK (FABACEAE): COMPOSITION AND ANTIBACTERIAL EFFECTS

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ABSTRACT

Erinacea species is used in traditional medicine to treat rheumatic diseases. The aim of this study was to determine for the first time the chemical composition and antibacterial activity of essential oil from the fresh aerial parts of Erinacia anthyllis belonging to the Fabaceae family. The steam distilled oil was analyzed using gas chromatography techniques (GC-FID and GC-MS) using two different stationary phase columns (polar and non polar). Furthermore, antibacterial activity against various gram-positive and negative bacteria was determined by disk diffusion and microdilution. A total of 44 volatile substances were identified, accounting for about 98.22% of essential oils. The main components were phytol (9.26%), tricosane (8.62%). In addition, essential oils exhibit effect on all bacterial strains. The obtained inhibition zone ranged from 7mm to 21mm with the highest inhibition zone recorded forBacillus Sp (21mm).Erinacea anthyllis essential oil has good antimicrobial activity against all tested pathogenic bacteria and may be used as a natural antimicrobial agent in the treatment of many infectious diseases.

Key words: Erinacea anthyllis;antibacterial; essential oil; Batna; Algeria

ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF PLANTAGO L. EXTRACTS FROM THE PLANTAGINACEAE FAMILY

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ABSTRACT

Throughout human history, people have sought out natural remediesto improve their well-being and treat disease. The therapeutic benefits of medicinal plants have been recognised around the world and much scientific research has been done to prove their efficacy. This study reviews the antioxidant, antibacterial and antifungal properties of a plant belonging to the Plantaginaceae family and the Plantago L. genus. The species of this genus contains a number of effective chemical constituents including flavonoids, alkaloids, terpenoids, phenolic acid derivatives, iridoid glycosides, fatty acids, polysaccharides and vitamins which contribute to its exerting specific therapeutic effects. In this study, the three tested extracts, chloroform, ethyl acetate and n-butanol, were obtained by maceration using solvents with increasing polarity. Quantitative estimation of flavonoids and total polyphenols by colorimetric method revealed that the three extracts were moderately rich in phenolic compounds. The antioxidant activity results show that the three extracts have a powerful inhibitory effect. The two extracts ethyl acetate and n-butanol showed the best activity compared with the chloroform extract. Evaluation of antibacterial activity revealed that the ethyl acetate extract showed inhibition zones against Gram (+) bacteria: Staphylococcus aureus ATCC 6538 and Bacillus spizizenii ATCC 66 33 and against the yeast Candida albicans ATTC 10 231, while it showed no zone of inhibition against the Gram-negative bacterial strains: Escherichia coli NCTC 10. 538, Pseudomonas aeruginosa NCIMB 8626 and even against the fungus Alternaria alternata. The MIC value of the extract studied was the same against the two Gram-positive strains: Staphylococcus aureus ATCC 6538 and Bacillus spizizenii ATCC 66 33, at 50 mg/ml. These results suggest that this plant has antimicrobial properties that could justify its use in traditional medicine.

Key words: Plantaginaceae, Plantago L, Flavonoids, Polyphenols, Antioxidant, Antibacterial, Antifungal.

ANTIBACTERIAL EFFECT OF CURCUMIN ON STREPTOCOCCUS MUTANS ASSOCIATED WITH CARIES DISEASE

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ABSTRACT

Introduction: Streptococcus mutans is a bacteria mainly responsible for caries disease. On a socio-economic level, finding a simple and inexpensive way to prevent and reduce this pathology is necessary. This study aims to evaluate the antibacterial effect and the determination of the minimum inhibitory concentration of synthetic and natural curcumin on strains of Streptococcus mutans in biofilm mode. Materials and methods : The Streptococcus mutans strain was isolated from saliva samples using a special kit (CRT Bacteria® from Ivoclar) at the conservative endodontics department of Tlemcen University Hospital. The determination of the minimum inhibitory concentration was made by the dilution technique in 96-well microplates, with double serial dilutions of synthetic curcumin (Sigma-Aldrich, Saint-Quentin-Fallavier, France) and natural curcumin (pure curcumin 99%, origin India), prepared in Heart-Brain Broth® (BHIB) (Conda Pronadisa, Madrid, Spain) up to a final volume of 100 µl per well. Then an observation by an environmental scanning electron microscope was made on glass slides immersed in a suspension of Streptococcus mutans incubated for 48 hours at 37°C and immersed for 30 minutes in a solution of curcumin at its minimum inhibitory concentration. Results : The minimum inhibitory concentration of curcumin is 64 µg/ml, and scanning electron microscopy showed a significant reduction in the number of adhered Streptococcus mutans strains.
Conclusion : Curcumin is a promising antibacterial agent for the prevention of caries disease.

Key words: tooth decay,curcumin,saliva,streptococcus mutans

IN VIVO THERAPEUTIC TRIAL OF THE ANTIMICROBIAL EFFECT OF CURCUMA LONGA ON STRAINS OF STREPTOCOCCUS MUTANS OF ORAL ORIGIN

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ABSTRACT

Caries disease is classified as one of the most common pathologies in the world leading to early tooth loss. Medicinal plants have long been used to improve oral health. Curcuma longa is currently being studied for its numerous effects on general and oral health.Goals :To evaluate the antimicrobial effectiveness of a curcumin-based mouthwash for reducing the number of Streptococcus mutans and as an anti-plaque and anti-gingivitis agent compared to a placebo. Materials and methods :The study sample consists of 80 patients in good general condition with a high caries risk, randomized into two groups of 40 patients (group 1: placebo, group 2: mouthwash). The enumeration of Streptococcus mutans was carried out by the Ora-test which is based on the use of sterile milk for saliva samples and methylene blue as an indicator, salivary pH is evaluated by pH strips, gingival inflammation and dental plaque are evaluated respectively by the Gingival Index (GI) and the Plaque Index (PI) of Silness and Loe. The time in minutes for the color of milk expectorate to change from blue (methylene blue) to white, salivary pH, dental plaque index and gingival index were recorded for each group between the first day (D0) and the last day (D21).
Results :A statistically significant difference was found when the means of these four parameters were calculated and compared between the two groups.
Conclusion :Mouthwash based on curcumin has proven to be a good therapy for the prevention of caries disease.

Key words: Dental caries, Curcuma longa, gingival inflammation, oratest, salivary pH, Streptococcus mutans

LC/MS-MS ANALYSIS AND ANTIOXIDANT ACTIVITY OF THE N-BUTANOL EXTRACT OF TOURNEUXIA VARIFOLIA SPECIES

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ABSTRACT

The aim of this study was the investigation of the chemical composition of n-butanol (n-BuOH) extract of Tourneuxia variifolia Coss. from the Asteraceae family, and the evaluation of its antioxydant activity. The phytoconstituents of the n-BuOH extract were screened using LC/MS-MS technique. The antioxidant activity was measured using DPPH radical scavenging activity and ABTS+° decolorization methods. The results of the LC/MS-MS analysis revealed that twenty-three phytochemicals in n-BuOH extract were identified and quantified from which isoquercetin and astragalin were the most present, also the n-BuOH extract possesses a strong antioxidant effect in vitro. This study could provide a scientific background to the use of the Asteraceae species derivatives as functional ingredients in Algerian traditional medicine.

Key words: Asteraceae, Tourneuxia variifolia, LC/MS-MS, phytoconstituents, antioxidant activity.

INVESTIGATION OF LACTATE DEHYDROGENASE B-LIGAND INTERACTIONS THROUGH MOLECULAR DOCKING : INSIGHTS INTO INHIBITION AND CATALYSIS

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ABSTRACT

La lactate déshydrogénase B (LDH-B) est l'une des isoenzymes de la lactate déshydrogénase (LDH) impliquée dans la conversion réversible du pyruvate en lactate dans la voie glycolytique. La LDH-B se trouve principalement dans les tissus musculaires et cardiaques, où elle maintient l'homéostasie énergétique cellulaire. Elle joue également un rôle dans diverses pathologies, notamment le métabolisme du cancer, contribuant à la reprogrammation métabolique des cellules cancéreuses. Notre étude vise à explorer les aspects structurels et fonctionnels de la LDH-B (PDB ID : 7DBJ), en se concentrant sur ses interactions avec divers ligands à l'aide de techniques d'amarrage moléculaire. En utilisant Molegro Virtual Docker, nous avons examiné les interactions de liaison de LDH-B avec son inhibiteur spécifique, la N-[[3-[2-[(phénylméthyl)amino]éthyl]-1H-indol-2-yl]méthyl]cycloheptanamine (AXKO-0046), l'acide oxamique (structurellement similaire au pyruvate) et le NADH, un cofacteur essentiel à la réduction du pyruvate en lactate. Nos résultats d'amarrage ont révélé des liaisons hydrogène critiques et des interactions hydrophobes stabilisant les complexes enzyme-ligand, expliquant le potentiel inhibiteur d'AXKO-0046, tandis que l'acide oxamique a fourni des informations sur l'inhibition compétitive. Les interactions NADH ont mis en évidence le mécanisme catalytique de LDH-B. La compréhension de ces interactions moléculaires spécifiques ouvre de nouvelles perspectives pour cibler LDH-B dans des conditions pathologiques telles que le cancer, offrant ainsi un aperçu complet du rôle de LDH-B et de son potentiel en tant que cible thérapeutique.

Key words: Lactate dehydrogenase B, AXKO-0046, Oxamic acid, NADH, Molecular docking, Molegro Virtual Docker.

EXPLORING MOLECULAR INTERACTIONS OF MITOCHONDRIAL MALATE DEHYDROGENASE WITH OXALOACETATE AND NADH : PHYSIOLOGICAL AND PATHOLOGICAL IMPLICATIONS IN CANCER

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ABSTRACT

La malate déshydrogénase mitochondriale (MDH2) est cruciale pour le cycle de Krebs et la navette malate-aspartate, catalysant la conversion réversible du malate en oxaloacétate (OAA) en utilisant le NAD+/NADH comme cofacteur. Physiologiquement, MDH2 est essentiel à la production d'ATP. Pathologiquement, la surexpression de MDH2 dans divers cancers augmente la production d'énergie (ATP) et de précurseurs nécessaires à la synthèse de macromolécules (protéines, acides nucléiques, lipides), favorisant ainsi la prolifération des cellules cancéreuses et la progression de la maladie. En utilisant Molegro Virtual Docker (MVD), nous avons étudié les interactions entre MDH2 (PDB ID : 4WLO) et les ligands, OAA et NADH. Les résultats révèlent plusieurs liaisons hydrogène cruciales pour la stabilité du complexe enzyme-ligand, fournissant des informations sur les mécanismes de régulation enzymatique et les sites potentiels d'inhibiteurs thérapeutiques. La compréhension de ces interactions spécifiques pourrait ouvrir des perspectives pour le développement de traitements ciblant cette enzyme dans les cancers. L'amarrage moléculaire s'avère être une approche efficace pour explorer ces interactions et identifier de nouvelles opportunités thérapeutiques.

Key words: Keywords : Mitochondrial Malate Dehydrogenase, OAA, NADH, Molecular Docking, Molegro Virtual Docker.

EXPLORING THE GASTROPROTECTIVE EFFECTS OF HYSSOPUS OFFICINALIS L. ETHYL ACETATE EXTRACT ON GASTRIC ULCERS"

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ABSTRACT

Hyssopus officinalis L. (Lamiaceae) is a flowering plant that grows in the Mediterranean area. It is traditionally used in the treatment of respiratory and gastrointestinal disorders. The present study aims to investigate the anti-ulcerogenic activity of Hyssopus officinalis L. leaf ethylacetate extract (EALE) on ethanol-induced gastric ulcers in Wistar rats and to determinate the amount of total phenols and flavonoids available. EALE (500mg/kg, 250 mg/kg) was orally administered to experimental groups of rats 1 hour before ethanol induction of gastric ulcer. The lesions of the gastric mucosa were evaluated by macroscopic and histopathological examination. The outcomes indicated that the EALE pretreatment significantly reduced ulcerated and hemorrhagic areas in comparison to both negative and positive control (omeprazole 80 mg/kg). Furthermore, histological analysis of the gastric mucosa has indicated that EALE pretreated groups displayed normal histology and showed remarkable mucosal lesion improvement at the concentration of 500 mg/kg. The phytochemical study showed an appreciable amount of phenols and flavonoids in the extract. Our results demonstrate that EALE display significant therapeutic effects against gastric ulcers.

Key words: Hyssopus officinalis L, gastric mucosa, Ethanol-induced gastric ulcer, TPC/TFC levels.

THE USE OF ZEBRAFISH (Danio rerio) AS BIOMEDICAL MODELS

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ABSTRACT

Various animal species have important roles as experimental models to advance biomedical research. Animal models play an important role in ensuring the consistency and validity of research results obtained from in vitro studies or studies with rodents. Today, zebrafish are considered a suitable model to investigate development, genetics, immunity, behaviour, physiology and nutrition. Danio rerio, the Latin name for zebrafish, formerly Brachydanio rerio, is a small tropical freshwater fish originating from the Ganges River and its tributaries in northern India. The annual number of publications on zebrafish as a model for biomedical research has increased significantly in recent years. The most advantageous features of zebrafish are its fully sequenced genome, easy manipulation of its genome, high fecundity, short generation time (about 3 months), rapid embryonic development (24 hours) and external fertilisation. The translucent zebrafish embryo allows the study of different developmental stages starting from the early stage of embryogenesis. Furthermore, zebrafish embryos form complete organ systems, including heart, intestine and blood vessels, within 48 hours after fertilisation. More than 10,000 mutants in protein-coding genes have been produced and several transgenic zebrafish lines have been constructed to study human diseases. The large number of zebrafish species available is another important advantage of this species. In addition, it is very economical to keep large numbers of zebrafish in a relatively small amount of laboratory space. In this review, information on the use of zebrafish as a bio-medical model, especially in areas related to diet-related diseases, metabolic disorders, liver diseases and intestinal diseases in humans, is compiled.

Key words: Biomedical model, Metabolic disorders, Zebrafish

PURIFICATION, BIOCHEMICAL, AND MOLECULAR CHARACTERIZATION OF NOVEL PROTEASE FROM BACILLUS LICHENIFORMIS STRAIN K7A AND ITS APPLICATION IN NON-AQUEOUS PEPTIDE BIOCATALYSIS AND DETERGENCE.

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ABSTRACT

A novel extracellular alkaline protease, called SAPHM, from Bacillus licheniformis strain K7A was purified by four steps procedure involving heat treatment (30 min at 70 °C) followed by ammonium sulfate precipitation (40–70%)-dialysis, UNO Q-12 FPLC, and ZORBAX PSM 300 HPLC, and submitted to biochemical characterization assays. The purified enzyme is a monomer of molecular mass of 30,325.12 Da. It was completely inhibited by phenylmethanesulfonyl fluoride (PMSF) and diiodopropyl fluorophosphates (DFP), which strongly suggested its belonging to the serine protease family. Its sequence of the 26 NH2-terminal residues showed high homology with those of Bacillus proteases. The purified enzyme was optimally active at pH 10 and temperature 70 °C. Its catalytic efficiency was higher than those of Alcalase and Thermolysin. SAPHM exhibited excellent stability to detergents and wash performance analysis revealed that it could remove blood-stains effectively. Data suggest also that SAPHM may be considered as potential candidate for future applications in non-aqueous peptide biocatalysis because it possesses an elevated organic solvent resistance. The sapHM gene encoding SAPHM was cloned, sequenced, and expressed in Escherichia coli strain BL21(DE3) pLysS. The biochemical properties of the extracellular purified recombinant enzyme (rSAPHM) were similar to those of native one. The deduced amino acid sequence showed strong homology with other Bacillus proteases. The highest sequence identity value (97%) was obtained with APRMP1 protease from Bacillus licheniformis strain MP1, with only 9 aa of difference.

Key words: Bacillus licheniformis - Alkaline protease - Detergent formulation - Peptide biocatalysis – Expression - Recombinant enzyme

THE IMPACT OF WATER ACTIVITY AND TEMPERATURE ON WATER CONTENT DURING THE PRESERVATION PROCESS OF DATES "MAJHOUL VARIETY

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ABSTRACT

The date preservation process is a key step to ensure the quality of the product while preserving its sensory and nutritional characteristics. Several parameters, including temperature, water activity and water content, play a crucial role in maintaining date quality over time. Temperature management during the preservation process is essential to inhibit the growth of unwanted microorganisms while avoiding the degradation of the nutrient and aromatic compounds of dates. Proper storage conditions help to prolong the lifespan of dates, ensuring that they remain fresh and appetizing. In this perspective, an uncoded unit regression equation of water content and temperature and water activity has been developed. The model is more meaningful and has better predictive capacity for new observations. The characteristic that has most influenced is water activity and then temperature. Specifically, the increase in water activity increases the water content and the increase in temperature reduces the water content.

Keywords: Date, water activity, water content, temperature

PROBABILISTIC HEALTH RISK ASSESSMENT OF FLUORIDE IN WATER OF NATURAL – ARTIFICIAL LENTIC HABITATS OF GÖKÇEADA ISLAND (TÜRKIYE)

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ABSTRACT

Located in the north of the Aegean Sea and at the entrance of Saros Gulf, Gökçeada is the largest island of Türkiye. The island is home to important freshwater resources and there are 2 dam lakes (Zeytinli and Uğurlu Dams), 3 ponds (Aydıncık, Şirinköy and Uğurlu Ponds) and a lagoon (Gökçeada lagoon). The aim of the current research was to assess the non-carcinogenic health risks of fluoride via daily human intake in water of natural – artificial lentic habitats of Gökçeada Island of Türkiye. 6 natural – artificial lentic habitats were selected on the island and water samples were collected during the dry – wet seasons of 2022 – 2023. The fluoride levels were measured by using spectrophotometric method and Estimated Daily Intake (EDI) and Hazard Quotient (HQ) of fluoride were calculated. As a result of this investigation, all the calculated HQ values both in dry and wet seasons in terms of all age groups were recorded as less than the critical limit of 1 with an annualy mean of 0.099 for infants, 0.703 for children, 0.496 for teenagers and 0.398 for adults.

Key words: Gökçeada Island, Natural – Artificial Lentic Habitats, Health Risk Assessment

THE FIRST REPORT ON THE ESSENTIAL OIL CONTENT AND ANTIOXIDANT EVALUATION OF MUSCARI (LILIACEAE) FROM ALGERIA

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ABSTRACT

In the present investigation, we looked at Algerian Muskari's chemical composition and antioxidant capacity. The findings indicated that the methanolic crude extract contained moderate amounts of flavonoids and phenols (15.11 ± 0.78 µg GAE/mg and 31.27 ± 2.71 µg QE/mg, respectively). Furthermore, the results indicated that the antioxidant capacities of both samples were modest (8.74 ± 1.13 mg/ml; 13.18 ± 0.18% and 12.94 ± 0.89%, respectively). Based on GC–MS and GC–FID analyses, twelve (12) volatile compounds were identified in the oil including tetrapentacontane (48.25%), 3,7,11,15-tetramethyl-2-hexadecen-1-ol (16.59%), hexatriacontane (9.17%), and 6,10,14-trimethylpentadecan-2-one (8.80%). As far as we are aware, no prior research has examined the chemical composition of our Muscari oil. These findings may deepen our comprehension of the characteristics of this species and make it a useful source of food and medicine in the future.

Key words: Muscari, total phenol and flavonoid contents, antioxidant activity, GC–FID and GC–MS.

SPATIAL – TEMPORAL VARIATIONS OF FLUORIDE IN STAGNANT WATER BODIES OF GÖKÇEADA ISLAND THE WESTERNMOST PART OF TÜRKIYE: A GIS BASED ASSESSMENT

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ABSTRACT

Gökçeada, a district of Çanakkale, is the largest island in Türkiye. It is one of the rare islands in the world whose drinking water resources are sufficient to meet its own needs. There are 2 dam lakes, 3 artificial ponds, and a lagoon on the island, which may use its fresh water resources for both drinking and irrigation. The aim of this research was (1) to determine the spatial–temporal variations of fluoride accumulations in water of stagnant water bodies located in the Gökçeada Island of Türkiye and (2) to evaluate the data in terms of dental health of the local people. 6 stagnant water bodies were selected on the island and water samples were collected during the dry–wet seasons of 2022 – 2023. The fluoride concentrations were measured by using spectrophotometric method. According to the results of this study, the fluoride accumulations were varied from 0.166 – 3.300 mg/L. It has been also noted that, the fluoride contents of water bodies decreases approximately 1.5 times during the rainy season, in general.

Key words: Gökçeada Island, Stagnant Water Bodies, Fluoride Accumulations

STUDING THE EFFECT OFAN AQUEOUS EXTRACT OF TEUCRIUM POLIUM L. ON MERCURY TOXICITY INDUCED ALTERATIONS IN LIPID PROFILES (LIPID FRACTIONS) IN LIVER TISSUE OF RATS.

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ABSTRACT

Mercury is a highly toxic metal that can cause profound deterioration of vital metabolic processes. Although there are several reports delineating the biochemical toxicity of mercury which induced oxidative stress by generation of reactive oxygen species initiates various pathological conditions in humans. In the last few years, Some studies have focused their efforts on the use of plant-derived compounds as natural antioxidants which has been found to be beneficial in metal toxicity. The present study, we selected a plant Teucrium polium L. The present work aims to investigate the role of an Aqueous Extract of Teucrium polium L in reversing the deleterious effects of HgCl2 exposure on the different lipid fractions (phospholipids liver). To achieve the study, rats were assigned to four groups : Group control received intraperitoneal solutions of 0.9% saline solution (NaCl) ; Group HgCl2 received i.p. injection of HgCl2 at a dose of 2 mg/kg once a week ; Group intoxicated treated were injected with HgCl2 as for group 2 and received aqueous extract of T. polium (125mg/kg) by gavage for 45 consecutive days ; Group treated received (125mg/kg bw /day)aqueous extract of T. polium by gavage. At the endpoint of the experiment (45 days), the separation of lipid fractions (phospholipids) was carried out by the thin layer chromatography method after extraction the total lipids of the liver each group. Phospholipids in chromatographic fractions are estimated by phosphorus determination. Study results revealed a significant ($P < 0.05$; $P < 0.01$; $P < 0.001$) elevation in lipid fractions Lysophospholipid, Sphingomyelin, Phosphatidylcholine , Phosphatidylinositol , Phosphatidylserine ,Phosphatidylethanolamine, phosphatidic acids and Cardiolipin in HgCl2 group comparison with control group .However, aqueous extract of T. polium treatment has led to a significant ($P < 0.05$; $P < 0.01$; $P < 0.001$) decrease in liver levels of different class of phosphilipids in intoxicated treated group in comparison with the HgCl2 group. Altogether, It is concluded that aqueous extract of T. polium administration has the ability to increase the resistance of liver against the HgCl2-induced changes in lipid synthesis.

Key words: HgCl2-toxicity, oxidative stress, Teucrium polium L, lipid fractions.

CORRELATION BETWEEN DIET AND OBESITY: IMPORTANCE OF PLANT DIVERSITY IN TREATMENT

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ABSTRACT

Obesity has seen widespread prevalence in recent times, becoming one of the health issues faced by populations worldwide. The objective of this study was to raise awareness about it. To achieve this, a questionnaire was distributed to 50 obese individuals, divided into two parts: the first part consisted of general questions to identify the afflicted individuals, while the second part focused on obesity-specific inquiries. Results revealed that the majority of respondents were females, aged 15 to 55, from diverse occupational backgrounds, with many being university students, residing in urban areas. Additionally, it was noted that most respondents were unaware of their Body Mass Index (BMI) (58%), and many had begun gaining weight during childhood (44%). Furthermore, our study uncovered that poor dietary habits were the primary cause of the disease's proliferation (90%). All respondents were cognizant of the various diseases associated with obesity, such as diabetes and hypertension, prompting the majority to adopt measures to safeguard their health, including diet, exercise, and the use of medicinal plants such as green tea and ginger.

Key words: Obesity, BMI, diseases, diet, medicinal plants.

PHENOTYPIC ANALYSIS OF LEAF SENESCENCE IN ANTIRRHINUM MAJIS L.

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ABSTRACT

Leaf senescence represents the final phase of development, culminating in cell death. While leaf senescence poses challenges in the post-harvest lifespan of horticultural plants and the yield of agricultural plants, it plays a crucial role in facilitating the re-mobilization of nutrients within plants. Various factors can influence the regulation of leaf senescence. The natural senescence of the leaf starts and progresses according to a regular schedule. During senescence, morphological and physiological events occur along with intracellular changes. Despite this, these processes have not been thoroughly explored across many species. The snapdragon (Antirrhinum majus L) flower serves as a valuable model system that has been extensively studied in terms of genetic traits, flower development, and cellular death. However, the senescence of its leaves has not been investigated. This study delved into the morphological attributes of senescing snapdragon leaves and revealed significant alterations in various indicators as senescence progressed. The results indicated that many indicators changed significantly with the onset and progression of senescence. Notably, there were significant decreases in fresh and dry weight, photosynthetic pigment levels, total soluble protein content, and chloroplast numbers per cell. Conversely, ion leakage and the incidence of dead cells increased with the progression of senescence. Trypan blue staining elucidated that cell death initiation occurred at the leaf tip, progressing to encompass all cells within the leaf blade during the later stages of senescence.

Key words: Chlorophyll, chloroplast, ion leakage, soluable protein

CHEMICAL COMPOSITION OF ARTEMISIA HERBA-ALBA ASSO ESSENTIAL OIL FROM ALGERIA.

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ABSTRACT

Mugwort (Artemisia herba-alba Asso), called White Grass or Shih, is a medicinal plant endemic to Algeria (a North African country); it constitutes particularly interesting fodder. Plants of the Asteraceae family, to which white mugwort belongs, have been the subject of several phytochemical studies for economic interest, especially for their essential oils. The diversity in chemical composition of Artemisia herba-alba Asso essential oil grown in different localities in the same country (Algeria; Djelfa, M'sila, Biskra, Méchria, Saïda, Oum El-Bouaghi, Batna, Laghouat and Bechar) was the subject of an in-depth investigation. For the genus Artemisia of Algeria, camphor and thujane derivatives as well as chrysanthenone are the major and most widely spread structural types.

Key words: Mugwort, Artemisia herba-alba Asso, chemical composition, essential oil, Algeria.

BACTERIAL FOODBORNE ILLNESSES CAUSED BY SALMONELLA SPP. A RETROSPECTIVE STUDY IN THE NORTHEASTERN REGION OF ALGERIA

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ABSTRACT

Microbial infections, particularly Foodborne Toxi-infections (FTI), constitute a major public health issue due to microorganisms normally present in the human body. However, under various conditions, these microorganisms, especially bacteria, can become potentially pathogenic. The diagnosis of FTI caused by Salmonella (Salmonella spp) relies on bacteriological examination of feces (stool culture). In our study, we conducted a retrospective study on 580 cases, of which 125 were positive. Among them, 14 strains of Salmonella spp (11.2%) were isolated. The analysis of the results obtained shows a predominance of FTI in women (57.14%), hospitalized patients (85.71%), and adults (78.57%). Salmonella spp exhibit resistance to quinolones, particularly Nalidixic Acid, unlike Fosfomycin, which remains effective against various strains of Salmonella spp.

Key words: Stool culture; Salmonella spp; Foodborne Toxi-infection; Public health.

ANTIBACTERIAL ACTIVITY AND ACTIVE COMPOUNDS OF SOME ENDEMIC PLANTS OF THE LAMIACEAE FAMILY

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ABSTRACT

Recently, numerous side effects of synthetic drugs have led to using medicinal plants as a reliable source of new therapy. Antibiotic resistance is a global public health problem with a high impact on life quality and a huge economic implication, becoming one of the most important concerns in modern medicine. The Lamiaceae family, one of the most important herbal families, incorporates a wide variety of plants with biological and medical applications. In this review, the antibacterial activity and active compounds of some endemic plants of the Lamiaceae family are presented. The data highlighted in this review paper provide valuable scientific information on the specific effectiveness of Lamiaceae plants in terms of antibacterial activity. Which could be used in the future to isolate potential active compounds from some of these medicinal plants and formulate potential commercial therapeutic agents to fight different infections such as urinary tract infections or respiratory infections.

Key words: Lamiaceae; Antibacterial activity; Active compounds; Medicinal plants.

IMMUNE RESPONSE OF INSECT IN TERM OF GALLERIA MELLONELLA: AN ROBUST PHYSIOLOGICAL MODEL TO DEVELOP INSECTICIDAL DRUGS

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ABSTRACT

Immunity is crucial for protecting organisms from diseases and harmful substances. Vertebrates and insects have immune systems with different molecular mechanisms. Vertebrates, like humans, have innate and adaptive immunity. The innate response offers immediate, nonspecific defenses, including physical barriers like skin and mucous membranes, along with cellular and humoral responses involving various immune cells and soluble components. On the other hand, adaptive immunity entails highly specialized responses mediated by T and B cells that form memories against specific infections. However, insects, such as Galleria mellonella model rely heavily on their innate immune system for defense. This system, which includes physical barriers, cellular reactions, and humoral components, responds to invading pathogens in a quick and nonspecific manner. Cellular defenses in insects include nodulation, phagocytosis, encapsulation, the respiratory burst in which free radicals are generated, and humoral defense mechanisms such as prophenol oxidase, antimicrobial peptides, and coagulation. Furthermore, molecular pathways like Imd (Immune deficiency), mTOR, and JAK-STAT are critical in coordinating insect immune responses. These pathways control a variety of immunological processes, including pathogen identification, signal transduction, and immune effector synthesis. Understanding the complex molecular mechanisms of insect immunity is critical not only for understanding the underlying principles of host defense, but also for practical applications like pest control and disease management. Insights into insect immunity would led light to develop new drugs by crippling of insect immune system by immunosupressive innovative drugs such as eicosanoid (immune meditor molecules in insects) biosynthesis inhibitors for combating insect-borne diseases in human and agricultural pests while limiting environmental effects.

Key words: Immune Response, Insects, Galleria mellonella, Immunosupressive Drugs

ROLES OF EICOSANOIDS IN INSECT IMMUNE RESPONSE: CHALLENGING MOLECULES IN INSECTS

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ABSTRACT

Eicosanoids are a large class of compounds known as intercellular signaling molecules derived from fatty acids with 20 carbon atoms. Eicosanoids were discovered in vertebrates as physiolohical mediators in the 1960s and were shown to be present in insects in the 1980s. In both vertebrates and invertebrates, eicosanoids play important roles in the immune system as well as normal physiological roles such as digestion, reproduction and nervous system functions and also were secreted in pathophysiological process. Insects, unlike vertebrates, have an innate immune system and are not capable of developing adaptive immunity. The innate immune system of insects provides defense by forming physical barriers (integument, peritrophicmembrane), cellular and humoral immune responses and reactive free radicals (ROS and nitrous oxide radicals). Eicosanoids play a critical role in regulating and activating these immune responses via certain signal pathways. For example, prostaglandins and thromboxanes promote phagocytosis and respiratory burst against pathogens, while leukotrins and lipokines trigger inflammation and migration of immune cells. In conclusion, eicosanoids play a crucial role in the functioning of the insect immune system and are critical in defense against pathogens. Further research on the insect physiology and pathology of these molecules may offer new opportunities for insecticide development and pest control strategies. We foster to develop new drugs in term of agricultural insecticidal apporoaches by inhibiting eicosanoid biosynthesis in different tissue of insects by eicosanoid biosynthesis inhibitors (EBIs) such as Cyclooxygenases enzyme systems (COX-1 and 2), Lipoxygenases (LOXs), Epoxyeicosatrienoic acids (EETs) pathways in our laboratory.

Key words: Eicosanoids, Insects, Immune Response, Eicosanoid Biosynthesis Inhibitors

LC-MS ANALYSIS OF THE METHANOLIC EXTRACT OF CINNAMOMUM CAMPHORA .

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ABSTRACT

The aim of this study is to identify the active compounds from the methanolic extracts of leaves of Cinnamomum camphora cultivated in Algeria. The methanolic extracts of Cinnamomum camphora leaves were subjected to qualitative chemical tests to detect the presence of various classes of phytoconstituents by Liquid Chromatography Mass Spectrometry (LCMS). Twenty-eight compounds were isolated from Cinnamomum camphora methanolic extracts leaves and identified by spectroscopic methods.

Key words: Cinnamomum camphor, methanolic extract, Liquid Chromatography Mass Spectrometry.

CHEMICAL COMPOSITION OF CINNAMOMUM CAMPHORA (L.) ESSENTIAL OIL FROM ALGERIA.

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ABSTRACT

Camphor tree essential oil is considered of medicinal importance, there are several chemotypes of Cinnamomum camphora essential oil, this is why we were interested in chemical composition of Cinnamomum camphora essential oil from Algeria (Mediterranean, North African country). The chemical composition of the hydrodistilled essential oil of Cinnamomum camphora, collected from Skikda (North Eastern Algerian), was analyzed by gas chromatography-mass spectrometry (GC-MS). The essential oil showed the presence of 17 major compounds, Cinnamomum camphora essential oil was dominated by Camphor (36.81%), α-Pinene (9.91%), D-Limonene (8.63%) and Camphene (6.99%) as major constituents.

Key words: Cinnamomum camphora, essential oil, chemotype, chemical composition.

EFFECTS OF NACL ON GERMINATION AND SEEDLING EMERGENCE GROWTH IN BARLEY (HORDEUM VULGARE)

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ABSTRACT

Salinity is one of the major abiotic stresses limiting the growth and productivity of plants. This work presents a study of germination and early seedling growth of two varieties of Algerian barley (Hordeum vulgare) under salt stress conditions. The varieties are Saida 183 and Rihane. This study is to determine the physiological characteristics of these two varieties facing salt stress at the seed germination and post [1]germinative growth. Successful germination and seedling development are crucial steps in the growth of new plants. The seeds are germinated in Petri dishes containing increasing concentrations of NaCl (0, 50, 100, 150, 200 mM) at 25°C. The measurements are focused on different germination tests. Fresh weight, dry weight and length of emerging seedlings were determined, as well as the seedling height stress tolerance index calculation. Sodium chloride content had a negative effect on the germination and growth of emerging seedlings of two barley varieties. However, at evolved NaCl concentrations, Rihane variety is much more tolerant of development in saline environment than variety Saida183.

Key words: Barley, Saida 183, Rihane, Germination, Seedling, Salinity Stress, NaCl.

MATING RATE OF PAIRS OF DROSOPHILA MELANOGASTER (DIPTERA; DROSOPHILIDAE) AFTER TREATMENT WITH AQEUE AND ETHANOLIC EXTRACTS OF RUTA CHALEPENSIS (RUTACEAE).

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ABSTRACT

As part of the research carried out in our laboratory, we have initiated a protocol to study the effect of aqueous and ethanolic extracts of Ruta chalpensis on the mating rate of the fly Drosophila Melanogaster (this insect plays a central role in biological research). This test involves monitoring the mating stages of control and treated D. melanogaster adults. The results show that the plant influences the choice of female for the fertility of the flies, as we recorded a significant reduction in the number of successful couplings after treatment with aqeue extract and ethanolic extract of Ruta chalpensis.

Key words: Biological control, Drosophila melanogaster, Ruta chalepensis, mating, fertility.

IN VITRO ASSESSMENT OF THE ANTIMICROBIAL POTENTIAL OF PROBIOTIC LACTIC ACID BACTERIA FROM LACTOBACILLUS GENUS

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ABSTRACT

Currently, the phenomenon of antibiotic resistance poses a challenge for certain diseases or food poisonings of microbial origin. To address this problem, recent studies have focused on finding natural substances produced by lactic acid bacteria.
Certain strains of beneficial lactic acid bacteria are referred to as probiotics. They contain several genera, the majority of which are predominantly Lactobacillus, which have proven their ability to produce antimicrobial agents, including lactic acid, hydrogen peroxide, and bacteriocins. In our experiment, we confirmed the probiotic potential of four dairy strains (L1, L2, L3, and L4) by studying their viability under simulated gastric pH, bile salts, and antibiotic resistance conditions. Then we highlighted their antagonistic effects against six indicative pathogenic bacteria (Staphylococcus aureus, Bacillus cereus, Enterococcus faecalis, Escherichia coli, Klebsiella pneumoniae, and Pseudomenas aeruginosa), as well as four fungal strains (Aspergillus niger, Phytophtora infestans, Penicilium sp, and Endosporium sp). Regarding the functional criteria study, we observed the viability of the four Lactobacillus strains tested for all durations of contact with pH = 2 and bile salts (1 h, 1:30 h, and 2 h). Notably, the L3 strain exhibited the highest degree of antibiotic resistance. Evaluation of the antibacterial potency of the tested lactic strains revealed their antagonistic activity against Pseudomonas aeruginosa, Enterococcus faecalis, Bacillus cereus, and Staphylococcus aureus, with inhibition zones ranging from 7 to 12mm. Furthermore, the antifungal activity studied showed that the L1 and L2 strains had the most potent inhibitory effect with an anti-fungal index of 63%, 61.54%, and 55.56% against Penicillium sp., A.niger, and P. infestans, respectively, and the highest antifungal activity against Endosporium sp. was obtained from the L4 strain with an inhibition rate of 38.24%.
These findings collectively provide a clear understanding of the antimicrobial potential of selected Lactobacillus strains, offering an alternative pathway to certain antimicrobial agents used in different fields (medical, agro-food industry, etc).

Key words: lactic acid bacteria, probiotic, Lactobacillus, antibacterial potency, antifungal activity.

IN VITRO EVALUATION OF THE ANTIFUNGAL ACTIVITY OF LACTOBCILLUS STRAINS AGAINST PHYTOPATHOGENIC FUNGI

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ABSTRACT

Lactic acid bacteria include several genera, the majority of which are represented by Lactobacillus. They are currently the focus of a great deal of research, due to their potential in a variety of biotechnological applications. They have demonstrated their ability to produce antimicrobial agents such as lactic acid, hydrogen peroxide and bacteriocins, which may act synergistically against filamentous fungi. These properties of Lactobacillus, in particular their antimicrobial potential, raise important questions linked to the production of antifungal agents, bio-preservation and the fight against fungal deterioration. These issues are of fundamental importance in diverse fields such as agricultural field, biotechnology, food industry and more.
In our experiment, we have demonstrated the antifungal activity of four lactic acid bacteria isolated from camel and goat milk, designated L1, L2, L3, and L4, against four phytopathogenic fungal strains (Aspergillus niger ; Phytophtora infestans ; Penicilium spp ; et Endosporium spp). This evaluation was carried out using different levels of concentrations of the bacterial supernatant, namely 0.25; 1; 1.75; and 2.5 µl/ml. Our strains showed strong antifungal activity, even at low concentrations, with a significantly different effect from one strain to another. All four supernatants had a significant effect against Penicillium spp, A.niger, and P.infestans, with an antifungal index between [43.33 - 63] %, [38.46 - 61.54] %, and [35.56 - 55.56] % respectively. Furthermore, the best antifungal activity against Endosporium spp was obtained by strains L4 and L1 with inhibitory effect equal to 38.24% and 26.47%. These results provide a clear idea of the antimicrobial potential of Lactobacillus strains, which represent an alternative to some antifungal agents used in different fields (agriculture, biotechnology, etc.).

Key words: Lactobacillus, filamentous fungi, antifungal activity, agriculture, biotechnology.

ANALYSIS OF TRACE METALS IN BROWN MUSSELS FROM THE GULF OF ANNABA (NORTHEAST ALGERIA): AN ENVIRONMENTAL APPROACH

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ABSTRACT

The use of marine bivalves, particularly mussels, has proven to be an effective method for assessing metal pollution in coastal regions worldwide. In this study aimed at evaluating the health status of the Gulf of Annaba, brown mussels Perna perna were transplanted for 12 weeks at three distinct sites, each exposed to different sources of pollution (Joinoneville S1, the port S2, Lacaroube S3). The levels of four trace metals, namely copper, zinc, lead, and cadmium, were carefully measured in the mussel tissues both before and after the transplantation period. Alongside this, various environmental parameters such as temperature, pH, salinity, and dissolved oxygen concentration were monitored throughout the study period. The results of this study revealed a significant increase in the concentrations of all trace metals in the mussels, except for zinc. This increase was clearly attributed to exposure to pollution. The most heavily contaminated site by heavy metals was found to be the port, particularly concerning lead and copper. In contrast, Lacaroube beach showed less contamination compared to the other sites.

Key words: Gulf of Annaba, brown mussels, environmental parameters, contamination, trace metals

OVERVIEW OF PLANT BASED NANO MEDICINES

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ABSTRACT

Demand for nanoparticles is increasing day by day due to their broad range applications in various commercial areas including nano-pharma industries to treat various diseases. Chemically prepared nanoparticles involve generation of toxic products which limit their biological applications. Therefore, phyto synthesis of metal oxide nanoparticles (MNPs) using plant broth and biomolecules has gained significant attention. Green synthesis of nanoparticles is ecofriendly, cost-effective and is a promising alternative to physical and chemical route. Green synthesis of nanoparticles using medicinal plants has become a promising substitute to traditional physical and chemical approaches. The conventional methods of developing nanomaterials are costly and produce toxic products, which limit their uses in different biological applications. So, it is the need of today to minimize the toxic effects of these noxious chemicals on environment, plant and animal life. Hence, an alternative approach is intended to develop which is eco-friendly and cost-effective for the synthesis of small size stable nanoparticles using selected medicinal plants. Here in the current study the overview of nanomedicine based on plant based nano particle/ nano materials have been discussed in detail by focusing different types of nanoparticles.

Key words: Nano Medicines, PLant based Drugs

DATA ON THE FAMILIES NYMPHALIDAE, PIERIDAE, PAPILIONIDAE, HESPERIIDAE, AND LYCAENIDAE OF THE ORDER LEPIDOPTERA IN THE KORÇË REGION (ALBANIA)

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ABSTRACT

A study was conducted to document the butterfly diversity in the Korçë area from May to September 2022-2023 across four stations: Moravë, Drenovë, Ersekë, and Pirg in the Korçë region, located in the southeastern part of Albania. A total of 241 individuals from the families Nymphalidae, Pieridae, Papilionidae, Lycaenidae, and Hesperiidae were collected, identified into 36 species. Our analysis revealed that the family with the highest species biodiversity is Nymphalidae, while the family with the lowest biodiversity is Lycaenidae. The area with the highest diversity is Drenovë, and the area with the lowest diversity is Pirg.

Key words: Keywords: Lepidoptera, Nymphalidae, Pieridae, Papilionidae, Lycaenidae, Hesperiidae biodiversity, ecology, Albania.

AN OVERVIEW ON LEPIDOPTERA INSECTS BIODIVERSITY ORDER IN KORÇA REGION

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ABSTRACT

Studies and research about Lepidoptera (butterfly) are numerous. This is due to the continuous nature of the research, which can never be fully completed. Butterflies are one of the most important groups in various habitats and environments, as well as one of the largest fauna groups. These organisms play a significant ecological role in these environments. The collection of biological material for this paper was conducted during the period of 2021-2022 at various stations in the Korça region, specifically: Drenova, Voskopoja, Dardha, Morava, Polena, and Voskop, among others. We collected biological material from May to September, which coincides with the flight period of these species.During the study, 290 individuals belonging to 25 species were collected. The family with the highest biodiversity of species is Nymphalidae, with 12 species, while the family with the fewest species is Papilionidae, with 2 species. The station with the highest diversity observed was Morava, with 15 species, and the station with the lowest diversity was Voskop, with 3 species.

Key words: Keywords: Lepidoptera, ecosystem, insects biodiversity, Korça.

AQUATIC TOXICOLOGY AND AGRICULTURAL CHEMICALS

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ABSTRACT

This review examines aquatic toxicology and the effects of agricultural chemicals on aquatic ecosystems. The use of agricultural chemicals such as pesticides, herbicides and fertilisers, while increasing agricultural productivity, can cause serious damage to aquatic ecosystems. Pollution from chemicals entering water bodies can have toxic effects on fish, crustaceans and other aquatic organisms. This review explains the specific effects of pesticides and herbicides on aquatic ecosystems and basic toxicological concepts such as bioaccumulation and biomagnification. In addition, problems caused by fertilisers in aquatic ecosystems such as eutrophication and hypoxia are discussed. Chemical management, alternative agricultural practices and the development of less toxic chemicals are suggested for environmental sustainability. In conclusion, sustainable agricultural methods should be adopted and chemical use should be regulated to protect aquatic ecosystems.

Key words: Agricultural Chemicals ,Lc50, Aquatic Toxicology

INVESTIGATION OF TOXIC EFFECTS OF PHOSMET ON EISENIA FETIDA (ANNELIDA, CLITELLATA)

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ABSTRACT

Earthworms are key organisms in terrestrial ecosystems, playing critical roles such as maintaining soil health, supporting plant growth, and increasing agricultural productivity. Their movements aerate the soil and facilitate the distribution of organic matter, while their castings increase soil water retention capacity, thus promoting plant development. Additionally, they serve as a significant food source within the ecosystem. Through these ecosystem services, earthworms make substantial contributions to soil organic matter cycling and nutrient availability. However, organophosphorus compounds like Phosmet, commonly used in fruit and vegetable cultivation in agricultural areas, can negatively affect important organisms such as earthworms and other non-target organisms. Studies show that Phosmet can cause various toxic effects in non-target organisms, including genetic damage, endocrine disruption, oxidative stress, in addition to its neurotoxic effects on pests. The aim of this study is to evaluate the toxic effects of the organophosphorus compound Phosmet on the earthworm Eisenia fetida, which is crucial for the health and sustainability of soil ecosystems. The study assessed the effects of Phosmet at different concentrations (5 mg/kg, 10 mg/kg, and 20 mg/kg) over periods of 7, 14, 21, and 28 days. Increasing concentrations of Phosmet resulted in weight loss and histopathological changes in the earthworms. Furthermore, experiments demonstrated that increased pesticide exposure had negative effects on the earthworm's general energy reserves, including total carbohydrates, lipids, and proteins. The study emphasizes the importance of risk assessment studies to better understand the effects of pesticides on the environment and biodiversity. This research provides valuable insights into understanding the impacts of pesticides used in agriculture on ecosystems and contributes to developing measures for sustainable agriculture.

Key words: Pesticides, phosmet, histopathology, earthworms, ecotoxicology

Acknowledgment: This study was supported by the Ege Üniversitesi Bilimsel Araştırma Projeleri Koordinatörlüğü (EGEBAP) (project number: FM-YLT-2023-31935).

COMPARISON OF ORIGINAL EQUIPMENT MARKET FILTER AND UNORIGINAL AFTERMARKET FILTER PERFORMANCES FOR THE DRINKING WATER PURIFICATION SYSTEMS: FROM THE PERSPECTIVE OF ECOTOXICOLOGICAL INDICATORS

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ABSTRACT

With the developing technology, many different filter types have been added to the household water purification systems (WSP). Recently, the most used technology in household WPS is the devices equipped with reverse osmosis technology, which helps to filter the ions, heavy metals, all bacteria and all the substances harmful to the human health in the water. However, it is very important to maintain our device and change its filters periodically for obtaining healthy and safe water. In this research, the performances of original equipment market **(**OEM) filter and unoriginal aftermarket (UAM) filter for one of the most popular WPS in Türkiye were evaluated by using widely used ecotoxicological risk assessment indices. Unpurified and purified tap water samples were taken from İstanbul Province in winter season of 2021. Four significant inorganic pollution parameters (Ni, As, Cd and Pb) were measured and Heavy Metal Pollution Index (HPI) and Heavy Metal Evaluation Index (HEI) were applied to data in order to assess the qualities of OEM and UAM filtered WPS in terms of multiple effects of toxicants. According to the results of this study, it has been clearly noted that the OEM filtered WPS significantly improved the drinking water quality by decreasing the HPI and HEI coefficients approximately 40% – 50% respectively, while the UAM filtered WPS did not decrease these values, and even increased the results of applied ecotoxicological risk assessment indices in drinking water samples (20% for HPI and 30 % for HEI).

Key words: Ecotoxicological risk assessment, OEM filters, UAM filters

MORPHOMETRIC ANALYSIS OF APIS MELLIFERA SPERMATOZOA FROM POPULATIONS WITH RECORDED COLONY LOSSES IN SOUTH BULGARIA

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ABSTRACT

The losses of numerous bee colonies have given rise to public concerns regarding the long-term viability of honey bees. The quality of the drone's sperm, which is a limiting factor in the successful reproduction of bees, can be assessed using morphometric comparisons based on the total length of the spermatozoa and the length of each of its components. The present study assesses the morphometric parameters of spermatozoa of Apis mellifera L. from six localities in South Bulgaria with varying rates of colony losses (0.8%, 1.7%, 14.5%, 26.7%, 53.3%, and 63.5%, respectively, over a year). The presence of genotoxic agents, specifically pesticides, in bees and food stocks within the hives of the tested localities was confirmed through chromatographic analysis. A notable trend toward dimension reduction was observed for all measured structures (nucleus length, head length, tail length, and total sperm length) except for the acrosome length in the three apiaries with the highest colony losses. The significant differences observed in the data set revealed that the nucleus length was the most affected parameter. The findings indicate that genotoxic agents in the environment, such as pesticides, may contribute to the reduction in spermatozoa morphometric parameters, particularly in honey bee populations that are most severely affected by high mortality rates. The results of the first morphometric analysis of spermatozoa of A. mellifera conducted in Bulgaria on bee populations with recorded colony losses demonstrate the potential of the studied morphometric indicators as biomarkers for characterizing the fitness of drone spermatozoa and for environmental quality assessment.

Key words: Apis mellifera, spermatozoa, honeybee colony losses, pesticides

Acknowledgments: This study was supported by the National Research Fund of Bulgaria by thecontract KP-06-H5112/2021, "Complex assessment of genetic and environmental factors related to the losses of honeybees (Apis mellifera L.) in Bulgaria."

RESISTANCE TO QUATERNARY AMMONIUM COMPOUNDS of Staphylococcus aureus ISOLATED FROM CHICKEN MEAT

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ABSTRACT

Staphylococcus aureus is an important pathogen due to its serious human and animal health problems worldwide. It causes a wide variety of diseases, including skin and soft tissue infections, mastitis, osteomyelitis, bacteraemia, endocarditis, pneumonia, foodborne intoxication, and hospital- and community-acquired infections. Many disinfectants, including quaternary ammonium compounds (QACs) as active biocides, have been widely used for sanitization in the food industry, poultry processing facilities, veterinary medicine, hospitals and healthcare facilities, and environments that could promote the development of bacterial resistance to disinfectants. The aim of the present study was to investigate the susceptibility of S. aureus isolated from chicken meat to quaternary ammonium compound (QAC) disinfectants, including benzalkonium chloride (BKC) and cetylpyridinium chloride (CPC). The minimum inhibitory concentration (MIC) of these QACs against the chicken meat isolates of S. aureus was determined quantitatively using a broth microdilution method. The MIC values of BKC were ranged between 1 and 8 µg/ mL, while the MICs for CPC were ranged between 0.5 and 2 µg/ mL. Of the isolates, 53.8% were found to be resistant to BKC with MICs of over 2 µg/ mL. The results of this study demonstrated the antimicrobial efficacy of quaternary ammonium compounds BKC and CPC on S. aureus isolated from chicken meat, which could be useful for food processing and consumer health in preventing and controlling foodborne pathogens, including resistant bacteria.

Key words: Quaternary ammonium compounds, Chicken meat, Staphylococcus aureus, Minimum inhibitory concentration, Broth microdilution method

ANTIBACTERIAL ACTIVITY OF GOLD NANOPARTICLES AGAINST *Staphylococcus aureus*

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ABSTRACT

Infections caused by antimicrobial-resistant and multidrug-resistant bacteria such as Staphylococcus aureus are the most common cause of mortality and morbidity worldwide. Antimicrobial therapeutic options against infections caused by resistant pathogens, such as methicillin-resistant S. aureus (MRSA), are frequently restricted. The clinical problems emphasize the crucial need for novel and effective antibacterial treatments. Nanoparticles (NPs) act as potential antimicrobial agents. They can penetrate the bacterial cell membrane, disrupt important molecular pathways, showing unique antimicrobial mechanisms. Therefore, the antibacterial effect of gold nanoparticles (AuNPs) on S. aureus isolates, including MRSA originating from chicken meat, was examined in this study. The antibacterial activity of chemically synthesized AuNPs (20 nm in size) against S. aureus isolates was carried out using the broth microdilution method. The minimum inhibitory concentrations (MICs) of AuNPs for the meat-associated isolates were determined at 500 µg/mL and higher. The results of this study present the susceptibility of the S. aureus isolates to AuNPs. Further studies are needed investigating the antibacterial activity and efficacy of different gold nanoparticle sizes and concentrations against resistant pathogens.

Key words: Gold nanoparticles, Staphylococcus aureus, MIC, Antibacterial effect

MEDICALLY SIGNIFICANT SPIDERS (ARACHNIDA: ARANEAE) AND HYMENOPTERANS (INSECTA: HYMENOPTERA) OF ALBANIA: A COMPREHENSIVE REVIEW OF ECOLOGY AND VENOM TOXICITY

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ABSTRACT

There are several studies on spiders and insects in Albania; however, only a few papers address their venom, toxicity and medical significance. This paper presents the first comprehensive data on ecology and distribution, including their morphology and habitat preferences, as well as the venom toxicity of medically significant insects and spiders found in Albania. The data presented here has been gathered from an extensive literature review and through citizen science, focusing on social networks, written and verbal media, and observations collected from the online platform iNaturalist. Spiders from the "widow" group (genera Latrodectus and Steatoda), are frequently mentioned for the severity of their bites due to the potent neurotoxin α-latrotoxin present in their venom. On the contrary, the medical significance of hymenopterans, mainly honeybees (Apis mellifera), is due to the anaphylactic reactions induced by their venom. This study presents the first attempt to map the distribution of venomous spiders and insects present in Albania.

Key words: Balkans, arthropods, arachnids, Hymenoptera, venomous, anaphylactic

REPRODUCTIVE STATUS OF BLUE SWIMMING CRAB (PORTUNUS PELAGICUS) AND INFLUENCING ENVIRONMENTAL FACTORS IN PARE-PARE BAY, SOUTH SULAWESI, INDONESIA

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ABSTRACT

Aim. This study was conducted to analyze sex ratio, spawning season, size of ovigerous females, fecundity, and environmental factors that affect to spawning season in Pare-Pare Bay. **Methods**., Sampling of crabs was carried out at the crab landing site in Watang Suppa Village, South Sulawesi, Indonesia. The crab samples were caught by fishermen in Pare-Pare Bay using gill nets. There were 5278 samples collected from July 2023 to June 2024. Chi-square (X2) statistical was performed to test the difference between ratios in both sexes and to determine the influence of physicochemical parameters of water on the abundance of ovigerous females using the Principal component analysis (PCA) by Xlstat. **Results**. The results showed that the ovigerous crab landed dominated in 8-11 cm of Carapace Width. The average sex ratio is about 0,6:0,4 (M:F). The lowest number of ovigerous females was caught in May (11%) and the highest (32%) in March. The fecundity ranges from 107,640 eggs to 1,308,400. Water salinity, Dissolved Oxygen, pH, Temperature, Depth, and Current fluctuated during the year. **Conclusion**. Based on this research, it can be concluded that the sex ratio of crab catches fluctuated each month. 34 % of the ovigerous females are under sizes (< 10 cm). Crabs in Pare-Pare Bay spawn throughout the year, however, there are peaks in spawning in certain months and the highest is in March. The environmental conditions in Pare-Pare Bay are very dynamic. However, temperature is the main factor for the peak of the spawning seasons of crabs.

Key words: Crab, Environment, Pare-Pare Bay, Portunus pelagicus, Reproduction

STUDY OF THE EPIDEMIOLOGICAL-CLINICAL ASPECTS OF SICKLE CELL DISEASE IN CHILDREN IN THE NORTHERN REGION OF MOROCCO

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ABSTRACT

Introduction : Sickle cell disease (SCD) is one of the most common monogenic diseases in humans is an inherited blood disorder caused by abnormal hemoglobin called hemoglobin S. World Health Organization (WHO) has declared sickle cell disease as a major public health problem worldwide, particularly in Africa, due to the increasing morbidity rate associated with this disease. The aim of our work is to study the epidemiological -clinical aspects of sickle cell disease patients in the pediatric service of the Princess Lalla Meriem Provincial Hospital Center in Larache. **Patients and methods :** This is a prospective descriptive study that involved sickle cell patients followed in consultation at the Provincial Hospital Center of Larache over a period of one year (March 2023- March 2024). The collection of medical data was carried out using an exploitation sheet that was completed during the consultations by direct interview with the parents (legal guardians) of the children, based on the documents presented during these consultations. **Results :** We collected during this period 37 children with sickle cell disease, aged between 1 month and 15 years with an average of 6,5 years with a female predominance. The majority of our patients resided in rural areas in 86.49% of cases. The parents are consanguineous in 58.62% of the cases. The electrophoresis of hemoglobin showed 50.6% heterozygous sickle cell and 12.5% composite β-thalassemia sickle cell disease. Osteoarticular pain was the most frequent reason for consultation with 74.86% of cases, pallor, jaundice and splenomegaly were the most common signs. These results demonstrate the interest of prevention through awareness, genetic counseling and antenatal diagnosis for families and couples at risk who reside in Larache, which is a potential hotspot in Morocco. **Conclusion :** Our results confirm the need for the implementation of a strategy for the optimal management of sickle cell anemia, which often involves multidisciplinary coordination between the various medical and social stakeholders to improve the quality of life of patients.

Key words: Sickle cell, Epidemio-clinical aspects, Morocco

EVALUATION OF DEVELOPMENTAL TOXICITY OF LEAD (PB) ON ZEBRAFISH (DANIO RERIO) EMBRYOS

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ABSTRACT

Heavy metals are of critical importance due to their easy absorption into the food chain and bioaccumulation processes. The aim of this study was to evaluate the toxic effects of lead (Pb) in zebrafish embryos. Embryos were exposed to 4.39-50 mg L-1 Pb for 96 hours and the survival rates, heart rates and embryonic growth rates of these individuals were determined. According to the results of the study, the 96-hour LC50 value of the Pb was determined as 18 (16.6-20.72) mg L-1. Heart rates of zebrafish embryos (48-hour) exposed to the Pb were significantly reduced at concentrations of 14.81-50 mg L-1. At concentrations of 6.88 mg L-1 and higher, it caused significant inhibition in the length of zebrafish larvae.

Key words: Lead, zebrafish, embryo toxicity, pollution

MORPHO-FUNCTIONAL CARACTERIZATION OF THE ADRENAL CORTEX DURING DEVELOPEMENT IN Mériones libycus MALE.

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ABSTRACT

The adrenal gland, small but vital, is composed of two morphologically distinct parts responsible for the secretion of several hormones, a central part : the medulla, and an external part the cortex. The latter is composed of three different layers, the zona glomerulosa, the fasciculata and finally the zona reticularis, each secreting a specific type of hormones. However, the molecular and cellular mechanisms regulating the complex process of adrenal cortex development remain poorly understood. Our work aims to study the morphostructural characteristics of the adrenal cortex during development, at three different stages (juvenile/prepubertal/adult) in the male of Meriones libycus, a particular rodent species, for its highly developed gland, which expresses a reticularis zona responsible for the secretion of androgens, comparable to the human's, therefore these rodents are a suitable model for the understanding of these mechanisms that could be applicable to the benefit of humans. Histological and morphometric analyses have revealed major architectural changes that take place in the cortex during postnatal life. The results show a decrease about 26% of the total thickness of the cortex from the juvenile stage to the adult stage, accompanied by a 40% increase in the thickness of the zona glomerulosa in the adult, which is probably related to the increased needs of mineralocorticoids. Conversely, the zona fasciculata decreased by about 40%. Regarding the zona reticularis, already well-developed in juveniles, its thickness has a little increased in the prepubertal stage and regressed significantly in adults. The voluminous reticularis zone observed in juveniles could correspond to a transitional « fetal zone » whose regression would coincide with the emergence of the mature reticularis zona producing DHEA and DHEA-S.

Key words: Adrenal gland, Meriones libycus, adrenal cortex, developpement

POLLUTION WITH HEAVY METALS (PB, ZN, NI, CD) IN INDUSTRIAL AREAS IN KOSOVO AND THEIR IMPACT ON THE POPULATION OF THE FROG PELOPHYLAX RIDIBUNDUS (PALLAS, 1771)

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ABSTRACT

Industrial pollution caused by the anthropogenic factor constitutes one of the major global environmental problems. The content of heavy metals Pb, Zn, Ni and Cd in the natural habitats of populations of frogs Pelophylax ridibundus was investigated in this study. Water and soil samples were collected from four polluted industrial sites and one control site in Kosovo: Kishnica, Obiliq, Mitrovica, Drenas (polluted sites) and the Dragash-Brezne (control site) in spring- summer and autumn-winter seasons. The investigated areas are characterized by industrial mining activity (Kishnica, Mitrovica), electricity production from coal (Obiliq), and nickel processing (Drenas). Soil samples were dried at 105°C for 48 hours and treated with a mixture of 69% HNO3 and HClcc in a 1:3 ratio, while the water samples were filtered. Soil samples were dissolved in the microwave digestion at 200°C for 45minutes. Water and soil samples were analyzed using a ISPE. The results of the study show significancy concentration of heavy metals between the investigated habitats compared to the control site, types of metals, seasonal significance, and difference concentration in water and soil. A greater concentration of metals in the autumn season compared to the spring season has been determined. The values of cadmium in all localities were below the detection limit and did not show seasonal differences, while the concentration values of Pb, Zn, and Ni were higher in the polluted sites compared to the control site Also, the values show high significance between the water and the substrate, which the concentration of heavy metals is higher in the substrate compared to the water samples. This study proves the practical usefulness of investigating the types, sources and nature of pollutants in the natyral habitats (water and substrate) of Pelophylax ridibundus frogs as important parameters for assessing the investigating the types, sources and nature of environmental health of these ecosystems and the health of frog populations in these areas.

Key words: Key words: Environmental Monitoring, Amphibian Health, Metal Contamination, Seasonal Differences, Industrial Emissions

ACUTE TOXIC EFFECTS OF CHLOROTHALONIL ON MEDITERRANEAN MUSSEL (MYTILUS GALLOPROVINCIALIS LAMARCK, 1819) SAMPLES

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ABSTRACT

The layer formed by the attachment of shells, algae, or microorganisms to the submerged surfaces of marine vessels is called fouling. Antifouling biocides are used as anti-fouling agents, but they also pose a threat to non-target organisms. The use of chlorothalonil, a type of antifouling agent, presents various risks to the environment. In this study, the acute toxic effects (96 hours) of 0, 10, 100, and 1000 µg/L chlorothalonilon Mediterranean mussels (Mytilus galloprovincialis) were evaluated for histopathological and genotoxic findings. For this purpose, after exposure, the mussels were dissected, and hemolymph, gill, digestive gland, and mantle samples were collected. Haemolymph samples were analyzed for total haemocyte count, cell types, and genotoxic effects (micronuclei and nuclear anomalies). Tissue samples were examined histologically. The most significant histological findings observed in gill sections were an increase in lipofuscin granules, expansion of hemolymphatic sinuses, hyperplasia, and fusion. In particular, in digestive gland sections of mussels exposed to 1000 µg/L chlorothalonil, epithelial cell deformations around the lumen and connective tissue infiltration were observed. In mantle sections, increased haemocyte infiltration was observed with higher doses of exposure. Additionally, necrotic areas were detected at the highest dose of exposure. In terms of genotoxic effects, significant differences were found in the frequencies of micronuclei and nuclear anomalies (binuclear haemocyte) when compared to the control group ($p < 0.05$). Based on the findings of this study, it was concluded that chlorothalonil is harmful to mussels in terms of histological and genotoxic effects. Given that this mussel species is easily exposed to this chemical and is also consumed by humans, we believe that the observed toxicity is of significant concern for the ecosystem.

Key words: M. galloprovincialis, histopathology, micronucleus, chlorothalonil

CYCLOOXYGENASE-MEDIATED MECHANISMS OF DECOCTION EXTRACT FROM THYMELEAE HIRSUTA IN MODULATING GASTRIC EMPTYING AND INTESTINAL TRANSIT IN MICE

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ABSTRACT

Thymeleae hirsuta (T. hirsuta) has been traditionally used for various medicinal purposes, including the treatment of digestive disorders. This study investigates the effects of decocted extract (DE) from T. hirsuta aerial parts on gastric emptying and intestinal transit in mice, as well as elucidates the underlying mechanisms. Mice were orally administered DE at doses of 125, 250, and 500 mg/kg, then, gastric emptying and intestinal transit rates were assessed. Pharmacological agents, including indomethacin, L-arginine, and L-nitro-n-arginine (L-NNA), were used to explore potential synergistic effects and underlying mechanisms. The results revealed that DE significantly reduced gastric emptying rates compared to the negative control, with reductions of 48.68 ± 2.95%, 38.60 ± 1.67%, and 55.98 ± 2.19% at doses of 125, 250, and 500 mg/kg, respectively. Mechanistic investigations indicated that DE primarily affects the cyclooxygenase (COX) pathway, with no evidence of involvement in the nitrinergic pathway. Additionally, DE significantly increased intestinal transit in a dose-dependent manner, implicating both COX and nitrinergic pathways in its action. These findings suggest that DE from T. hirsuta has potential therapeutic properties in modulating gastrointestinal motility, highlighting its value in the treatment of digestive disorders.

Key words: Thymeleae hirsuta, decocted extract, gastric emptying, intestinal transit.

INVESTIGATION OF THE HISTOPATHOLOGICAL AND GENOTOXIC EFFECTS OF REACTIVE ORANGE 16 TEXTILE DYE ON THE TISSUES OF MEDITERRANEAN MUSSEL (MYTILUS GALLOPROVINCIALIS LAMARCK, 1819)

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ABSTRACT

Textile industry activities have harmful effects on the environment because they consume a large amount of water and produce a large amount of polluted water as waste. There are various types of chemical dyes used in textile industry activities. Among these, azo dyes are the most commonly used. In this study, the toxic effects of Reactive Orange 16 (RT16), an azo dye frequently used in textile industry activities worldwide and in our country, on Mediterranean mussels (Mytilus galloprovincialis) were investigated from histopathological and genotoxic findings. The mussels were exposed to RT16 dye at concentrations of 0, 10, 100, and 1000 mg/L for 96 hours. After exposure, the mussels were dissected; gill, digestive gland, and mantle samples were examined histopathologically and haemolymph samples were analyzed for total haemocyte count, haemocyte types, micronuclei and nuclear anomalies. As a result of RT16 exposure, an increase in lipofuscin granules, epithelial deformations, fusion, hyperplasia, enlargement of haemolymphatic sinuses, and vacuolization were observed in gill sections. In digestive gland sections, haemocyte infiltration and focal necrosis were detected, while haemocyte infiltration and focal necrosis were observed in mantle sections. These findings were more identified at higher doses of RT16 with necrotic areas being observed particularly frequently at the 1000 mg/L exposure level. A significant difference in micronucleus frequency was observed between the control and exposure groups ($p < 0.05$). It was determined that the frequency of micronuclei increased with exposure. A significant difference in binucleate hemocyte frequency was also found between the control and treatment groups ($p < 0.05$). When all the findings are considered together, it was concluded that RT16 dye causes toxic effects on mussels and that further studies are needed to clarify the situation.

Key words: Reactive orange 16, dye, M. galloprovincialis, histopathology, micronucleus

IMPACT OF SOLVENT POLARITY ON THE ANTIOXIDANT POTENTIAL OF THYMELEAE HIRSUTA EXTRACTS: EVALUATING PHENOLIC CONTENT AND RADICAL SCAVENGING ACTIVITY

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ABSTRACT

Thymeleae hirsuta (L.) Endl., known as 'Methnane' in Algeria, is a widely used medicinal plant in folk medicine. This study evaluates the in vitro antioxidant activity of T. hirsuta extracts and examines how extraction solvent polarity affects antioxidant potential. Extracts were obtained using three solvents with varying polarities: water for decoction, methanol-water (50%) for hydromethanolic extraction, and absolute methanol for macerated extraction. The total phenolic and flavonoid contents were measured, revealing high concentrations that decreased with increasing solvent polarity. Antioxidant activity was assessed using ABTS assay for scavenging activity, CUPRAC assay, and reducing power tests to evaluate the reduction potential of the extracts. Results indicated that T. hirsuta exhibited strong scavenging activity, with notable differences in effectiveness based on solvent polarity. The most polar aqueous decoction demonstrated considerable reducing activity, followed by the hydromethanolic and methanolic extracts, with increasing reduction potential. These findings highlight the efficacy of polar solvents in extracting phytochemical compounds from T. hirsuta, contributing to its antioxidant activity against various radicals and ions.

Key words: Thymelaea hirsuta, antioxidant, solvent polarity, reducing power, Algeria.

ATTACHMENT MODE OF ACANTHOBOTHRIUM BENEDENI LÖNNBERG, 1889 AT ITS MICOHABITAT IN THE INTESTINAL MUCOSA OF RAJA RADULA DELAROCHE, 1809

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ABSTRACT

The study of a selachian Cestoda from the Algerian basin in the southwestern Mediterranean, and chiefly their attachment mode to the intestine of Raja radula Delaroche, 1809 established by simultaneous histological study of the intestinal microhabitat offered in this host and the disposition of the attachment's organs were uncovers for the first time. The structure of the spiral intestine of Raja radula is formed by an internal layer covered with a complex network with very typically size and shape. This structuring is extremely paired with an adaptive attachment mode of their Acanthobothrium Blanchard, 1848 cestoda, whose fixation is ensured principally and respectively by hooks, sucker and bothridia. This research expose complementarity between the evolutive development of the attachment mode of cestode to ensures an efficiently and permanent fixation of these parasites in this microbiotope.

Key words: Microhabitat, Cestoda, Acanthobothrium benedeni, histological study, complementarity, permanent fixation.

ATTACHMENT MODE OF ACANTHOBOTHRIUM BENEDENI LÖNNBERG, 1889 AT ITS MICROHABITAT IN THE INTESTINAL MUCOSA OF RAJA RADULA DELAROCHE, 1809

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ABSTRACT

The study of a selachian Cestoda from the Algerian basin in the southwestern Mediterranean, and chiefly their attachment mode to the intestine of Raja radula Delaroche, 1809 established by simultaneous histological study of the intestinal microhabitat offered in this host and the disposition of the attachment's organs were uncovers for the first time. The structure of the spiral intestine of Raja radula is formed by an internal layer covered with a complex network with very typically size and shape. This structuring is extremely paired with an adaptive attachment mode of their Acanthobothrium Blanchard, 1848 cestoda, whose fixation is ensured principally and respectively by hooks, sucker and bothridia. This research expose complementarity between the evolutive development of the attachment mode of cestode to ensures an efficient and permanent fixation of these parasites in this microbiotope.

Key words: Microhabitat, Cestoda, Acanthobothrium benedeni, histological study, complementarity, permanent fixation.

INFLUENCE OF ORGANIC COMPOUND ELICITATION IN ALSTROEMERIA SP. ON FEEDING BEHAVIOR OF WESTERN FLOWER THRIPS

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ABSTRACT

Alstroemeria crops are highly valuable to Colombia, being the third most exported cut flower. Recently, their production has been affected by species from the Western Flower Thrips (WFT) complex. These insects damage leaves, hindering photosynthesis, and harm the tepals, reducing the flower marketable appearance. Current pest management strategies rely predominantly on pesticide use, which can negatively affect non-target species, exacerbate soil erosion, and disrupt soil biota. Additionally, the thrips populations in Alstroemeria greenhouses are becoming resistant to the pesticides, necessitating higher doses and consequently increasing environmental impact. An innovative approach to managing WFT involves using low-molecular weight organic compounds as elicitors to activate the plant's defense mechanisms against herbivores to modify their feeding performance. To evaluate this approach, we treated Alstroemeria plants with two organic elicitors and then fed WFT with the tepals of those plants. Water-treated and untreated plants were used as controls. The impact of these treatments on thrips feeding behavior and plant damage was observed. Using Barvocuc software, the damage on the tepals was distinguished from the rest of the tepal area. ImageJ software was then used to measure and record the damaged area for subsequent statistical comparison. The results revealed significant differences in the feeding patterns of WFT, suggesting a potential anti-herbivore response activated by the elicitors. This research was funded by the Vice-Rector for Research at the Universidad Militar Nueva Granada through the IMP-CIAS-3739 research project, validity 2023 - 2025.

Key words: Elicitation, specialized metabolites, herbivory, cut flower

ORGANIC COMPOUND-BASED ELICITATION INDUCES ANTI-HERBIVORE METABOLITE-RELATED RESPONSES IN ALSTROEMERIA AS POTENTIAL MANAGEMENT OF WESTERN FLOWER THRIPS

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ABSTRACT

Western Flower Thrips (aka WFT) are a species complex known to attack a wide variety of economically important crops. They cause damage through direct herbivory and, in some cases, by transmitting viruses such as tospovirus in tomato plants. In Colombia, a major flower-exporting country, WFT significantly affects the production of various cut flowers. Specifically, in Alstroemeria, WFT damages the leaves, interrupting photosynthesis, and harms the tepals, compromising the flower aesthetic value, which is crucial for its marketability. The current management strategy primarily relies on pesticides, which can have detrimental effects on non-target organisms such as pollinators and biocontrol agents. A promising alternative for WFT control is the elicitation of plant defense mechanisms using specific biologically-active compounds. To test this hypothesis, we conducted an elicitation experiment using two organic compounds and monitored the LC-MS-derived metabolic profiles of Alstroemeria leaves and tepals at 48, 96, and 144 hours post-treatment. These profiles were compared to those of water-treated and untreated plants used as controls. Metabolic profiling was performed to compare specialized metabolite variations using univariate and multivariate statistics. The findings revealed significant upregulations and downregulations in certain metabolites related to conjugated flavonoids, suggesting a plausible induced anti-herbivore response in the treated plants. This study was funded by the Vice-Rector for Research at Universidad Militar Nueva Granada through the IMP-CIAS-3739 research project, validity 2023 - 2025.

Key words: Specialized metabolites, LC-MS, WFT, biocontrol

DETERMINATION OF ANTIOXIDANT AND ANTIBACTERIAL PERFORMANCE OF EDIBLE FLOWERS GROWN IN ANKARA

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ABSTRACT

Edible flowers have been used for centuries in many countries of the world for their nutritional value, medicinal effect, taste, shape and aesthetic appearance and the need for production is increasing day by day. In our study, marigold (Tagetes erecta L.) and nasturtium (Tropaeolum majus L.), which are among the most important edible flowers, were used and it was planned to evaluate the antioxidant and antibacterial performances of their edible parts. In the study, the leaf parts of marigold, nasturtium and nasturtium were collected, dried, ground, dissolved in ethanol, lyophilized and extracted with the help of DMSO (Dimethylsulfoxide). For antioxidant performance, Efficient Concentration 50 (EC50) values were calculated from the graphs drawn with DPPH free radical scavenging activity, % inhibition values. According to the results, radical reducing activities were recorded as follows; marigold IC 50: 1,42 ±0,22 µg/ml, Latin leaf IC 50: 18,28± 5,25 µg/ml, Latin flower IC 50: 16,56 ±4,15 µg/ml. Although BHT used as a standard in the study was significantly different from the plant parts in the study, the activity in marigold was very close to BHT ($p<0.005$). It is thought that marigold, which has the highest antioxidant activity among the plant parts and gives statistically significant results compared to other plants and parts, may be an alternative to artificial scavenger. In antioxidant performance evaluation; total phenolic content (TP) was expressed as gallic acid and total flavonoid content (TFC) was expressed as quercetin equivalent. The results were similar in terms of total phenolics and flavonoids and marigold showed statistically significant differences ($p<0.005$). The total phenolic content of marigold was 91.28±5.76 mg GAE/g dry matter and flavonoid content was 88.00±4.74 mg QE/g. The findings obtained indicate that marigold plant, which is mostly produced as an ornamental plant, can be used as a powerful antioxidant. Fresh cultures of B.pumilus, E.facelis, Shigella, B.linhentiformis, S.aureus, P.aureginosa, K.pnemoniae, E.gallinarium and E.coli microorganisms were used for antibacterial evaluation and their effects were determined by using disk diffusion method. It was concluded that the extracts of the plant and its parts used in the study at a concentration of 45 mg/ml were effective against all microorganisms except E.facelis and Shigella. According to the disk results, the bacteria with the highest inhibition zone diameter were B.linhentiformis (1,1± 0,1) in nasturtium, B.pumilus (1,0±0,1) in nasturtium leaf, and K.pnemoniae (1,0±0,1) in marigold. The results emphasize the sustainable production of flowers with medicinal characters in Ankara conditions, which can be brought to the economy and can be a source of medicinal studies.

Key words: Tagetes erecta, Tropaeolum majus, Antioxidant, Antibacterial

EFFECTS ON HERBIVORY PERFORMANCE BY THE INDUCED DEFENSE OF ALSTROEMERIA SP. AGAINST WESTERN FLOWER THRIPS VIA INORGANIC COMPOUND-MEDIATED ELICITATION

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ABSTRACT

Western flower thrips (WFT) present a substantial threat to the health and productivity of Alstroemeria crops due to their ability to cause extensive damage to leaves and flowers by feeding on photosynthetic pigments, leaving a silvery stain. This feeding damage reduces the aesthetic and commercial value of the plants, resulting in millions of dollars in annual losses for the floriculture industry. Traditional methods for controlling thrips often rely on chemical pesticides, which can negatively impact the environment and human health. Consequently, inducing plant defenses using inorganic elicitors has attracted increasing attention as a sustainable and eco-friendly alternative. The aim of this study was to assess the effectiveness of elicitation with calcium chloride and potassium phosphite in dissuading thrips from feeding by comparing the damage caused by thrips in the Alstroemeria tepals between treated individuals (elicited) with two different concentrations of each of the previously mentioned elicitors and untreated ones (control) after 48, 96, and 144 hours. Thrips were placed in Petri dishes with a tepal from each plant of one of the different treatments as the only food source for 48 hours. The damaged area was then calculated with the aid of image analysis software. We found significant differences in the defoliated area in some of the evaluated treatments, indicating that there were defense mechanisms associated with elicitation, causing whether deterrence, repellence, and even toxicity, which affected the thrips physiological processes. This study was funded by the Vice-Rector for Research at the Universidad Militar Nueva Granada through the IMP-CIAS-3739 research project, validity 2023-2025.

Key words: Herbivory, Western Flower Thrips, Plant Defense

PHENOLIC-BASED METABOLITE VARIATIONS ON ELICITED ALSTROEMERIA SP. WITH INORGANIC COMPOUNDS AS INDUCED RESPONSE AGAINST WESTERN FLOWER THRIPS

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ABSTRACT

Western flower thrips (WFT) pose a significant threat to the health and productivity of Alstroemeria crops due to their ability to inflict severe damage on leaves and flowers by feeding on photosynthetic pigments and ovipositing. They also transmit plant diseases such as tospovirus, resulting in millions of dollars in annual losses for the floriculture industry. Traditional thrips control methods often rely on chemical pesticides, which can have harmful effects on the environment and human health. For this reason, inducing plant defenses using inorganic elicitors has garnered increasing attention as a sustainable and eco-friendly alternative. This study aims to assess the effectiveness of inorganic elicitors in triggering plant defense mechanisms against thrips infestations by corroborating the metabolic products generated after elicitation with calcium chloride and potassium phosphite. The experiments involved the application of these two inorganic elicitors at two different concentrations (150 ppm and 300 ppm) to Alstroemeria plants. The elicitors were applied through foliar spray, and then tepals and leaves were collected after 48, 96, and 144 hours after elicitation. Plant defense responses were evaluated by examining the specialized metabolite profiles obtained through high-performance liquid chromatography coupled with mass spectrometry. Many of the possible candidates found to be involved in plant defense mechanisms against herbivores included flavonoid compounds (free and glycosylated) as well as methylated and phosphorus donor compounds. Deterrence and repellent effects are also suspected mechanisms to be involved in plant defense within the differential metabolites found between treated and untreated plants. This study was funded by the Vice-Rector for Research at the Universidad Militar Nueva Granada through the IMP-CIAS-3739 research project, validity 2023-2025.

Key words: Metabolomics, Western Flower Thrips, Alstroemeria, Phenolic compounds, Flavonoids

DETERMINATION OF TOXIC EFFECTS OF IMIDACLOPRIDE ON SOME BEHAVIOURAL CHARACTERISTICS OF DROSOPHILA MELANOGASTER

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ABSTRACT

Pesticides are widely used in agriculture for the control of pests, weeds or plant diseases. The widespread and/or improper use of pesticides causes pollution of water, air, soil and food. Although they are designed to act selectively against specific organisms, they can have harmful effects on non-target organisms. Imidaclopride is a neonicotinoid insecticide and acts by affecting the nervous system of insects. In this study, the behavioural toxicity of imidaclopride on Drosophila melanogaster was determined. Following the application of imidaclopride at doses of 0.01, 0.05, 0.1 and 0.3 ppm to 72±4 hours old larvae of Drosophila Oregon R+ lines, pupation and pupal emergence success, adult mass measurement and negative geotaxis experiments were carried out. As a result of the comparison of the data obtained with the control group data, it was determined that imidaclopride application doses did not cause statistically significant changes in pupation and pupal emergence success, mass of adult individuals and negative geotaxis.

Key words: Imidacloprid, Drosophila melanogaster, insecticide, behavioral toxicity

APIS MELLIFERA GUT MICROBIOTA DIVERSITY BETWEEN ABIOTIC AND BIOTIC FACTORS

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ABSTRACT

The Apis mellifera or the honey bee is one of the most important species in domestic agriculture. Besides agricultural crops, numerous ecologically significant plant species are also pollinated by honey bees. However, in their environment, Apis mellifera hives face numerous threats, including abiotic and biotic factors, that can cause the sudden departure of worker bees, leaving behind a queen, some nurse bees, immature bees, brood, and ample food. This phenomenon is known as Colony Collapse Disorder (CCD). Abiotic factors encompass pesticide use, temperature fluctuations, and precipitation levels. Biotic factors include viral, bacterial, or fungal pathogens, mite infestations, and hive invasions by small hive beetles, wax moths, or wasps. Investigating the gut microbiota diversity of Apis mellifera following metagenomic analysis reveals that abiotic and biotic factors can shape this diversity and indeed influence the health of his host. The abundance and community composition of honey bee gut microbiota is associated with winter hive loss. The differences in the host and their geographical location modify how various processes contribute to forming the honeybee's gut microbiota. Regardless of the cause, hive loss poses a significant threat to agriculture and ecosystem function. Any research that enhances our understanding of the contributing factors will aid in developing strategies to reduce its occurrence.

Key words: Apis mellifera, Gut Microbiota, biotic and abiotic factors.

ANALGESIC EFFECTS OF ETHANOLIC EXTRACTS FROM ALGERIAN ORIGANUM MAJORANA (LAMIACEAE)

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ABSTRACT

Origanum majorana L is endemic to mediterranean countries including Algeria, Egypt and Cyprus. Its leaves and flower oil are used as seasoning and flavoring in meals (**1**). This aromatic herb is used extensively as a spice and medicinal plant in many parts of the world. It is said to help with respiratory and digestive disorders and to have mild sedative properties. However, modern herbal medicine is well-known for its possible antibacterial, anti-inflammatory, and antioxidant qualities (**2-4)** The objective of this study is to evaluate the acute toxicity as well as the analgesic properties of the ethanolic extract of the Algerian Origanum majorana L The analgesic activity was conducted with the abdominal contractions produced by the injection of acetic acid in albino mice, which treated with the extracts (200 and 400 mg/kg). Both doses of ethanolic extract of Origanum majorana L exerted a significant decrease of 25.88% and 21.46% respectively in acetic acid-induced writhing in mice. When compared to the standard IC50 values (Asperin). We may conclude that hydroalcoholic extract of Origanum majorana L possess peripheral analgesic activity. It could be a promising source of active ingredients that could constitute potential therapeutic modalities in different clinical settings.

Key words: Origanum majorana L, analgesic activity, toxicity effects

COMPARISON OF TOTAL PHENOLIC AND FLAVANOID CONTENT OF MELISSA OFFICINALIS SAMPLES FROM CYPRUS AND TURKEY

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ABSTRACT

M.officinalis, a member of the Lamiaceae family, is a perennial plant. It is also known as Oğul Otu, Kovan Otu, Limon Mint (Muğla), Limon Otu, Tatırambe, Temre Otu (Antakya) according to different regions in our country. It usually grows in coastal regions in Turkey. Melissa officinalis L essential oils have been found to have a good potential in terms of antioxidant activity. Flavanoids are polyphenols that provide human health benefits such as antioxidant, anti-inflammatory and cancer-protective effects. Considering the known beneficial effects of Melissa officinalis on human health, the aim of this study was to analyse the phenolic and flavonoid contents of methanol and ethyl acetate extracts of samples collected from Cyprus and Turkey. Fresh leaves of Melissa officinalis were used in this study. Plant extracts were prepared in methanol and ethyl acetate at 1:20 (w/v) and 1:25 (w/v) plant/solvent ratios using shaking water bath and ultrasonic extraction methods. Polyphenols in plant extracts were measured spectrophotometrically using Folin reagent, a specific redox reagent. Flavonoids were determined spectrophotometrically based on the complexation reaction with Al+3. According to the findings obtained in the study, the traditional method of shaking water bath extraction (SWB) showed higher efficiency than the ultrasonic (U.E) method. Better solubilisation efficiency was obtained in methanol in Cyprus samples and in ethyl acetate in Turkey samples of Melissa officinalis. According to the data obtained, it was also determined that the flavanoid content of the Turkish samples was higher. The yields of Melissa officinalis Turkey samples were Ethyl Acetate (SWB) > Methanol S.W.B > Ethyl Acetate U.E. > Methanol U.E., respectively. The yields of Cyprus samples were Methanol S.W.B > Ethyl Acetate S.W.B. > Ethyl Acetate U.E. > Methanol U.E., respectively. According to the results of the total phenolic content of Melissa officinalis samples from Turkey and Cyprus, the highest phenolic compound content in all samples was found in ethyl acetate solvent. In addition, the conventional agitated water bath extraction technique was found to be more efficient compared to the ultrasonically assisted method. The yield ranking forMelissa officinalis Turkey samples was Ethyl Acetate S.W.B. > Methanol S.W.B. > Methanol U.E. > Ethyl Acetate U.E. For Cyprus samples, Ethyl Acetate S.W.B. > Methanol S.W.B. > Ethyl Acetate U.E. > Methanol U.E. The highest phenolic content of both samples was obtained in the shaking water bath method using ethyl acetate as solvent. According to these results, it was determined that Melissa officinalis Turkey samples had higher phenolic components.
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Key words: Melissa officinalis, Phenolic, Flavanoid , Extraction

PLANT EXTRACTS: BIOACTIVE SOLUTION AGAINST PATHOGENS OF THE HONEYBEE APIS MELLIFERA

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ABSTRACT

The honeybee (Apis mellifera) and flowers are closely linked. Indeed, the bee forages plants in order to collect nectar and pollen; sources of their food, while contributing to the pollination and survival of several cultivated and wild plant species. However, different pathogens threaten the survival of bee colonies around the world. These agents can be bacteria (Melissococcus plutonius, Paenibacillus larvae), fungi (Ascosphaera apis), mites (Varroa destructor), or microsporidia (Nosema apis, Nosema cerana). Since decades, chemical compounds were used against these biotic factors, which has led to the appearance of residues in hive products as well as the resistance of these agents to different synthetic molecules. Thus, news compounds have been extracted from different parts of plants, then tested in vitro on infected honeybees, including essential oils and phenolic compounds. These compounds are extracted following different methods. Essential oils are obtained by hydrodistillation while phenolic extracts are extracted by maceration or sonication. The plant extract expresses a toxicity against pathogens without affecting bees. In conclusion, plant extracts witness of promising as an alternative compound of control to maintain the survival of bees.

Key words: Apis mellifera, pathogens, biological control, plants extracts

PROTECTIVE EFFECTS OF N-ACETYLSYSTEINE ON SODIUM FLUORIDE-INDUCED CYTOTOXICITY AND APOPTOSIS IN MOUSE LEYDIG CELLS

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ABSTRACT

Fluoride is a naturally occurring element that is abundantly found in nature and belongs to the halogen group. Fluoride compounds are encountered by individuals in several ways on a daily basis, including through the consumption of drinking water, food, and dental products. Research has shown that fluoride has detrimental effects on human health and can lead to toxicity. Furthermore, clinical research and animal trials have conclusively established that fluoride exerts harmful effects on the male reproductive system. Upon reviewing the literature, researchers have conducted numerous studies using antioxidant molecules to enhance the detoxifying effects of fluoride. N-acetylcysteine (Nac) is an amino acid that is produced from L-cysteine and has antioxidant effects. Nac has been globally utilized for more than five decades and is included in the World Health Organization's list of essential medicines. Scientific evidence has demonstrated that Nac effectively safeguards cells and tissues from oxidative stress by eliminating reactive oxygen radicals (ROS). Additionally, researchers have discovered that Nac shields cells from apoptosis by influencing genes involved in programmed cell death. The investigation involved individual and combined application of sodium fluoride (NaF) (50 ppm) and Nac (0.5 and 1 mM) to the TM3 Leydig cell line for a duration of 24 hours. We assessed the cytotoxicity in Leydig cells using the lactate dehydrogenase (LDH) test after exposure, and determined apoptosis using the double fluorescence staining method. The findings demonstrated that sodium fluoride induced cytotoxicity in Leydig cells and resulted in apoptosis. Furthermore, studies have established that Nac, renowned for its antioxidant properties, could potentially shield cells from the damaging effects of sodium fluoride.

Key words: Fluoride, Leydig cells, n-acetylcysteine, apoptosis, cytotoxicity.

LARVICIDAL ACTIVITY OF CLOVE OIL AGAINST LARVAE OF DENDROCTONUS MICANS (KUGELANN) (COLEOPTERA: CURCULIONIDAE)

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ABSTRACT

Plant essential oils can be considered as environmentally friendly applications compared to synthetic insecticides. The aim of this study was to determine the larvicidal activity of clove essential oil against 3rd instar larvae of Dendroctonus micans. A single dose of clove oil was tested against the 3rd instar larvae of D. micans under laboratory conditions. At the end of the 9th day, the percentage mortality rate was 63.63%. It was determined that clove oil showed larvicidal activity on the 3rd instar larvae of D. micans

Key words: Clove oil, D. micans, Larvicidal activity

EXPLORING HYPOTHYROIDISM STATUS AMONG PREGNANT WOMEN IN SÉTIF, ALGERIA

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ABSTRACT

The most frequent clinical manifestation of thyroid hormone insufficiency is hypothyroidism, which can lead to maternal-fetal health effects. Therefore, this preliminary study aims to explore hypothyroidism effects during pregnancy on mother and fetus in Sétif. This case-control study was conducted at the Maternity Mother and Child Hospital in Sétif, on a population of 125 pregnant women in the third trimester, including 41 women with hypothyroidism and 84 pregnant women without thyroid disorders (control group). Complete data on their age, parity, body mass index (BMI), abortion, and other factors were gathered using an extensive questionnaire. In addition, a follow-up at the delivery was performed based on their medical records. Several biochemical tests were assessed by appropriate kits. Results showed that the prevalence of gestational hypothyroidism was 55% among case group, but it was not significantly associated with increased maternal age (29.43 ±5.32 vs 31.39 ± 5.49 years). The comparison between the study groups did not show significant difference regarding the BMI (27.83±5.05 vs 29.55 ± 4.55 Kg /m2), blood pressure, caesarian delivery (31% in cases vs 29.76% in control), or newborn birth weight (2900 g vs 3100 g). Furthermore, there was 17% of hypothyroidism associated to gestational diabetes among case group. On the other hand, maternal stress during pregnancy and previous abortion was significantly associated with hypothyroidism. The mean levels of lipid parameters, renal parameters, prothrombin rate, and glucose levels did not significantly differ between women with hypothyroidism and control group. However, Thyroid Stimulating Hormone (TSH) levels showed a significant increase in hypothyroidism group (2.32 ± 1.37 mUI/L) when compared to controls (1.73 ± 1.03 mUI/L) despite the treatment with levothyroxine. In order to lower the prevalence of hypothyroidism in our region, consideration must be given to several risk factors that may influence thyroid function, encouraging in-depth reflection on the potential benefits of early check-up and therapy during pregnancy to reduce its negative consequences.

Key words: Hypothyroidism, Risk Factors, Pregnancy, TSH, fetus, Sétif

NENONATAL IMPACT OF PREGNANCY- INDUCED HYPERTENSION IN SÉTIF, ALGERIA

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ABSTRACT

Pregnancy-Induced Hypertension (PIH) is a major public health problem because of its severe maternal-newborn complications, especially in developing countries. This work aims to evaluate PIH neonatal impact in the Sétif region via a case-control study conducted on a group of cases, including 77 pregnant women with PIH (46 cases of gestational hypertension (GH) and 31 cases of preeclampsia (PE), while the control group included 126 pregnant normotensive women. Variables collected via a pre-established questionnaire and medical records, included sociodemographic, medical, obstetrical, and neonatal outcomes. The results identified advanced maternal age (> 35 years), and obesity (BMI ≥ 30 kg/m2), as the main risk factors for these disorders. Among the PIH, only PE was associated with a significant increase in intrauterine growth retardation (22.58 vs. 0.79%), premature births (64.51 vs. 11.11%), low birth weight <2500g (35.48 vs. 14.28%), neonatal asphyxia (41.93 vs. 17.46%), and neonatal mortality (9.67 vs. 1.58%) compared to controls. The negative neonatal impact underscores the need for effective, rigorous prenatal education and surveillance programs to improve maternal and newborn outcomes in this region of our country.

Key words: Pregnancy-induced hypertension, neonatal impact, preeclampsia, Sétif.

PHYTOREMEDIATION POTENTIAL OF ALTERNANTHERA REINECKII BRIQ (VAR. LILACINA) FOR THE TREATMENT OF NICKEL FROM FRESHWATER

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ABSTRACT

Introduction: The contamination of aquatic ecosystems with heavy metals is a global environmental concern that poses a significant threat to both aquatic life and human health. Nickel is a common heavy metal found in the environment, originating from natural processes as well as anthropogenic activities. While nickel is essential for plant growth and development, it can become toxic at high concentrations, leading to genotoxic effects and disruption of various biological processes in aquatic plants. On the other hand, phytoremediation is a promising, cost-effective, and environmentally friendly technology for removing pollutants from aquatic ecosystems. Therefore, in this study, the ability of Alternanthera reineckii Briq (var. Lilacina), a resilient submerged aquatic plant, to remove nickel from freshwater, and the subsequent genotoxic effects of nickel, were investigated. **Material and methods:** Plants were kept in tanks filled with 0.2% Hoagland solution for 10 days at 28 ± 1°C to facilitate growth and adaptation to the aquarium environment. Subsequently, they were exposed to NiCl2 stress at concentrations of 0, 10, 25, 50 and 100 μM, respectively. The leaves and shoots of plants harvested 10 days after nickel treatment (both washed and unwashed) were analyzed by ICP-OES to determine their nutrient contents (B, Ca, Cu, Fe, K, Mg, Mn, Na, and Zn). Additionally, genomic alterations were evaluated with ISSR markers, and the effects of nickel stress on photosynthetic pigments in the plants were investigated. **Results:** Overall, the results indicate that nickel accumulation in leaf and shoot samples increased proportionally with the nickel concentration. Additionally, unwashed leaf samples accumulated higher amounts of nickel in their tissues compared to washed leaf samples. Moreover, nickel toxicity led to a reduction in the concentrations of photosynthetic pigments. According to the results of the molecular analysis, no new bands appeared or disappeared in the band profiles. However, alterations in band intensities were observed, suggesting that genomic template stability was unaffected. **Discussion:** In this study, the potential effectiveness of Alternanthera reineckii Briq (var. Lilacina) for the phytoremediation of nickel-contaminated freshwater was demonstrated. Nickel stress affects the mineral nutrients and photosynthetic pigments in leaves and shoots. The unaffected genomic template stability and high accumulation rate suggest that the plant has potential for effective phytoremediation of nickel-contaminated water as a biomonitor.

Key words: Alternanthera reineckii, Genotoxicity, ISSR, Nickel, Phytoremediation

STUDY OF THE MORPHOMETRIC VARIATIONS IN Chaitophorus indicus Ghosh, Ghosh & Raychaudhuri, 1970 (HEMIPTERA: APHIDIDAE) ASSOCIATED WITH LOCALITIES

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ABSTRACT

The holarctic genus Chaitophorus feeds on members of Salicaceae (Populus spp. and Salix spp)., represented by about 90 described species worldwide, whereas in Bhutan, India, Pakistan and Turkey they usually feed in colonies under the leaves of Populus members. Chaitophorus indicus, found in colonies on the underside leaves of Populus spp., is distributed in India, Pakistan, Bhutan, and Turkey. Chaitophorus members that feed on Populus spp. cause defoliation and weakening of the tree, and it is believed that damage will increase due to excessive infestation. Since morphological traits can be influenced by host plant physiology and environmental factors, locality is likely to be important. To determine whether locality has a significant effect on variation among Chaitophorus indicus populations, 20 morphometric characters were obtained from 59 aptera individuals collected from Muğla, Antalya, Karaman, Malatya, Afyonkarahisar, and Kütahya provinces. As a result of the analyses of the measured characters by one-way analysis of variance (ANOVA), it has been shown that 14 morphometric characters were significantly different related with sampling locality. The findings of the presented study strongly indicated locality effects on morphological characters of the Chaitophorus indicus populations.

Key words: Morphological variation, Chaitophorus indicus, Populus spp, Turkey

COLD PLASMA APPLICATIONS IN PLANT GROWTH AND GERMINATION

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ABSTRACT

Cold plasma or non-thermal plasma is a partially ionized gas, that can be generated using different methods. One such method is the dielectric barrier discharge (DBD) which consists of producing plasma between two electrodes separated by a dielectric material. Cold plasma has emerged as a valuable tool in agriculture, especially by boosting seed germination and improving food safety. Moreover, cold plasma technology not only promotes seed germination but also can eradicate contaminants from the seed surface, decreasing the risk of seed-borne diseases. Several studies have shown that cold plasma technology has different potential benefits in agriculture as it can improve water quality and soil structure, reduce and eradicate pathogens, enable the degradation of toxins and pesticides, promote seed germination. The latter is considered one of the main aims of sustainable agriculture as its efficiency could improve the growth and development of crops, hence, increase plant yield. Seed germination is considered as an important phase in the life cycle of a plant, that requires different factors such as water, light, temperature and oxygen. However, under unfavorable conditions and depending on the nature of the seed (hard coat), it may enter a phase of dormancy, which may delay or inhibit the germination. Consequently, applying the cold plasma treatment on seeds by controlling different plasma parameters such as frequency and treatment timing could effectively break the dormancy and induce germination. In fact, during the plasma treatment, different reactive species are generated such as reactive nitrogen and oxygen species. These reactive species could potentially interact with the seed surface and induce several changes within the seed (seed coat modification, decreasing, contact angles, improving wettability, increasing germination rates and eliminating pathogens). Taking together, the application of cold plasma DBD on seeds with controlled plasma parameters can promote seed germination and plant growth.

Key words: Plant, cold plasma, dielectric barrier discharge, germination, plant growth

CYTOTOXIC EFFECTS OF URTICA DIOICA ON THE C6 GLIOBLASTOMA CELL LINE

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ABSTRACT

Brain tumors are caused by uncontrolled growth of abnormal cells. The rate at which these tumors grow can vary significantly depending on the specific type of tumor. Treatment typically involves surgical removal of the tumor followed by elimination of any remaining cancer cells. **Stinging nettle (Urtica dioica)**, a medicinal plant, has shown promise in affecting cancer cells. This study investigated the effect of stinging nettle extract on **C6 glioblastoma cells**, a type of brain cancer cell line. The MTT assay used to measure the extract's cytotoxic activity. The results showed that the extract mixed with water had a lower IC50 (concentration required to inhibit cell growth by 50%) compared to the ethanol extract. This suggests the water extract may be more potent. Additionally, the extract's overall moisture and ash content, total phenolic content, antioxidant activity, and the specific phenolic compounds were analyzed.

Key words: Brain cancer, Cancer cells, Urtica dioica, total phenolic content, total antioxidant activity, MTT cell-proliferation assay.

ELECTROSPUN MATERIALS FROM BIODEGRADABLE POLYMERS AS SUITABLE CARRIERS FOR BIOCONTROL AGENTS

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ABSTRACT

The progress in the field of nanotechnology during recent years, and the possibilities that it offers have enhanced the interest of researchers and industry in composite materials, especially those based on biodegradable polymers. This interest is due to a great extent to the various and increasing possibilities of application of materials from these polymers in a growing number of areas of social and economic importance, such as biomedicine and agricultural application. Electrospinning is currently regarded as one of the most promising nanotechnologies for the preparation of fibers having micro- and nanoscale diameters and a large specific surface area which is a prerequisite for the attainment of high effectiveness in a number of applications, e.g. biomedicine and agriculture. In this respect, among the polymers from renewable sources, polyesters and polysaccharides deserved special attention in fabrication of electrospun materials. Furthermore, several bacterial species possess valuable properties useful for diverse biotechnological, industrial and agricultural applications. Their beneficial characteristics involve plant protection and growth promotion. For that reason, innovative electrospun polymer materials based on polyesters/polysaccharides containing beneficial biocontrol agent were successfully prepared by electrospinning and film formation techniques. The obtained biohybrid materials were characterized in details by scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray diffraction analysis, water contact angle measurements and mechanical tests, and show that fabricated electrospun materials are suitable carriers for biocontrol agents. Moreover, performed microbiological tests revealed that the prepared biomaterials, in which the beneficial bacteria are incorporated, have the potential to be used as novel biocontrol materials in sustainable agriculture.

Key words: electrospinning, biopolymers, biocontrol agent, modern agriculture

Acknowledgments: Part of this research was funded by the European Union – NextGenerationEU (Grant BG-RRP-2.011-0005-C01), Investment C2I2 "Increasing innovation capacity of the Bulgarian Academy of Sciences in the field of green and digital technologies" under the Recovery and Sustainability Plan. Research equipment of Distributed Research Infrastructure INFRAMAT, part of the Bulgarian National Roadmap for Research Infrastructures, supported by the Bulgarian Ministry of Education and Science was used in this investigation.

INNOVATIVE POLYMER MATERIALS BASED ON POLY(3-HYDROXYBUTYRATE) AS CARRIERS FOR BIOAGENTS

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ABSTRACT

Diseases of crop plants are a worldwide problem that causes enormous damage to agricultural crops every year. The main causes of the disease are various phytopathogens, the most widespread among which are fungi such as Fusarium, Phaeomoniella, Verticillium, Botritys and Rhizoctonia. Currently, chemical pesticides are widely used to combat plant diseases, which in the long term use lead to soil, water and air pollution, harm insects, birds and mammals, and are dangerous to human health. Innovative biocontrol agents accelerate the process of reducing dependence on pesticides and thus ensure sustainable eco-agriculture. In this study, eco-friendly hybrid materials based on poly(3-hydroxybutyrate) (PHB) coated with cellulose derivatives and beneficial model bacteria were successfully prepared by using a combination of electrospinning method and film formation technique. The influence of the type and molecular weight of cellulose derivatives on the dynamic viscosity of cellulose solutions, on the film formation, mechanical properties, bacterial incorporation and growth was studied. SEM observation revealed the fiber, film and bacterial morphology. The film formation on the PHB fibers resulted in better physico-mechanical properties compared to the pristine PHB fibers. After 72 h of incubation the beneficial bacterial cells that have grown from the hybrid materials occupied the whole Perti dish. The created novel biomaterials have the potential to be used in eco-agriculture as biocontrol materials ensuring plant protection and grow promotion.
Acknowledgments: This research was funded by the European Union – NextGenerationEU (Grant BG-RRP-2.011-0005-C01), Investment C2I2 "Increasing innovation capacity of the Bulgarian Academy of Sciences in the field of green and digital technologies" under the Recovery and Sustainability Plan. Research equipment of Distributed Research Infrastructure INFRAMAT, part of the Bulgarian National Roadmap for Research Infrastructures, supported by the Bulgarian Ministry of Education and Science was used in this investigation.

Key words: PHB, cellulose derivatives, model bacteria, biocontrol, eco-friendly nanomaterials, eco-agriculture

BIOHYBRID ELECTROSPUN MATERIALS WITH POTENTIAL APPLICATION IN ECO-AGRICULTURE

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ABSTRACT

Plant diseases cause major crop losses or damage globally, reducing the quality and quantity of agricultural products. They are currently mostly controlled by the use of chemical pesticides. Yeasts, fungus, viruses, bacteria, and protozoa are examples of the many naturally occurring biocontrol agents (bioagents) that can either directly or indirectly control plant diseases. One disadvantage of these products is that they are available in combination with other materials, such as chemical pesticides and synthetic low molecular weight compounds, and are typically targeted at single pathogenic pests, necessitating the use of different preparations for specific diseases. Micro- and nano-based polymer carriers usually are made of naturally or synthetically derived polymers and inorganic materials that can improve the stability and effectiveness of a wide range of bioinspired active ingredients. Poly(3-hydroxybutyrate) (PHB) is a naturally occurring biodegradable polyester that can be synthesized by various microorganisms. Recently, application of electrospinning to biodegradable and biocompatible polymers is elucidating novel applications in medicine, pharmacy, agriculture, etc. That is why, in the current work, electrospun materials based on PHB, natural polysaccharide chitosan and beneficial microorganism B. subtilis were created. The molecular weights of chitosan were varied in order to study the effect of the use polysaccharide on its ability to incorporate Gram-positive bacteria, and its influence on the mechanical and biological properties of the obtained novel electrospun biomaterials. The coating of PHB fibers with chitosan resulted in hydrophilization of the electrospun materials. Furthermore, the film formation on the PHB fibers resulted in better mechanical properties compared to the pristine PHB fibers. The obtained results revealed that the prepared hybrid materials are active carriers of the beneficial bacteria facilitating the bacterial growth. The created innovative eco-friendly materials possess the potential to be used in agriculture as biocontrol agents insuring plant protection and grow promotion.

Key words: biopolymer, electrospinning, biocontrol agent, eco-friendly agriculture

Acknowledgments: This research was funded by the European Union – NextGenerationEU (Grant BG-RRP-2.011-0005-C01), Investment C2I2 "Increasing innovation capacity of the Bulgarian Academy of Sciences in the field of green and digital technologies" under the Recovery and Sustainability Plan. Research equipment of Distributed Research Infrastructure INFRAMAT, part of the Bulgarian National Roadmap for Research Infrastructures, supported by the Bulgarian Ministry of Education and Science was used in this investigation.

FABRICATION OF GELATIN/POLY (SULFONIC ACID DIPHENYL ANILINE)/IRON OXIDE NANOFIBERS

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ABSTRACT

In this study, gelatin-based nanofibers that are candidates for use in bioapplications such as tissue engineering, drug delivery, and biosensors were produced. For this purpose, poly (sulfonic acid diphenyl aniline), a water-soluble polyzwitterion ion thanks to its sulfonyl groups, was synthesized via oxidative polymerization. Then, poly (sulfonic acid diphenyl aniline) taken at 4%, 8%, and 16% mass ratios with respect to gelatin was mixed with gelatin, and nanofibers were obtained by the electrospinning method. FTIR spectra of gelatin/ poly (sulfonic acid diphenyl aniline) nanofibers confirmed the presence of gelatin and poly (sulfonic acid diphenyl aniline). Crystalline peaks thought to belong to poly (sulfonic acid diphenyl aniline) were seen in XRD patterns. SEM images showed that nanofibers containing poly (sulfonic acid diphenyl aniline) were beaded fibers, and these beads decreased as the poly (sulfonic acid diphenyl aniline) ratio increased. Then, gelatin/poly (sulfonic acid diphenyl aniline)/iron oxide nanofibers were produced by taking 16% poly (sulfonic acid diphenyl aniline) and 2% iron oxide by mass with respect to gelatin.

Key words: Poly (sulfonic acid diphenyl aniline); Gelatin; Iron oxide; Nanofiber

ENHANCEMENT OF PMMA FILM SURFACE WITH CHITOSAN-AgNPs COATING FOR ANTIBACTERIAL PROPERTIES

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ABSTRACT

The infection of medical polymers is a major clinical problem causing high mortality and morbidity, increasing healthcare costs. Therefore, improving the anti-infective properties of polymers is crucial in medical applications. Surface modification is essential to endow medical polymers with anti-infective properties. However, the increasing use of antimicrobial agents has led to pathogenic strains developing resistance and toxic agents leaking into the environment, causing pollution. Silver nanoparticles (AgNPs) are a novel antimicrobial agent with potent activity against various pathogenic microorganisms, including multidrug-resistant bacteria. Traditional synthesis methods for AgNPs are expensive and produce toxic contaminants, increasing the need for environmentally friendly alternatives like green synthesis. Focusing on green chemistry, natural compounds such as glucose, soluble starch, and chitosan have gained interest as safer reducing and stabilizing agents. Chitosan (CS), a natural cationic polymer obtained from chitin deacetylation, is biocompatible, non-toxic, biodegradable, and antibacterial. Its significant content of primary amines and hydroxyl groups gives it a high affinity for metal ions, supporting the nucleation and stabilization of synthesized AgNPs. CS also acts as a carrier for AgNPs, allowing the slow release of Ag+ in a liquid medium while maintaining antimicrobial activity. Recently, non-degradable polymers have gained attention in the biomedical field for therapeutic and diagnostic applications. Polymethyl methacrylate (PMMA) is widely used as bone cement, screws for bone fixation, dental implants, and intraocular lenses due to its low cost, good biocompatibility, and ease of processing. This study aimed to provide antibacterial properties to PMMA film surfaces with chitosan and AgNPs. AgNPs were synthesized by a one-step green synthesis method using only CH without toxic chemicals in an autoclave. Nanoparticle formation was confirmed by absorbance peak at 425 nm UV-vis spectroscopy. PMMA surfaces were modified by using CH-AgNPs colloid. Chemical surface properties of the modified PMMA surfaces were investigated using ATR-FTIR, and EDS. In addition, it was determined that the modified PMMA had antibacterial activity against E. coli ATCC 11229 and S. aureus ATCC 25923 at inhibition zones of 3.25 and 9.9 nm, respectively, in the disk diffusion method.

Key words: PMMA, surface modification, chitosan, silver nanoparticles, antibacterial activity

EFFECT OF CHITOSAN CONCENTRATION ON THE PROPERTIES OF AgNPs SYNTHESIZED BY ONE-POT GREEN SYNTHESIS AND DETERMINATION OF THE ANTIBACTERIAL ACTIVITIES OF AgNPs AGAINST E. coli and S. aureus.

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ABSTRACT

Silver nanoparticles (AgNPs) have become one of the most popular research topics in recent years due to their unique properties (such as electrical, optical, and catalytic features, antibacterial, antifungal, antioxidant, anti-cancer, anti-inflammatory, and anticoagulant activities) and the wide range of applications they offer. The methods traditionally used to synthesize AgNPs are expensive and produce many toxic pollutants. This has increased the need to develop environmentally friendly alternative methods without using toxic substances, leading to the adoption of green synthesis. Green synthesis is more beneficial than traditional chemical synthesis because it is less costly, reduces pollution, and enhances environmental and human health safety. Chitosan is used in green chemical approaches to prepare metal nanoparticles as both a reducing and stabilizing agent and a shape-directing or size-controlling agent. This study aims to synthesize AgNPs using the green synthesis method and investigate the effect of chitosan concentration on the morphological and antibacterial properties of the obtained AgNPs. AgNPs were synthesized using only chitosan and AgNO3 through a one-pot green synthesis method in an autoclave without toxic chemicals. The formation of AgNPs was first confirmed by the change of the pale-yellow color of 0.3%, 0.6%, and 0.9% w/v chitosan solutions to yellowish brown, light brown, and dark brown, respectively. The nanoparticles obtained were named AgNP-CH0.3, AgNP-CH0.6, and AgNP-CH0.9 based on the chitosan concentration. It was observed that AgNP samples exhibited a spherical morphology, and the size of the nanoparticles decreased as the chitosan concentration increased (at 50 nm for AgNP-CH0.9). The XRD of the AgNP-CH0.9 sample displayed diffraction peaks corresponding to the (210), (122), (111), (200), (231), (142), (241), (220), (311) reflection planes at 2θ values of 27.90°, 32.35°, 38.26°, 44.31°, 46.36°, 54.95°, 57.60°, 64.47°, and 77.09°, indicating the face-centered cubic crystal structure of AgNPs. The zone diameters of AgNP-CH0.3, AgNP-CH0.6, and AgNP-CH0.9 samples were measured between 9.1-9.4 mm against S. aureus and 6.6-7.2 mm against E. coli. Thus, it was concluded that as the nanoparticle size decreased in the AgNPs samples, the antibacterial efficacy of the synthesized AgNPs increased.

Key words: green synthesis, silver nanoparticles, chitosan

GENETIC RESOURCES FOR BIODIVERSITY CONSERVATION AND ADAPTED GENOTYPES TO DIFFERENT CULTIVATION SYSTEMS, OF A DURABLE AGRICULTURE, IN THE CLIMATE CHANGE CONDITIONS

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ABSTRACT

Genetic resources for biodiversity conservation and adapted genotypes to different cultivation systems, of a durable agriculture, in the climate change conditions

Key words: climate change, Genetic resources, biodiversity, Adaptation, Genotype

MEIOTIC ABNORMALITIES DURING MICROSPOROGENESIS IN EIGHT ANGISPERMS SPECIES FROM BEJAÏA (ALGERIA)

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ABSTRACT

Meiosis is an essential stage of the developmental cycle for sexually reproducing organisms. It is a regulatory process of great evolutionary stability that allows the constancy of the chromosome number within a species. This stable process can be subject to mutations that can affect its regular course and thus cause meiotic anomalies. The presence of these abnormalities can affect the fertility of individuals by producing deviant pollen. However, on the adaptive level, these meiotic abnormalities constitute potential mechanisms at the origin of genetic variability that can lead to a modification of the genetic structure of natural populations. During a classical cytogenetic analysis (orcein staining) carried out on natural populations of eight species of Angiosperms: Avena sterilis L. (Poaceae Family), Clematis flammula L. (Ranunculaceae Family), Genista tinctoria L. ., Medicago sativa L. and Medicago murex Willd. (Fabaceae Family), Oxalis cernua Thunb., Oxalis corniculata L., Oxalis articulata Savigny (Oxalidaceae Family) collected in the Béjaia region (Algeria), various meiotic anomalies were detected. These anomalies are : cytomixis (detected in all species), lagging chromosomes (detected in 4 species), multipolar cells (detected in 3 species), micronuclei (detected in 5 species), multipolar cells with micronuclei (detected in 4 species), stickiness (detected in 6 species), asynchronous divisions (detected in 3 species), disoriented chromosomes and bivalents (detected in 4 species), univalents (detected in 2 species), chromatic bridges (detected in 3 species), tetravalents and syncytes (detected in 1 species).
These anomalies are discussed in a molecular framework.

Key words: Angiosperms, Meiotic abnormalities, Microsporogenesis, Algerian populations

MICROSPOROGENESIS AND INFERTILITY IN ALGERIAN POPULATIONS OF HORDEUM BULBOSUM L. (POACEAE)

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ABSTRACT

This report is about the mechanisms behind the low production of caryopses in natural populations of H. bulbosum (Poaceae) sampled in Algeria. The taxon reproduces asexually as well as sexually. It is known for its natural vegetative propagation by bulbs. Pollen mother cells at different steps were treated with "basic Fushin" for meiotic behavior study and mature pollen was stained by blue aniline dye to estimate pollen viability. The analyzed samples proved to be diploid (2n = 2x = 14, based on x = 7) and showed apparently regular meiosis with seven bivalents at metaphase and four microspores at the end of the division with a variation in pollen viability ranging from 12.38% to 87.24%. Some meiotic abnormalities were detected (univalents in pollen mother, tetravalents, laggards, chromatin bridges, micronuclei, unoriented bivalents, asynchronous divisions, syncytes, triads and cytomixis). These cytogenetic results alone do not appear to explain the low caryopses production of the species (from 46.62% to 49.3%) and the use of asexual reproduction through bulbs. Other biological mechanisms likely to be implicated in this infertility are discussed.

Key words: Hordeum bulbosum, meiotic behavior, meiotic abnormalities, pollen viability, Algerian populations.

BIOMETRIC AND CONDITION OF THE AFRICAN MUSSEL PERNA PERNA (LINNÉ, 1758) FROM THE GULF OF ANNABA (NORTH-EAST ALGERIA)

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ABSTRACT

The African mussel Perna perna is a bivalve mollusc widely distributed on the coasts of North Africa. The present study focuses on the measurement of the different morphometric parameters of this species while characterizing their physiological state by monitoring the evolution of their condition index. A total of 183 specimens, 86 males and 97 females, were sampled between February and May 2022. The analysis of allometric relationships showed the existence of an allometry of minorant growth between (L - La), the width of the bivalves grows slower than the length. An majorant growth at equal speed (isometry) between length (L) and thickness (Ep) and an increase in growth between (La – Ep), indicating a rapid increase in thickness compared to width. The monthly evolution of the mussel condition index shows that the state of overweight gradually increases with the approach of the warm seasons.

Key words: Perna perna, bivalve mollusc, morphometry, condition index, Gulf of Annaba.

SCALIMETRIC STUDY AND POPULATION GROWTH OF THE COMMON PAGEOT PAGELLUS ERYTHRINUS (LINNAEUS, 1758) (TELEOSTEI, SPARIDAE) FROM THE LITTORAL OF EL-KALA (EL-TARF, ALGERIA).

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ABSTRACT

The present study concerns the ecosystem management of Pagellus erythrinus (Linaeus, 1758) of the El-Kala coastline (Eltarf, Algeria). Different points were addressed: the study of age and growth (linear and weight), in order to better characterize the population of the pageot common to the coast of El-Kala (extreme North-East Algeria) especially that no study has not been reported to date in the region. Using the scalimetric method, we isolated 6 age classes with a predominance of the 3 year old size class in the total population (F = 22.48%). The maximum total length measured does not exceed 22 cm. The growth of P. erythrinus was described by the classic Von Bertalanffy model which gave calculated asymptotic lengths ($L\infty$ = 23.41 cm) matching perfectly with the maximum length observed in the total population (Lt = 22 cm), as well as an asymptotic weight ($P\infty$ = 153.18 gr), a growth rate k = 0.1 and a t0 = -7.67. Growth performance in this species is relatively high (Φ = 1.54) in the study area compared to other Mediterranean populations.

Key words: Sparidae, Pagellus erythrinus, growth, El-Tarf, Algeria.

REPRODUCTION OF THE COMMON PAGEOT PAGELLUS ERYTHRINUS (LINNAEUS, 1758) (TELEOSTEI, SPARIDAE) FROM THE LITTORAL OF EL-KALA (EL-TARF, ALGERIA)

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ABSTRACT

This biological study devoted to the pageot (Pagellus erythrinus) of the bay of El-Kala, was carried out over eleven months and from a global sample of 353 individuals ($16 \leq Lt \leq 23.5$ cm; $50.7 \leq TW \leq 164.3$ g). We focused mainly on the reproduction of this species. The maximum total length measured in this work does not exceed 24 cm. From the temporal monitoring of the hepatosomatic and gonado-somatic ratio and the reproductive period determined in previous works, we assume that the reproductive period extends from May to August with a peak observed in July and a second peak in October. Monitoring the monthly variations of the condition coefficient K showed fluctuations during the sampling period. Overall, the values range between 1.18 and 1.51. The sex ratio is generally constant and even monthly, with the exception of the months of August (SR = 4,50 ; χ^2 obs = 4,45 ; $p \leq 0,05$) and October (SR = 0,67 ; χ^2obs = 1,2 ; $p \leq 0,05$), when it is in favor of males, and in January and February in favor of females.

Key words: Pagellus erythrinus, reproduction, El-Kala bay, Algeria.

CONTRIBUTION TO THE STUDY OF THE AQE AND GROWTH OF THE ZANDER SANDER LUCIOPERCA (LINNAEUS, 1758) FROM LAKE OUBEIRA (EL-TARF, ALGERIA)

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ABSTRACT

In teleosts, growth interruptions during their lifetime are reflected in all bony structures (scales, fin rays, otoliths) by structural disturbances that are generally easy to detect. When these modifications have a regular periodicity throughout the fish's life, they thus allow for the determination of age and the study of growth. The objective of this study is to determine the size structure, growth, age, and length-weight relationship of the species Sander lucioperca in Lake Oubeira (El-Tarf). We note that this approach has not been previously addressed in this region. To achieve this, over a period from November 2022 to March 2023, we inventoried a total of 255 individuals, both male and female. Age and growth were estimated using scalimetry, which allowed us to distinguish 8 age groups in the total population. The von Bertalanffy growth parameters for both sexes combined were determined using the FiSAT program (version 1.2.2). The values obtained are: $L\infty = 91.39$ cm, $P\infty = 6572.3272$ g, $k = 0.16$, and $t0 = -0.335$. The growth performance of this species in the study area ($\varphi = 3.12$) is quite similar to those reported in the literature for other populations of zander. The parameters of the length-weight relationship showed that the zander in Lake Oubeira exhibits isometric growth.

Keywords: Sander lucioperca, age, growth, length-weight, Lake Oubeira, Algeria

CONTRIBUTION TO THE STUDY OF THE REPRODUCTION OF THE ZANDER SANDER LUCIOPERCA (LINNAEUS, 1758) FROM LAKE OUBEIRA, (EL-TARF, ALGERIA).

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ABSTRACT

thorough understanding of the reproductive biology of a species is a crucial approach to providing sound scientific advice for fisheries management. It is the reproductive biology that largely determines the productivity and hence the resilience of a population to exploitation or disturbance from other human activities. In this context, this study will focus on examining the reproduction of the Zander Sander lucioperca in Lake Oubeira (extreme northeast Algeria) by estimating various reproductive indices as well as sex ratio. To do this, a total of 255 individuals, including males and females, were examined during the period from November 2022 to March 2023. Several indices were calculated: gonado-somatic index (GSI), hepato-somatic index (HSI), the condition factor K, as well as the sex ratio. Our results show a male-biased sex ratio during the month of February in size categories ranging from 28 to 33 cm, while it remains constant for the rest of the size classes. Based on the monitoring of the evolution of GSI and HSI, assuming that the study period coincides with the onset of reproduction (gonad maturation). The monitoring of the condition factor K remains stable in both sexes, leading us to conclude the absence of muscle lipid consumption by the fish during reproduction.

Key words: Sander lucioperca, reproduction, Lake Oubeira, El-Tarf, Algeria.

CONTRIBUTION TO THE STUDY OF THE AGE AND GROWTH OF THE ZANDER SANDER LUCIOPERCA (LINNAEUS, 1758) FROM LAKE OUBEIRA, (EL-TARF, ALGERIA)

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ABSTRACT

In teleosts, growth interruptions during their lifetime are reflected in all bony structures (scales, fin rays, otoliths) by structural disturbances that are generally easy to detect. When these modifications have a regular periodicity throughout the fish's life, they thus allow for the determination of age and the study of growth. The objective of this study is to determine the size structure, growth, age, and length-weight relationship of the species Sander lucioperca in Lake Oubeira (El-Tarf). We note that this approach has not been previously addressed in this region. To achieve this, over a period from November 2022 to March 2023, we inventoried a total of 255 individuals, both male and female. Age and growth were estimated using scalimetry, which allowed us to distinguish 8 age groups in the total population. The von Bertalanffy growth parameters for both sexes combined were determined using the FiSAT program (version 1.2.2). The values obtained are: $L\infty = 91.39$ cm, $P\infty = 6572.3272$ g, $k = 0.16$, and $t0 = -0.335$. The growth performance of this species in the study area ($\varphi = 3.12$) is quite similar to those reported in the literature for other populations of zander. The parameters of the length-weight relationship showed that the zander in Lake Oubeira exhibits isometric growth.

Key words: Sander lucioperca, age, growth, length-weight, Lake Oubeira, Algeria.

PHYSICOCHEMICAL ANALYSIS OF SEAWATER ALONG THE EL KALA COAST, WILAYA OF EL TARF (NORTHEASTERN ALGERIA)

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ABSTRACT

This study assesses the physicochemical quality of seawater along the El Kala coastline in the wilaya of El Tarf (Northeastern Algeria). To do this, we took water samples at 8 sites between December 2022 and May 2023 where we sought to determine monthly and seasonal variations in water quality parameters. The results show seasonal variations, influenced by climatic factors. Temperature is one of the factors that respond best to climate change, with variations of 12°C. Salinity shows variations of around 4 g/l between December and May. Dissolved oxygen levels fluctuate, strongly influenced by seasonal variations in water temperature and mixing caused by strong winter winds. As for pH, it is slightly alkaline throughout the study period.

Key words: Physicochemical parameters, climat change, El Kala coasline, Algeria.

CONSERVATION STATUES OF ALBANIA COASTAL DUNE HABITATES

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ABSTRACT

Coastal dunes are among habitats with the worst conservation status on a global. Reporting theirs loss due to strategic importance of them is our duties protect the unique biodiversity heritage of the Albania. In this study we will try to figure up the costal vegetation. Highlighting its updated current conservation status at the EFD. The conservation status was evaluated through the following criteria: geographic range, surface area, structure, functions, pressures, threats, conservation measures and prospects. We have collected more than 100 releves in Albania shoreline, (mainly in Adriatic coast). Focused on the floristic study, total plants identified 220 species and their endangerment status, based on red book as well as phytosociological study. The first group comprises of the Cakilo-Xanthietum, and Eryngio Sporoboletum. The second group compose stable dunes with Euphorbio paraliae-Agropyretum junceiformis, Medicagini marinae-Ammophiletum australis and Ephedra distachya communities. Results highlighted the dramatically bad conservation status of Albanian coastal dunes. Results showed a generalized threat and an alarming conservation status both on herbaceous and wooded communities, in particular in some relevant habitats, such as the embryo dunes. Plants associations are classified based on principles of Zurich–Montpellier school that made the base of classification in Europe sites. Main pressures and threats were linked to residential, commercial and industrial activities, as well as alien species. Although some of the changes in distribution and trends are probably deriving from more accurate and updated data, the alarming conservation status of Albania coastal areas requires a better knowledge of pressures and threats for further management actions and monitoring plans. Finally, this scientific paper will be a powerful instrument for the future management of Adriatic costal habitats from a conservation perspective.

Key words: Coastal dunes, EFD, Embryo Dunes, Conservation statues

DIVERSITY OF SOIL FAUNA IN A POST-FIRE CORK OAK FOREST IN EL-KALA NATIONAL PARK

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ABSTRACT

Forest fires have been frequent in recent years. The economic damage is inestimable and the ecological consequences harmful. Natural regeneration is predictable for some regions, for others, the conditions for the recovery of fauna and flora are not always favorable. Our study assessed the state after the fire of the Ain Khiar cork oak forest, in the wilaya of El-Tarf, located in the northeast of Algeria, ravaged by a large fire in summer 2022. The work consists of analyzing the physicochemical properties of the soil (pH, electrical conductivity, organic carbon and organic matter); as well as the inventory of the flora and fauna of the soil over a period of seven months.The results obtained show a significant amount of organic matter that facilitated the recovery of the plant cover. On the contrary, soil fauna appears with low densities during this period, according to the bibliography, it takes 10-15 years to find the populations existing before the fire.

Key words: Fire, cork oak forest, regeneration, soil fauna, flora.

AN OVERVIEW OF THE ACRIDIDAE FAMILY (ENSIFERA - ORTHOPTERA) IN THE VLORA REGION, SOUTH-WESTERN ALBANIA

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ABSTRACT

This study intends to provide a comprehensive account of the species of Short-Horned Grasshoppers belonging to the family Acrididae (Orthoptera) that may be discovered in the various habitats of the Vlora region, which is located in the southern part of Albania. A well-defined seasonal pattern that includes a cold and rainy winter and a warm and arid summer is characteristic of the climate in this region, which shows some characteristics that are typical of the Mediterranean climate. On a worldwide scale, this region represents a discovery that is both extraordinarily valuable and one of a kind. Following an examination of the data, it has been determined that the genera Calliptamus, Chorthippus, and Oedipoda are known to exist, with two species belonging to each of these genera. It is estimated that 13.33% of each species is present. For the purpose of establishing whether or not these species are present in this region, the Llogara and Armen National Parks were both investigated. According to the conclusions of the study, these parks, which each include six species and have a species frequency of forty percent, offer the best possible environment for the species in question.

Key words: Orthoptera, Acrididae, Habitat, Biodiversity, Vlora, Southwestern Albania

CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF PHLOMIS HERBA-VENTI .L. SUBSP. PUNGENS FROM ALGERIA

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ABSTRACT

Exploring new local natural resources involves investigating the volatile profile and essential oil compositions of Algerian Phlomis herba venti L. The essential oils were extracted by hydro distillation. The chemical composition of the latter was determined by gas chromatography coupled to mass spectrometry. Capillary GC-MS analysis of the essential oils permitted the detection of 57 components, using Rxi-5MS. Our results revealed that the oil was mainly composed of three categories of compound: sesquiterpenes hydrocarbons, oxygenated sesquiterpenes and monoterpene hydrocarbons.

Key words: Phlomis herba venti L, Essential oil, Chemical composition, GC-MS

DISTRIBUTION AND LENGTH-WEIGHT RELATIONS OF SEA CUCUMBER IN THE GULF OF ANNABA (ALGERIA)

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ABSTRACT

The holothurians commonly known as sea cucumbers are common organisms in the benthic fauna of all marine environments. They can make up to 90% of the biomass in seafloor ecosystems and are often considered the most important group of detritivores in reef fauna.
Our work focuses on studying the distribution and length-weight relations of holothurians sampled by free diving along 2 beaches (La Caroube and Cap Rosa) in the Gulf of Annaba between March and April 2023. A total of 108 individuals allowed the identification of four species: Holothuria tubulosa, H. sanctori, H. stellati, and H. Poli. The abundance shows a significant difference (ANOVA < 0.05) between the 2 sites. Numerically, H. tubulosa is the dominant species (85 individuals), followed by H. Poli (12 individuals), H. stellati (6 individuals), and H. Sanctori (5 individuals). The overall relative growth of La Caroube and Cap Rosa, expressed respectively by Lt = 2.348PTF 1.475 and Lt = 0.899 PTF 1.868, shows a positive correlation (r= 0.610 and r= 0.79). This represents a negative allometry. Due to the limited number of individuals, only the species H. tubulosa is considered for the calculation of the relative growth per site and per species. The size-weight relationship of H. tubulosa sampled at La Caroube and that sampled at Cap Rosa shows a negative allometry (r= 0.66 and 0.78 respectively). No significant difference is observed between the two populations from the two sites (ANCOVA, F= 101.82, P > 0.05), indicating a similar weight-related growth.

Key words: Distribution, Growth, Sea Cucumber, Annaba, Mediterranean

DIVERSITY OF STORED GRAIN PESTS IN NORTHEAST OF ALGERIA

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ABSTRACT

The human diet is dominated by stored foodstuffs, particularly in developing countries (wheat, semolina, flour, barley, wheat bran, corn, and corn flour). However, our food resources are still being used by certain species, this has never been enough because insect pests that feed, multiply, grow, and secrete sticky odorous substances are present in their environment, causing contamination of the entire stock. Cereal stocks and food legumes do not have a well-established diversity of pests in the north-eastern region of Algeria. However, an important preliminary step to successfully protecting the stock is knowledge of the pest. The objective of this work is to enrich and study the biodiversity of insect pests of foodstuffs stored in the province of El Tarf. Ten species were detected in the results, with four being primary pests and six being secondary pests, all the species that have been identified are classified into eight different families that belong to the orders Coleoptera and Lepidoptera. Stored foodstuffs in Bouhadjar commune are most negatively affected by the presence of six different species. Noting that Rhyzopertha dominica, a primary pest, has only been detected in the wettest region.

Key words: insect pests, stored foodstuffs, entomological inventory, Coleoptera, Lepidoptera, north-east Algeria

CONSERVATION STATUES OF ALBANIA COASTAL DUNE HABITATS

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ABSTRACT

Coastal dunes are among habitats with the worst conservation status on a global. Reporting theirs loss due to strategic importance of them is our duties protect the unique biodiversity heritage of the Albania. In this study we will try to figure up the costal vegetation. Highlighting its updated current conservation status at the EFD. The conservation status was evaluated through the following criteria: geographic range, surface area, structure, functions, pressures, threats, conservation measures and prospects. We have collected more than 100 releves in Albania shoreline, (mainly in Adriatic coast). Focused on the floristic study, total plants identified 220 species and their endangerment status, based on red book as well as phytosociological study. The first group comprises of the Cakilo-Xanthietum, and Eryngio-Sporoboletum. The second group compose stable dunes with Euphorbio paraliae-Agropyretum junceiformis, Medicagini marinae-Ammophiletum australis and Ephedra distachya communities. Results highlighted the dramatically bad conservation status of Albanian coastal dunes. Results showed a generalized threat and an alarming conservation status both on herbaceous and wooded communities, in particular in some relevant habitats, such as the embryo dunes. Plants associations are classified based on principles of Zurich–Montpellier school that made the base of classification in Europe sites. Main pressures and threats were linked to residential, commercial and industrial activities, as well as alien species. Although some of the changes in distribution and trends are probably deriving from more accurate and updated data, the alarming conservation status of Albania coastal areas requires a better knowledge of pressures and threats for further management actions and monitoring plans. Finally, this scientific paper will be a powerful instrument for the future management of Adriatic costal habitats from a conservation perspective.

Key words: Coastal dunes, embryo dunes, EFD, conservation statues

SAXICOLOUS AND TERRICOLOUS LICHENS FROM EDOUGH PENINSULA (NORTHEASTERN ALGERIA).

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ABSTRACT

In the Annaba region, the oak groves, the main forest formations of the Edough peninsula, have contributed to the installation of a very diversified saxicolous lichen vegetation, presenting a great biological and phytogeographical interest, because of its presence in humid forests represented mainly by zeen oak. Identification of taxa is based on stereo-microscopic examinations and usual chemical tests (K, C, P, I and KC). The development of a list of lichens for the Edough peninsula has enabled us to identify 55 saxicolous and terricolous species identified and reported in forest ecosystems. The most represented groups is the crustose and foliose growth form (about 75%) where as gelatinous, composite and fruticose were represented by 25%. Within each group, various taxa known for their high sensitivity to certain toxic air compounds (essentially SO2 and some NOx) have been inventoried (mainly fruticose and foliose). Such taxa qualified as bioindicators reflect a buffer capacity of these forest ecosystems to physical changes of the environment and some stability of their functioning without concealing artificialisation and simplification of the forest environment in response to various activities carried out by rural people and their livestock. This study contributes not only to complete knowledge of the lichen flora of the Edough Peninsula, but also to the conservation and protection of the biological diversity of its forest ecosystems.

Key words: Lichens, saxicolous, terricolous, biodiversity, Edough peninsula, Algeria.

THE DIVERSITY OF FAUNA OF THE ORTHOPTERA ORDER IN THE VLORA AREA

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ABSTRACT

Orthoptera is an order of insects that may be found in several habitats. Additionally, they play a crucial function in the food chain. This study aimed to ascertain the taxonomic classification of species within various habitats in the Vlora geographical region over the period of June to September 2023. This study pertains to 18 species belonging to the order Orthoptera and 4 different families. The Tettigoniidae family has the greatest species variety, consisting of a total of 9 distinct species. At the same time, there is just one species that represents each of the families Tetrigidae and Mogoplistidae. The Sevaster station is represented by ten species, which is the most number. This station provides the most favorable circumstances 4 species belonging to the order Orthoptera.

Key words: Orthoptera, Diversity, Grasshoppers, Ecosystem, Vlora

BIOLOGICAL DIVERSITY AND CONSERVATION OF CITRUS IN GEORGIA

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ABSTRACT

Although the history of the spread of citrus crops in Georgia is related to the distant past and dates back to the 7th–8th centuries. Its spread for industrial purposes dates back to the early 19th century. At first, subtropical and other exotic plants were imported to Georgia only for decorative purposes; however, due to Georgia's geographical location, soil and climate conditions of the Black Sea regions, and unique weather and landscapes, they significantly contributed to the creation of a gene pool of subtropical crops, including citrus fruits. Over the course of almost a century, many scientific expeditions were carried out with the aim of introducing citrus fruits and their experimental production testing and implementation in agriculture, which at that time played an important role in enriching the gene pool of citrus fruits. Although mandarins, lemons, and oranges are mainly grown for industrial purposes in Georgia, a variety of citrus genetic material has been collected in experimental collection plots of research institutes and on private farms. Citrus collections initially existed in Abkhazia, Ozurgeti, Adjara. For almost half a century, the aforementioned institutions conducted experimental production tests of citrus fruits of various types and varieties imported from different countries and bred by Georgian breeders. Due to various reasons, the collection in Abkhazia was completely destroyed, and the rest of the collections are almost on the verge of destruction. Traditional varieties adapted to local soil and climate conditions are gradually being lost; to this are added the risks of the spread of dangerous quarantine pests/diseases. Over the years, the selection varieties of citrus fruits created by Georgian breeders as a result of many years of scientific research are disappearing, many varieties and species have disappeared forever or are under threat of extinction. Therefore, on the basis of the Institute of Phytopathology and Biodiversity of BSU, a test-collection plot of citrus was created that included 20 species, 250 varieties (forms, hybrids, mutants): Citrus Reticulata Blanco (36 varieties and 30 forms); Citrus limon (L) Burm.f (18 varieties and 12 forms); Citrus Sinensis (L) Osb (21 varieties and 8 forms); Citrus Paradisi Macf. (10 varieties and 4 forms); Citrus Grandis Osb (5 varieties and 4 forms), Citrus Aurantium L (6 varieties and 3 forms), Citrus Medica L (2 varieties and 3 forms), Citrus aurantiifolia (Christm.) Swingle (2 varieties); Citrus deliciosa Ten (1 variety), Citrus Limetta Riss sin, Citrus × floridana (J. Ingram & H. Moore) Mabb (2 varieties); Citrus kinokuni hort. exTanaka (1 variety); Citrus Leiocarpa Tan (2 variety); Citrus Lumia Risso (1 variety); Citrus Aurantifolia Sin. Citrus lima Lunan (4 varieties); Citrus Wilsonii Tan (1 variety); Citrus Bergamia Risso & Poit (1 variety); Citrus Bigarradia Loisel (1 variety); Citrus Ichangensis Svingle (2 varieties); Citrus Yunos Siebold ex Tanaka (1 variety); Citrus yuko hort. exTanaka (1 variety); Citrus Natsudaidai Makino (2 varieties); Citrus

Jnsitorum Mabb (3 varieties); Citrus japonica Thunb. Sin. Fortunella japonica sw. (3 varieties); Citrus trifoliate L. sin. Poncirus trifoliata (L.) Raf. (1 variety). The purpose of collection is to preserve, study, refine the database of citrus species in Georgia, search for promising, rare, endangered varieties, hybrids, mutants an agricultural and breeding point of view, preserve the gene pool, and conserve them for future use. This collection will make the citrus gene pool even more diverse and will become the only genetic collection. This will contribute to the protection and preservation of the varietal purity of the citrus gene pool and their further successful use. The collection, as a test base for the university, will make a significant contribution to the effective management of the educational process.

Key words: Citrus, collection, Varieties, Species, Georgia

PRELIMINARY DATA ON MACROZOOBENTHOS FROM THE SHALLOW ROCKY COAST OF HIMARA, ALBANIA.

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ABSTRACT

Himara coast represents the northeastern segment of the Ionian Sea, which is situated in the southwestern part of Albania. Data from macrozoobenthic community of this area are scarce. Although studies on infralittoral and circalittoral have been more frequent, research and surveys on the shallow rocky coast of Himara have been very limited, and the few existing data on shallow macrozoobenthos have been mainly sporadic. Data represented in this paper were collected in October 2023 from 4 sampling sites along the Himara coast, in shallow water, in supralittoral and midlittoral. These are part of an ongoing long-term study that aims to know and analyze the macrozoobenthic community of this area, including species composition, abundance and quantitative characteristics of benthic invertebrate populations, their relations to algal cover and algae species, as well as other factors influencing characteristics of their populations, in a comparative way between sampling sites and sampling seasons. Preliminary data represented in this paper have shown the presence of about 130 species of benthic macroinvertebrates. At the level of large taxonomic groups, they include cnidarians, polychaetes, mollusks, crustaceans, sipunculids and echinoderms, where the predominant groups in species number and abundance were Gastropoda, Bivalvia, Amphipoda and Decapoda. Algal cover, morphological diversity of substrata, degree of coastal exposure, and environmental impact, mainly from tourism, seem to be the main factors that affect the macrozoobenthic community of this study area. Benthic invertebrate species of national and international concern, as well as alien species for the Mediterranean, were found in this study. This highlights the importance of the study and conservation of this area, which also includes a recently proclaimed marine protected area, the Natural Park of Porto Palermo - Llaman.

Key words: Benthic invertebrates, Ionian Sea, algal cover, marine and coastal conservation

DIGESTIF TRACT PARASITES OF SOME SELACHIANS FROM SOUTHWESTERN MEDITERRANEAN SEA

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ABSTRACT

In this parasitical inventory from southwestern mediterranean, in Algerian basin. We here list some parasites belonging to Cestoda that exploit intestinal tract of some selachians. Among cestoda identified during this investigation, the Rhinebothriidea Healy, Caira, Jensen, Webster & Littlewood, 2009 with family of Echeneibothriidae de Beauchamps, 1905 were omnipresent. Bisides, this research allowed us to collect a new species of cestoda. Among the morphological characters of this new parasites, it has four thin bothridium with twenty-eight loculus in each bothridium, an inconspicuous myzorhynchus and U shape ovary; the Scanning electron microscopy shows a typical network of microtriches which described here.

Key words: Selachians, southwestern mediterranean, intestinal parasites, Rhinebothriidea, new species, microtriches.

INTESTINAL PARASITES SURVEY OF AN UNCOMMON RAJIDS FROM ALGERIAN BASIN

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ABSTRACT

The present study is part of the ichyological and parasitical inventory of elasmobranchs and their Cestoda from the Algerian basin, a major part of the southwestern Mediterranean Sea. We here describe a community of three species of intestinal parasites: one belong of the order of Diphyllidea Van Beneden in Carus, 1863 and belong to the family of Echinobothriidae Perrier, 1897, the second to Rhinebothriidea Healy, Caira, Jensen, Webster & Littlewood, 2009 and from the family of Echeneibothriidae de Beauchamp, 1905 and the last one from the order of Onchoproteocephalidea Caira, Jensen, Waeschenbch, Olson & Littlewood, 2014 and family of Onchobothriidae Braun, 1900 from Raja undulata Lecepède 1802: Echinobothrium affine Diesing, 1863, Echeneibothrium beauchampi Euzet, 1959 and Acanthobothrium benedeni Lönnberg, 1889 respectively. For the first time, this survey allowed us to collect Echeneibothrium beauchampi a species non collected after its original description in the Mediterranean basin. Among the morphological characters of this cestoda, it has fourteen loculus in each bothridium, a typical undulate and voluminous myzorhynchus and an H shape ovary.

Key words: Cestoda, diversity, Raja undulata, Algeria, Mediterranean Sea.

NEW RECORDS OF TRUE FLIES (INSECTA: DIPTERA) FROM THE WESTERN BALKANS

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ABSTRACT

Adult true flies were collected from the Karadak Mountains (Kosovo and North Macedonia) between August and October 2017. During this investigation, we recorded two Diptera species from the Western Balkans for the first time. Sylvicola (Anisopus) stackelbergi Krivosheina & Menzel, 1998, was recorded in Bellanoc village, North Macedonia, while Ormosia (Ormosia) hederae (Curtis, 1835) was found in Dëbëlldeh village, Kosovo. The samples were preserved in 96% ethanol and prepared for examination by immersion in 10% KOH overnight, followed by a wash in undiluted glacial acetic acid, and then transferred to glycerol for further analysis. The distribution range of Sylvicola (Anisopus) stackelbergi is primarily restricted to northern and northeastern Europe, with isolated records from the Netherlands, Slovakia, Austria, Armenia, and Romania while O. hederae includes numerous European countries (Austria, Belgium, Bulgaria, Czech Republic, Denmark (including the Faroe Islands), Finland, France (including Corsica), Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey (European part: Kirklareli), and Ukraine), as well as parts of Russia, the North Caucasus, Georgia, Armenia, Azerbaijan, Turkey (Asiatic part), and Tajikistan (Pamir), indicating a broad ecological adaptability. These findings enrich the existing knowledge on the biodiversity of Western Balkans and highlight the importance of ongoing entomological surveys in the region.

Key words: first record, Kosovo, North Macedonia, biodiversity, entomological survey, ecological adaptability, distribution.

NEW DATA ON THE FAUNA OF COLEOPTERA (CERAMBYCIDAE) IN KOSOVO

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ABSTRACT

During our investigation from 2018 to 2024, we collected Cerambycidae samples, leading to the identification of 11 species across 8 genera and 4 subfamilies. Our research has uncovered five previously undocumented species within the fauna of Kosovo: Prionus coriarius (Linnaeus, 1758), Cerambyx (Cerambyx) carinatus (Küster, 1845), Stenocorus (Stenocorus) meridianus (Linnaeus, 1758), Saperda scalaris (Linnaeus, 1758), and Dorcadion scopolii (Herbst, 1784). The distribution of these species is as follows: Prionus coriarius is found in Europe, the Near East, and Northern Africa; Cerambyx (Cerambyx) carinatus is located in the Balkan Peninsula, Italy, and Asia Minor; Stenocorus (Stenocorus) meridianus is present in Europe; Saperda scalaris is distributed across Europe, Asia Minor, Kazakhstan, and Algeria; and Dorcadion (Cribridorcadion) scopolii is found in Slovakia, Hungary, Romania, Bulgaria, and Serbia. These findings greatly enhance our understanding of Cerambycidae diversity in Kosovo.

Key words: Coleoptera, Cerambycidae, New data, fauna, Kosovo

NEW RECORDS OF CADDISFLIES (INSECTA: TRICHOPTERA) FROM KOSOVO

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ABSTRACT

During 2023, a comprehensive entomological survey along Kosovo's Mirusha River documented five Trichoptera species for the first time: Hydroptila lotensis Mosely, 1930, Hydroptila simulans Mosely, 1920, Hydroptila vectis Curtis, 1834, Oxyethira falcata Morton, 1893, and Lepidostoma hirtum (Fabricius, 1775). Standard entomological nets were used to collect adult caddisflies from vegetation and water surfaces, supplemented by UV light traps deployed at night to capture nocturnal species. The identification of these species from the genera Hydroptila, Oxyethira and Lepidostoma, underscores the ecological richness of the Mirusha River. Hydroptila species are recognized indicators of clean, well-oxygenated water, indicative of a relatively healthy aquatic environment. Similarly, O. falcata and L. hirtum species significantly contribute to the diversity and stability of freshwater ecosystems through their roles in the aquatic food web. These species exhibit restricted distributions due to specific habitat requirements, rendering them susceptible to environmental changes and habitat degradation. This study emphasizes the importance of continuous monitoring and documentation of aquatic insects. Such ongoing surveillance is essential for detecting shifts in species composition and abundance, serving as early warnings of environmental health. Moreover, these efforts are integral to broader biodiversity conservation goals, providing crucial data to inform policy and management decisions. The discovery of these five Trichoptera species in the Mirusha River enhances Kosovo's biodiversity records and underscores the necessity for thorough entomological surveys. It highlights the ecological significance of the river and reinforces the urgent need to conserve its natural habitats to safeguard its diverse biological communities.

Key words: Balkan Peninsula, aquatic insects, biodiversity

SEASONAL FISH DIVERSITY AND DISTRIBUTION IN THE LEPENC RIVER BASIN, KOSOVO

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ABSTRACT

This study presents the findings from three seasonal field surveys conducted in the Lepenc River and its tributaries during 2023. The surveys were carried out on 30-31 May, 17-18 July, and 16-17 October, focusing on six sampling sites: Prevallë, Lepenc (Kaçanik), Hani i Elezit, Jezerc, Gerlicë, and Nerodime (Kaçanik). We used a standardized electrofishing technique, following approaches used by the European Union Water Framework Directive (EU WFD) monitoring protocols which has been applied in several areas of the Balkans. A total of 790 fish specimens were caught, identified, measured, and subsequently released back into their natural habitats. The species found during this investigation were: Salmo farioides, Barbus sp., Squalius platyceps, Alburnoides ohridanus, Alburnus scoranza, Alburnoides bipunctatus, Alburnus alburnus, Oxynoemacheilus bureschi, and Gobio sp. The sampling site in Gerlicë consistently showed no presence of fish, likely due to pollution. These findings provide valuable insights into the composition of fish communities and the ecological status of the Lepenc River Basin (Kosovo) system throughout different seasons. The results underscore the importance of targeted conservation efforts to preserve and restore aquatic biodiversity in this basin.

Key words: fish diversity, seasonal variation, electrofishing, water pollution, biodiversity conservation

GROWTH, MORTALITY AND YIELD OF OHRID TROUT STOCK IN LAKE OHRID

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ABSTRACT

The fish fauna of Lake Ohrid stands out as one of Europe's most diverse and abundant. This ancient lake harbors seventeen native fish species, among them the endemic Ohrid trout (Salmo letnica) and belushka/belvica (Salmo ohridanus). In 2022, inland waters fishery production in Albania totaled 3,388 tons, with Lake Ohrid contributing an estimated 155.5 tons. Of this, 93 tons were Ohrid trout catch. While the Lake's production may seem modest compared to Albania's total fishery production of 17,799 tons (including marine, inland waters, and aquaculture) for the same year, it is of significant local importance. The fishery constitutes the primary source of income for many families in the fishing villages along the Albanian part of Ohrid lakeshore. Despite the control measures implemented over the past decade to manage the exploitable fish stocks of Lake Ohrid, the lake's fish populations have faced various stressors, including pollution, habitat degradation, and invasive species, in addition to overfishing. Furthermore, the Ohrid trout is being exploited without sufficient knowledge of its stock status. The IUCN Red List of Threatened Species lists the Ohrid trout as Data Deficient. This study aims to provide an initial assessment of the condition and productivity of the Ohrid trout stock in Lake Ohrid. Growth parameters were calculated using length at age analysis of fish collected by the local small-scale fishery, while the total mortality rate was estimated through length-converted catch curve analysis. Stock production was predicted using the model developed by Beverton and Holt and adapted for FiSAT II (2005). The growth of the Ohrid trout population was expressed using the total length-based function Lt=68.0*(1-e-0.21*(t+0.01)). The total mortality rate was estimated at M=0.76 yr-1 and the exploitation rate at E=0.51 yr-1. The model's predicted production indicates that the Ohrid trout stock is currently exploited at maximum sustainable yield. Maintaining the same exploitation rate while increasing the length at first capture to 32 or 35 cm would increase the stock's relative yield per recruit (Y'/R) by 0.035. Implementing the national fishery regulation on minimum size at first catch for Ohrid trout would not only ensure sustainable productivity but also support population growth.

Key words: Ohrid trout, growth, mortality, stock.

SUSTAINABLE MANAGEMENT OF SMALL-SCALE FISHERIES IN ALBANIAN LAKES: BALANCING FISH PRODUCTION AND CONSERVATION

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ABSTRACT

Albania's natural lakes, encompassing a total area of 1,210 km², include the transboundary lakes Shkodra, Ohrid, and Prespa. These lakes are not merely bodies of water; they are jewelry of culture, history, and biodiversity. As a result, the ecosystems of these lakes have been designated with various protection statuses. Lake Shkodra is designated as a Managed Nature Reserve (Category IV, IUCN) and a Ramsar site. Lake Ohrid is recognized as a Protected Landscape (Category V, IUCN), a Transboundary Biosphere Reserve (UNESCO), and a UNESCO World Heritage Site. Meanwhile, the Micro and Macro Prespa Lakes are classified as National Parks (Category II, IUCN), Transboundary Biosphere Reserves (UNESCO), and Ramsar sites. These natural lakes offer a range of valuable services. In addition to climate regulation and cultural and aesthetic benefits, they support diverse fish populations that provide food and livelihoods for local communities. This encompasses both commercial and recreational fishing. The public ownership, along with the low costs and relatively simple technology of fishing gear, have made these ecosystems a longstanding source of livelihood and food security. In 2022, fish production in Albanian inland waters reached 3,388 tons, accounting for 19.3% of the country's total fish production, including aquaculture. The largest share of this inland water production comes from the large natural lakes: Lake Shkodra, Lake Ohrid, and the Prespa Lakes. The sustainability of small-scale fisheries faces several challenges, including over-exploitation of fish stocks, illegal fishing practices, seasonal bans, biodiversity loss and habitat degradation, complex regulatory frameworks, rising costs, fluctuating market demand, and inefficiencies in the supply chain. The fish stocks in these lakes are shared resources between Albania and neighboring countries. As a result, their conservation and sustainable use require unified fishery management plans and the harmonization of fishery regulations.

Key words: small-scale fishery, natural lakes

CORRELATION OF ARRIVAL DATES DURING THE SPRING MIGRATION OF THE LESSER KESTREL FALCO NAUMANNI AND THE DAILY TEMPERATURES BETWEEN 2019 – 2024 IN BULGARIA

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ABSTRACT

The Lesser Kestrel (Falco naumanni Fleischer, 1818) is a small, colonial nesting, falcon species, that is a typical long-distance migrant. In Bulgaria, it has been numerous breeding species in the past, but now they are enlisted as Critically endangered. In 2013, activities were started on the reintroduction of the species in Bulgaria and today it breeds in 4 colonies with more than 40 pairs. Some of the reasons for the decrease in species are changes and fragmentation in its nesting and hunting habitats. In recent years, it has also outlined a new threat to the species related to global climate change. In this study, we looked for a connection with the climatic characteristics in the village of Levka, Svilengrad region, where one of the most numerous colonies of the Lesser Kestrel (app. 25 pairs) in the country is located. The dates of return of the first birds from the wintering grounds and the temperature during the respective days and years were compared and can be divided into two periods. During the first 2019 – 2021 year, the birds arrived in the first half of March, and during the 2022 - 2024 - the first half of February. The lowest temperature at which the first birds arrived was in 2023 (4.6 ºC), in a period of warming after negative temperatures. The earliest registration is on February 12, 2024, at a temperature of 9.9ºC.

Key words: Climate change, Critically endangered, Falcons, Migrants, Reintroduction.

OBSERVATION OF MORPHOLOGICAL VARIATION IN NEOSCONA (ORDO: ARANEIDAE) SPECIES

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ABSTRACT

The morphological variations of Neoscona adianta (Walckenaer, 1802) and Neoscona byzanthina (Pavesi, 1876) belonging to the family Araneidae were investigated. Female, male and juvenile samples of the specimens collected from different provinces of Turkey were evaluated. 115 females, 72 males and 155 juveniles were studied. The spiders were caught by hand and using sweep net on herbaceous plants (Astaraceae). Specimens were evaluated using morphological characters (shape and positioning of the eyes, patterning of the prosoma, prosoma colour, opisthosoma colour and patterning). As a result of the study, it was determined that Neoscana adianta and N. byzanthina species were morphologically close to each other. In addition, sexual dimorphism was also detected between the specimens in intraspecific evaluations. In the light of the data, it was determined that intraspecific and interspecific morphological studies are insufficient and more detailed studies (such as molecular) are needed.

Key words: Araneidae, Neoscona adianta, Neoscona byzanthina

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CHARACTERIZATION AND COMPARATIVE ANALYSIS OF MORPHOLOGICAL TRAITS AMONG CHERRY CULTIVARS IN SOUK AHRAS, ALGERIA

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ABSTRACT

The Souk Ahras region of Algeria, known for its favorable climate and rich agricultural heritage, harbors a diverse array of cherry cultivars. This study aims to characterize and compare the morphological traits of these cultivars to better understand their genetic diversity and potential for cultivation, also to contribute to the broader understanding of cherry biodiversity and supports efforts to develop more robust and productive cherry varieties. A total of 7 cultivars were selected for analysis, representing the broad spectrum of phenotypic variation observed in the region. Key morphological traits, including fruit size, shape, color and leaf morphology, were meticulously measured and recorded. Our findings revealed significant variations in fruit size, ranging from small to large cherries, and shapes that varied from round to heart-shaped. Color analysis showed a spectrum from light red to deep maroon, indicating a rich genetic diversity. Leaf morphology also exhibited considerable diversity, with difference in leaf size, shape and vein patterns. The results underscore the unique morphological diversity of cherry cultivars in Souk Ahras, highlighting their potential for breeding and agricultural improvement. Additionally, the characterization of these traits is crucial for the conservation of cherry genetic resources in the region, ensuring the sustainability and resilience of cherry orchards against climatic changes and other environmental challenges

Key words: Cherry biodiversity, Morphological traits, Prunus Cerasus sp, Phenotypic variation, Genetic diversity.

CONNECTION BETWEEN CALAMITY IN BEECH STANDS BY Rhynchaenus fagi L. (Coleoptera, Curculinidae), EXCESSIVE OF SPRUCE BARK BEETLES SPECIES POPULATIONS AND THE ABSENCE OF POSSIBILITY TO PROTECT THE RARE EPIPHYTIC LICHENS: EVIDENCE FROM THE MOUNTAIN SLOPES FORESTS – NP KOPAONIK IN 2024

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ABSTRACT

The supplementary feeding of Rynchaenus fagi (Illiger, 1798), taxa with syn. or previously included within the genus Orchestes, as Orchestes fagi (L.) or beech miner's weevil lasted much longer this season and started earlier, even to 6 weeks. Due to the exceptional abundantion of it this season and with the ever-present meteo-climatic crisis this summer, it seems that in the end, the beech trees were damaged by 4 instead of two, both ones – per two adult and larval generations. The assumption is that the second generation of larvae appeared, so in addition to the much earlier appearance of the first, there is also a second this year due to the almost Mediterranean climate in areas where mountain summer normally starts late (in July) and ends quickly. Ever since the adults has been active and has been receiving supplementary feeding, all the time since the start of the growing season, it has created a picture and impression that the damage caused by this pest in the year 2024 is extremely strong and visible in many areas in Serbia where beech is widespread. Everything was affected, the chain of damages occurred (linking with three spruce bark beetles high abundation on Kopaonik from previous period) and all had been intensely reflected on even lichen diversity - as an indicator of the state of the environment, in the most negative sense. This the subject of our research and intervention this summer, results are present in paper here.

Key words: Rynchaenus, Adults weevil,, Abundance, Kopaonik, Lichens

A STUDY OF COASTAL DUNE PLANTS NATIVE TO THE ENEZ DISTRICT LOCATED AT NORTH SAROS BAY, TURKEY

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ABSTRACT

The coastal dunes are dynamic structures and transition regions between terrestrial and aquatic ecosystems. Saros Bay has a very rich flora in terms of dune ecosystem. This study was carried out to determine the plant diversity in the coastal dunes of Enez town located at North of Saros Bay and its surroundings. The study was conducted between 2023-2024. As a result of floristic studies; the most common taxa in dune areas are; Salsola kali L., Plantago lagopus, Limoniastrum monopetalum (L.) Boiss., Suaeda maritima (L.) Dumort., Xanthium strumarium L., Eryngium maritimum L., Limonium narbonense Mill., Anchusa calcarea Boiss.and Pancratium maritimum. Most of the characterized plant species were members of Chenopodioideae, Amaranthaceae, Plumbaginaceae families. Coastal dune vegetation plays an important role in dune stabilization. Therefore, the loss of plant species in the dune vegetation makes the dunes permeable to wind and wave erosion. However, climate change and anthropogenic effects disrupt the natural structure of the dune vegetation. These factors cause narrowing of the distribution areas of the plants in the dune areas and thus cause the extinction of the plant species. Beach arrangements in dune areas, housing construction in coastal areas, sand extraction from coasts, tourism, wetland drying and fires threaten dune habitats and plant species in the region. Especially the habitats of sea daffodil (Pancratium maritimum) have been damaged. Moreover, the fact that P. maritimum bulbs are collected by the people there greatly reduced the populations of this species. For this reason, new studies should be carried out in these areas in order to determine the biodiversity and conservation procedures of these areas, and also to give solution proposals for protection of dune plants.

Key words: Coastal dunes, Saros Bay, dune plants, biodiversity

DATE SEEDS SILVERNANOPARTICLES: ANTIOXYDANT&ANTIBACTERIAL ACTIVITY

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ABSTRACT

Green synthesis is cost-effective, eco-friendly and nontoxic, requires low energy and time as it is carried out at ambient temperature. Moreover, it serves the cause of green waste management of plants. Date seeds possess antimicrobial, powerful free radical-scavenging capabilities, and substantial amounts of antioxidants in the form of anthraquinone, flavonoids, alkaloids and saponin. The aqueous date seed extracts were used to obtain yellow colored silver nanoparticles (AgNPs) by using tap silver nitrate as metallic precursor, date seeds extract as a reducing agent. Plant extracts too served dual purposes as capping and reducing agents. UV-visible spectroscopy, Fourier transform infrared spectroscopy (FT-IR), scanning electron microscopy (SEM) and X-ray diffraction (XRD) were used for characterization of AgNPs prepared. These antibacterial agents show potential against both gram-positive and gram-negative bacteria including some of the drug-resistant strains of E coli, Paeruginosa and S aureus.The synthesized AgNPs are suitable for a wide range of application fields in the biomedical and pharmaceutical areas, such as for antibacterial, antifungal, antiviral, anti-inflammatory and anti-angiogenic activity due to their inherent robustness and stability. The synthesis methodology highlighted above serves as an exemplar for economy, resource effectiveness and environmental sustainability. This method promises huge yields of stable nanocolloids for pharmaceutical applications.

Key words: Green synthesis, date seeds, antibacterial activity, antioxydant activity, environomental sustainability

INVESTIGATION OF PECTIN AND XANTHAN GUM DEGRADATION BY INTESTINAL BACTERIA

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ABSTRACT

The microbiota in the colon transforms polysaccharides such as pectin and xanthan gum and contributes to the maintenance of colon health by providing the formation of short-chain fatty acids. Various studies have shown that microbiota breaks down these components and form short-chain fatty acids, gas, and various metabolites, but in studies, the microbiota has generally been examined as a community, and the contribution of different bacterial species to biotransformation has not been sufficiently demonstrated. This study investigated whether Escherichia coli strains isolated from the human colon, which has not been studied before, produce short-chain fatty acids using pectin or xanthan gum in vitro. The results showed that when cultures containing different concentrations of polysaccharides were compared with control cultures (without polysaccharides), the lowest pH values were observed in cultures containing 5 mg/ml xanthan gum and 10 mg/ml pectin (except for 10 mg/ml for E. coli A). However, gel formation was observed in the media prepared at these concentrations, and problems were experienced during the pipetting stages. For these reasons, 2 mg/ml xanthan gum and 5 mg/ml pectin concentrations were selected to test the production of short-chain fatty acids. The results of this study showed that these strains could not produce short-chain fatty acids under the conditions examined, but it aims to examine different bacterial strains in further studies.

Key words: pectin, xanthan gum, microbiota, E. coli, short-chain fatty acids

MOLECULAR CHARACTERIZATION OF PELEMIR (CEPHALARİA SYRİACA) GENOTYPES COLLECTED FROM THE NATURAL FLORA OF TURKEY AND DETERMINATION OF GENOTYES TO BE USED IN BREEDING

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ABSTRACT

In this study, genetic diversity of 42 genotypes and 2 registered cultivars of pelemir collected from 15 provinces was investigated. 12 SCoT primers were used during the study. A total of 229 bands were obtained and 219 of which were found to be polymorphic, resulting in 91.8% polymorphism. KMaraş1 (G47) and KMaraş3 (G49) genotypes found genetically closest to each other in the SCoT analysis data, while Muş1 (G84) and Mrdn2 (G67) genotypes were the most distant. The lowest PIC value obtained from the primers was obtained from primers SCoT5, SCoT16, SCoT21 and SCoT30 with 0.26, while the highest value was obtained from primers SCoT20 and SCoT29 with 0.32 and the overall mean value was determined as 0.28. In UPGMA cluster analysis, genotypes were divided into 5 main groups. The polymorphism value is normal due to the high diversity rate in natural population areas. There is no previous molecular analysis study on the pelemir plant. This study is a pioneering study on pelemir both in terms of scope and molecular sense. It is thought that it will benefit the breeding studies to be carried out in the future.

Key words: Pelemir, Molecular, SCoT, DNA analysis, İndustrial plants

IN VITRO EVALUATION OF THE DROUGHT TOLERANCE DEGREE OF TWO LOCAL VARIETIES OF LENTIL (Lens culinaris medikus)

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ABSTRACT

The lentil (Lens culinaris Medik.) plays an important role in sustainable agriculture and nutritional security. Water restriction will decrease the plant's water status and result in reduced production and yield. One of the main objectives to mitigate the adverse effects of drought is to identify locally adapted varieties suited to these conditions. The present study aims to investigate the effect of water stress induced by polyethylene glycol (PEG 6000) on the in vitro germination and growth of two lentil varieties (Aougrout and Timimoun). The seeds of these varieties come from southern Algeria, characterized by a very arid climate. The trial was conducted in a culture chamber with controlled temperature and photoperiod. The seeds were germinated in petri dishes on MS medium; the concentrations of PEG used were: 0; 10; 15 and 20%. Stress was applied for two weeks. Then roots and shoots lenght, dry weight of both varieties and seedling vigor index were measured. The results obtained show a sensitivity of the Timimoun variety to water stress translated by a reduction in all the morpho-physiological characters analyzed compared to the Aougrout variety, which showed great tolerance to stress. Indeed, under high osmotic pressures (20% PEG), Aougrout variety tends to accumulate much more dry matter in its roots, showing the ability to develop a larger root system, exceeding that of the control by 24%. However, Timimoun variety responds less to this objective and shows a decrease of 68% in root dry matter under the same conditions. Therefore, Aougrout variety seeds subjected to severe water stress (20% PEG) yielded the highest germination rate and produced vigorous seedlings. Such a result allows us to conclude that seed selection is an important criterion to ensure consistent and significant yields.

Key words: Legume, water stress, in vitro culture, germination, growth, vigor index

CHARACTERIZATION AND ANTIBACTERIAL EFFECTS OF PLANT-DERIVED NANOFIBERS

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ABSTRACT

The use of plants for treating various diseases has been researched and practiced since ancient times. However, there are not many studies on the use of plant extracts in different forms in the medical field. Many plants contain specific bioactive components that are toxic to microorganisms. Through the antimicrobial properties of various phytochemicals that plants have, such as phenolic compounds, alkaloids, and terpenoids, they have taken their place in the field of nanotechnology. In this study, the antimicrobial and anti-inflammatory effects of plant extract-based nanofibers, which have not been studied much, were investigated. For this purpose, Baicalein and Propolis with onion extracts were produced as nanofibers using the electrospinning method. Baicalein and Propolis, which are herbal materials with known antibacterial effects, were added to the onion extract samples at selected concentrations, and nanofiber production was carried out with them. For Baicalein-containing nanofibers, when the onion extract concentration increased, the mean fiber diameters decreased (avg. 611.25 nm, 583.57 nm, and 476.47 nm). Similarly, nanofibers containing Propolis decreased in diameter gradually (avg. 1179.01 nm, 731.87 nm, and 729.03 nm). Antibacterial tests against VRE and MRSA were also performed on all produced nanofibers. When the onion extract concentration was at its maximum for Baicalein-containing nanofiber samples, bacteria removal rates were 98.50% for VRE and 99.67% for MRSA. These ratios were 70.83% for VRE and 71.83% for MRSA for Propolis samples. The results showed that onion extract-derived nanofibers can be used with herbal materials, especially for wound dressings or grafts for biomedical purposes.

Key words: Green Nanotechnology, Plant Extract, Antimicrobial, Anti-inflammatory, Nanofiber, Nanomedicine

BIOCHAR-BASED SOIL AMENDMENT EFFECTS ON GROWTH OF JUVENILE PAULOWNIA TOMENTOSA STRESSED BY SALINITY

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ABSTRACT

Paulownia tomentosa the queen tree was used for their medicinal venues, economic, ecological and other benefits. Its relevance attracts the attention of researchers and let them thinking to integrate this specie. Unfortunately, this species like the major ones is negatively affected by salt stress factor widespread in environment. Our work aims to estimate the biochar effects on mitigating of salt stress effects on young Paulownia seedlings. The seeds were collected from P. tomentosa trees, which were planted by the research team of the Forest Ecology Laboratory (INRGREF) in a plot at the higher school of agriculture of El Kef under the semi-arid bioclimatic stage. Homogenate germinated seeds were transferred to grow on soil amended or no by Biochar (7.5%). Irrigation was effectuated with distillate water (control condition) or salt solution (NaCl, 200mM) during 60 days. Our data showed that, presence of biochar enhanced stem elongation and leaves number, but, reduced all measured leaves parameters (Fresh weight, area, length, width and perimeter). Data demonstrated that relative growth rates (RGR and RGRh) regression accompanied by decline of all morphological parameters and relative net assimilation rate (NAR) by salt stress; were significantly attenuated when Paulownia seedlings grown on amended soil by biochar. Furthermore, polyphenol compounds, total flavonoids, condensed tannins, proline, soluble sugar, malondialdehyde (MDA) and hydrogen peroxide (H2O2) highly accumulated in stressed seedlings, were less produced in those growing on soil supplied with biochar. More that, radical-scavenging activity (FRAP and DPPH) was stimulated in stressed seedlings, and inhibited in those stressed and planted on amended soil by biochar. We can suggest that the juvenile growth of Paulownia tomentosa was deeply affected by salt regardless its ability to confront it by physiological and biochemical strategies. But, accreditation of the biochar-based soil amendment, is a recommended approach that, avoids the harmful effects of salinity on the juvenile growth of Paulownia tomentosa.

Key words: Paulownia tomentosa, salt stress, biochar

ARBUSCULAR MYCORRHIZAL FUNGI ENHANCE TOLERANCE OF TOMATO PLANTS EXPOSED TO COMBINED DROUGHT AND HEAT STRESSES

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ABSTRACT

Climate change poses significant challenges to ecosystems worldwide, affecting everything from weather patterns to biodiversity. Understanding the interactions between plants and AMF under changing climatic conditions is essential for developing strategies to protect and enhance plant resilience in the future. Therefore, this study aims to explore and provide more insight into the effect of different arbuscular mycorrhizal fungi (AMF) strains (Rhizophagus irregularis, Funneliformis mosseae, and Funneliformis coronatum) on tomato plant tolerance against combined drought and heat stress, as well as combined drought and heat shock. A pot experiment was performed under controlled conditions in a growth chamber at 26/20 ◦C with a 16/8 h photoperiod. After six weeks of growth, one-third of plants were put in non-stress conditions, while another one-third were subjected to combined drought and heat stress (40% field capacity for two weeks and 38 ◦C/16 h and 30 ◦C/8 h for 5 days). The rest of the plants were exposed to combined drought and heat shock (40% of field capacity for two weeks and 45 ◦C for 6 h at the end of the drought period). All data were evaluated by one- and two-way analysis of variance (ANOVA). Means were compared by Duncan's post hoc test at $p < 0.05$. The obtained results showed that stressed AMF plants exhibited a decrease in hydrogen peroxide and malondialdehyde content in the cells and showed changes in defense enzyme activities (peroxidase (POD), catalase (CAT), in leaves compared with their relative non-mycorrhizal plants.

Key words: arbuscular mycorrhizal fungi; antioxidative activity; drought; heat stress.

A NEW PUTATIVE HIGH AFFINITY POTASSIUM TRANSPORTER (HKT) GENE FROM PURSLANE (PORTULACA OLERACEA L): A POTENTIAL PROGRESS IN SALINITY RESILIENCE

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ABSTRACT

The gradual salinization of soils is among the supreme abiotic stress problems of limiting agricultural production. In the coming days, the necessity of adaptation for agriculturally cultivated plants to changing environmental conditions will gradually become the highest priority for grower. In this context, it is necessary either to use tolerant varieties or to modify the environmental conditions to the extent possible, such as remediation of salinity from soil. A type of halophyte, vegetable, and aromatic plants of common purslane can serve both these requirements by accumulating salinity within the soil, and by harboring the potential genes for tolerance. In this case, one of these genes (a putative HKT) was located at the sequence level. HKTs have two classes and while one of these classes loads sodium to the plant, the other class removes sodium from the plant. For the detection of this gene, salt-treated RNA sequence data from the NCBI database were used as source material. The quality score of RNA sequence data was adjusted to a certain level by filtering with TRIMMOMATIC software. The assembled transcript was mined from these data using TRINITY software. The quantitative evaluation of the assembled trascripts was verified using BUSCO software. The CD-HIT software was employed reducing the sequence over-representation of the assembled transcript. The potential coding sequence (open reading frames) and the potential protein sequences corresponding to these open reading frames were predicted using TRANS-DECODER software. The conserved domains were obtained from sequence data of HKT proteins of some vegetable species using CLUSTAL OMEGA. By cross-checking these conserved regions and the peptide file generated by TRANSDECODER software, the location of the putative HKT gene was located in the genome. As a result of the screening of the obtained protein sequence in databases (NCBI, UNIPROT, SWISS-PROT), it was determined that it showed over 60% similarity with HKT1:3 group proteins and was identified as putative HKT in common purslane. Studies are ongoing to validate the sequence-level data on common purslane plants.

Key words: Salinity, HKT, Tolerance, Purslane, Stress

GENETIC CHARACTERIZATION OF BOTRYTIS CINEREA POPULATION FROM STRAWBERRY IN MOROCCO

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ABSTRACT

Botrytis cinerea, a ubiquitous fungal pathogen, causing gray mold in over 500 plant species, poses a significant threat to strawberry cultivation worldwide. Understanding molecular mechanisms underlying its genetic diversity is important for effective disease management strategies. Transposable elements (TEs) are known contributors to genomic variability and adaptive evolution in fungi. This study investigates diversity and impact of TEs within B. cinerea isolates infecting strawberry plants. Fifty Botrytis spp. isolates were collected from different Moroccan regions. DNA extraction was performed. Results showed that in our population the most dominant genotype is Transposa. This knowledge could lead to targeted strategies for controlling strawberry gray mold.

Key words: Botrytis cinerea, genetic diversity, gray mold, transposable elements, strawberry

HOW THE LEVEL OF VITAMIN C CAN EFFECTS ON METABOLIC DISEASES

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ABSTRACT

The level of vitamin C can play a role in metabolic diseases due to its antioxidant properties and involvement in various metabolic processes. Adequate levels of vitamin C are important for maintaining overall health and supporting the immune system. A deficiency in vitamin C can lead to oxidative stress, inflammation, and impaired glucose metabolism, which are all factors that can contribute to the development of metabolic diseases such as diabetes and obesity. It is recommended to consume a balanced diet rich in vitamin C to help prevent and manage metabolic diseases. This study aims to emphasize the effects of vitamin C in metabolic diseases, and to present an assessment of vitamin C at some fruits and fresh fruit juices. This is a review of the recent literature about how the level of vitamin c can affects on metabolic diseases. Iodometric method is used for the determination of vitamin C (ascorbic acid) levels in some fruits and fresh fruit juices. In this study, we described a summary of the existing literature and studies about the effects of vitamin C in metabolic diseases and the health benefits of fruits and fresh fruits' juices focusing on their contents of vitamin C, then we analyzed data of the vitamin C levels and finally, we make a comparison between fresh fruits and fresh fruit juices based on the level of the vitamin C presence. Based on the study results, that the association between vitamin C and metabolic diseases has been evaluated in several epidemiological studies but with conflicting results. Current evidence suggests that both dietary and circulating vitamin C level is inversely associated with metabolic syndrome (MetS), that people with metabolic syndrome have lower vitamin C status than healthy people.

Keywords: dietary vitamin C, metabolic diseases

LEAD-INDUCED PHYSIOLOGICAL AND GENOTOXIC EFFECTS ON LUDWIGIA REPENS: A STUDY OF PHYTOREMEDIATION EFFECTIVENESS

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ABSTRACT

Lead (Pb) is recognized as a hazardous heavy metal that significantly hinders the growth and development of plants. The rapid expansion of industrial activities and urbanization has exacerbated environmental issues, including heavy metal contamination. Pb contamination impedes the uptake of essential mineral nutrients by plants, leading to deficiencies and disruptions in metabolic pathways. Furthermore, Pb toxicity induces genotoxic effects in plants, adversely affecting their genetic integrity. By investigating Ludwigia repens in the context of lead phytoremediation, this research aims to contribute to the understanding of plant-based strategies for environmental remediation, emphasizing the potential of this species as a sustainable solution to mitigate lead. **Material and Methods**: Plants were grown in aquariums with 0.2% Hoagland solution for two days and subsequently exposed to Pb(NO2)3 concentrations of 0, 10, 25, 50, and 100 μM for 10 days. After this period, plants were harvested, and the effects of Pb exposure on nutrient contents (B, Ca, Cu, Fe, K, Mg, Mn, Na, and Zn) of L. repens leaves and shoots, both washed and unwashed, were analyzed with ICP-OES. Additionally, genomic alterations were assessed using ISSR markers, and photosynthetic pigments were examined in response to Pb stress in the plant. **Results:** The analysis revealed a significant decrease in mineral nutrient concentrations, correlating with increasing Pb concentrations. Washed leaves and shoots exhibited more pronounced reductions compared to unwashed tissues. Also, lead accumulation increased in the leaves and shoots of the plant in response to increasing lead concentrations, compared to the control group. Moreover, there was a decrease in the concentrations of photosynthetic pigments due to the toxicity of lead. Although no new bands appeared or disappeared in the band profiles, changes in band intensities were observed, suggesting that Genomic Templated Stability (GTS) remained unaffected. **Discussion**: This study reveals that Pb stress disrupts mineral nutrients, photosynthetic pigments, and genetic material in the plant. The plant's stable GTS and high accumulation rate suggest its potential for effective phytoremediation of Pb-contaminated water as a biomonitor plant.

Keywords: ISSR, Mineral nutrition, Lead, Ludwigia repens**,** Phytoremediation

SURVIVAL AND RESISTANCE OF ENCAPSULATED LACTOBACILLUS PLANTARUM IN CERTAIN STRESS CONDITIONS

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ABSTRACT

Lactic acid bacteria play a crucial role in the food industry for the production of various foods and the enhancement of their nutritional and organoleptic quality. Microencapsulation has been employed to protect cells and improve their viability in food products and the gastrointestinal tract. In the present study, we tested three encapsulating agents (alginate, alginate-starch, and alginate-skim milk) to coat Lactobacillus plantarum LMF6 cells using extrusion. The survival capacity of free and microencapsulated cells was evaluated after exposure to different stress conditions such as thermal stress, freezing, osmotic stress, and acid stress. The results showed that alginate-skim milk was the most effective encapsulating agent in protecting Lb. plantarum against the high-temperature effect (40°C and 45°C). Conversely, alginate-starch was the most effective encapsulating agent in protecting Lb. plantarum against freezing. Alginate and alginate-skim milk were the most suitable encapsulating agents for enhancing the tolerance of Lb. plantarum to NaCl concentrations up to 5%, while alginate-starch allowed for higher viability of Lb. plantarum at 1% and 2% citric acid compared to other encapsulating agents. We observed low lactic acid production by encapsulated cells, specifically those encapsulated with alginate-starch, compared to free cells, as estimated by titration.

Key words: Lactobacillus plantarum- Microencapsulation- Extrusion- Alginate- Osmotic stress- Thermal stress- Acid stress.

EVALUATION OF ANTIMICROBIAL AND ANTIBIOFILM ACTIVITY OF ORIGANUM COMPACTUM ESSENTIAL OIL AGAINST STAPHYLOCOCCUS AUREUS STRAINS ISOLATED FROM RAW GOAT MILK.

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ABSTRACT

Increased consumption of antibiotics in humans and farmed animals has caused the spread of antimicrobial resistance. The emergence of bacterial strains resistant to antibiotics, especially Methicillin-resistant Staphylococcus aureus (MRSA), is a major global health concern. Furthermore, the Essential oil (EO) of Origanum compactum exhibited an antimicrobial potential against a wide range of pathogens. Consequently, the main purpose of this study was to assess the antimicrobial and antibiofilm activity of O. compactum essential oil against S. aureus strains. A total of 4 S. aureus strains were isolated from the raw goat milk samples collected in 3 farms located in the Kabylia region, Algeria. These isolates were identified by Gram staining and biochemical tests such as catalase, coagulase and DNase. Congo red agar method and Microtiter plate assay were used for assessment of biofilm formation in S. aureus isolates. The obtained results showed that all the isolates were able to produce slime and biofilm. Moreover, the EO showed strong antibacterial activity against all the tested strains with inhibition zones ranging from 32.67 and 38 mm. Additionally, the EO tested had the ability to inhibit the biofilm formation of S. aureus strains. In light of the results, the EO of O. compactum could be a promising alternative to traditional antibiotics for the prevention and treatment of biofilm-related infections.

Key words: Goat Milk, Staphylococcus aureus, Biofilm, Origanum compactum.

INVESTIGATION OF MICROPROPAGATION POSSIBILITIES OF BLUE SPRUCE (PICEA PUNGENS CV. HOOPSII)

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ABSTRACT

Blue spruce is an important outdoor ornamental plant preferred in landscape design due to its symmetrical shape and blue needles, and it has a high economic value. It is possible to propagate superior varieties with these features through vegetative propagation methods. Although grafting is the most commonly used propagation method for this purpose, its success rate is quite low, and there is a risk of transferring new diseases. Additionally, blue spruce can also be grown from seeds, but only 4-6% of the seedlings exhibit blue foliage. Therefore, this propagation method is also not ideal for large-scale multiplication of desired varieties. Tissue culture techniques can overcome these problems. Obtaining plants with the desired characteristics and free from diseases through tissue culture is one of the main goals of tissue culture studies. Blue spruce production using tissue culture method can be done regardless of environmental conditions and seasons. Additionally, plants produced through micropropagation tend to have similar development, which is crucial for maintaining the desired blue color and symmetrical form of the blue spruce. This study investigates the optimal conditions for propagating blue spruce using tissue culture methods. Although some fundamental information has been produced worldwide for the micropropagation of blue spruce, a commercially viable tissue culture protocol has not yet been developed. Limited scientific research has been conducted on this topic, and only one study has reported the propagation of blue spruce through somatic embryogenesis. However, the applicability of this propagation method is challenging and its efficiency is low. In the study, it is planned to produce blue spruce with the desired characteristics year-round with high efficiency by developing a tissue culture propagation method. The study involves callus-based shoot formation (indirect organogenesis) research. Firstly, 18 different surface sterilization methods were tested on different explant types (short shoots and long shoots) to determine the most suitable sterilization method. Based on the results, the most appropriate sterilization methods were identified. Subsequently, 11 different callus induction media were tested to promote callus formation from blue spruce leaves, and the most suitable callus induction medium was determined. Developing suitable shoot regeneration media to encourage shoot development from the obtained blue spruce calli is a challenging stage. Based on the literature, it is known that forming shoots through indirect organogenesis in coniferous trees is challenging. For this reason, there is a tendency to use immature embryos as explants for somatic embryogenesis studies in coniferous trees. However, the immature embryos used as explants are genetically different from the donor plant. Therefore, new plants with the same characteristics as the donor plant cannot be propagated. In line with the objective of the study, in addition to indirect organogenesis research, efforts have been made to promote somatic embryogenesis using leaves of blue spruce with the same genetic structure as the donor plant.

Key words: Blue spruce, propogation, tissue culture, organogenesis, embryogenesis

EVALUATION OF POLYPHENOLS AND ANTHOCYANINS CONTENT IN KALLMET WINE, THROUGH SEQUENTIAL FERMENTATION, USING SELECTED NON-SACCHAROMYCES YEAST

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ABSTRACT

This study investigates the effects of sequential fermentation using selected non-Saccharomyces (M. pulcherrima) and Saccharomyces yeasts on the polyphenols and anthocyanin content in red wines. The consumers interest in quality wines with enhanced health benefits and richer color profiles is growing, therefore understanding the role of different yeast strains in wine fermentation and modification of vinification schemes become increasingly important. This research involves conducting fermentation trials where M. pulcherrima selected strain are initially used at a concentration of log107, followed by commercial strain of Saccharomyces cerevisiae in a sequential manner added after 48 and 72 hours. A control trial used only the Saccharomyces cerevisiae strain. The total polyphenols and anthocyanin content of resulting wines are analyzed using the spectrophotometry. The results demonstrated that sequential fermentation significantly boosts these compounds compared to traditional fermentation methods, leading to wines with improved antioxidant properties and deeper color intensity. These first findings suggest that the utilization of selected non-Saccharomyces yeasts in conjunction with Saccharomyces, can enhance the quality and health benefits of red wines, offering valuable insights for winemakers seeking to innovate and improve their products.

Key words: polyphenol, anthocyanin, color intensity, non-saccharomyces yeasts

EXPLORATION AND CHARACTERIZATION OF INDIGENOUS ALGERIAN SOIL MICROORGANISMS FOR BIOCONTROL AND BIOTECHNOLOGICAL APPLICATIONS

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ABSTRACT

To discover new biocontrol agents beneficial to agriculture, researchers can explore natural and uncharted ecosystems as potential sources of novel agents for pharmacological and industrial applications. Microorganisms represent the most economically viable and biologically valuable sources for the production of biocontrol compounds. In this study, 42 samples of soil collected from Tifrit forest located in semi-arid region in Saida 34° 50′ 00″ north, 0° 09′ 00″ east (Algeria).The main objective of the study was to assess six Streptomyces isolates (T1, T4, T5, T6, T7, and T8) for their enzymatic activity (lipase, protease, amylase, and cellulase) by screening their activities on agar plates and showing a clear zone around the colonies. The isolates were subsequently characterized phenotypically, biochemically, and through PCR analysis and 16S rDNA sequencing. Examination of colony morphology, agar plate culture characteristics, and biochemical reactions suggested that the isolates belong to Streptomyces species. The results demonstrated that isolates T1, T4, and T5 exhibited lipase activity by hydrolyzing lipids in egg yolk agar. Also, all isolates displayed protease activity by digesting proteins in skimmed milk agar. Amylase production, indicated by starch digestion in starch casein nitrate agar, was not observed in any of the tested isolates. However, isolates T1, T5, T6, and T8 demonstrated cellulase activity by hydrolyzing cellulose in carboxy methyl cellulose (CMC) agar. Molecular characterization of these isolates was conducted, which included genomic DNA extraction, 16S rRNA gene amplification, and sequencing to confirm the specific Streptomyces strains. Genomic DNA was extracted from Streptomyces isolates, followed by PCR amplification using Streptomyces-specific primers (RI7F/RI8R and AM45F/AM47R) and universal bacterial primers (27F/1492R) targeting the 16S rRNA gene. All isolates (T1, T4, T5, T6, T7, and T8) produced single PCR bands of approximately 438 bp, 940 bp, and 1480 bp when using RI7F/RI8R, AM45F/AM47R, and 27F/1492R primers, respectively. These results showed the presence of bacterial 16S rRNA and specifically the conserved 16S rRNA region of Streptomyces species in all the isolates. The isolates were sequenced using the 27F/1492R primers. BLASTn analysis of the 16S rRNA gene sequences identified isolates T1, T4, T5, and T6 as Streptomyces aegyptia, with identity percentages of 99.91%, 99.71%, 99.64%, and 96.7%, respectively. However, isolates T7 and T8 were identified as Lysinibacillus fusiformis and Umezawaea beigongshangensis, with identity percentages of 99.86% and 99.71%, respectively. The 16S rRNA sequences of these isolates were aligned with similar sequences from the GenBank database, and a phylogenetic tree was constructed. This tree demonstrated that isolates T1, T4, T5, and T6 formed a cluster within the Streptomyces group, while isolates T7 and T8 branched separately, consistent with their identification as belonging to different

genera. The findings highlighted the significant potential of these indigenous Algerian forest soil microorganisms, particularly in the discovery of novel enzymes, underscoring their relevance for industrial applications. This research emphasizes the diversity of the microbial population in Algerian soil and the importance of exploring such natural reservoirs for biotechnological advancements.

Key words: Algerian soil, Enzymatic activity, Streptomyces, Tifrit forest

LIFE CYCLE ASSESSMENT (LCA) OF BIO-ELECTROCHEMICAL SYSTEMS: AN EVALUATION FOR SUSTAINABILITY

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ABSTRACT

Bio-electrochemical systems (BES) are eco-friendly systems that are being used for various of purposes such as water treatment, resource recovery, biogas and biohydrogen production from various of biomass resources. In the bio-electrochemical process (BEP), biomass is decomposed and break into smaller components by both biological and electrochemical reactions. The biological activities of the bacteria and electrochemical reactions involved in this process can cause some environmental effects. Moreover, waste materials resulting from the BEP have the potential to pose a hazard to the environment and public health. Therefore, a detailed life cycle assessment (LCA) covering the entire duration from raw material supply to the management of waste generated at the end of the process should be carried out and the environmental impacts of this process should be evaluated. LCA for a BES should be "Cradle to Grave" approach and include transportation of waste material, pre-treatment of waste, inflow of waste into BEP, reactions occurring in BEP, outputs (product and waste), processing-making usable-transportation of the product, processing-transportation-disposal or recycling of waste. In LCA, system boundaries should be defined clearly and comprehensively and environmental impacts should be analysed based on various criteria such as energy consumption, fuel type and consumption, greenhouse gas emissions, and toxic substances released into water and soil, to help design and manage products, services and waste in a more sustainable way

Key words: Bio-electrochemical systems, energy, environmental impact, life cycle assessment, sustainability.

AN INVESTIGATION INTO THE BIOCHEMICAL AND TRANSCRIPTOMIC RESPONSES OF Solanum lycopersıcum and Solanum melongena TO INFESTATION BY Tuta absoluta

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ABSTRACT

Tomato is one of the most important vegetables grown worldwide. However, biotic factors, such as insects and pathogens, are major impediments to tomato production. Tuta absoluta causes significant economic yield losses in tomatoes and is one of the most destructive insect pests affecting tomato production, leading to substantial yield losses both in open fields and greenhouses. First reported in western South America in 1917, Tuta absoluta has caused great damage to tomato and other crops. The entire biological cycle of Tuta absoluta can occur within the green parts and fruits of tomato plants; however, the larval stages are the most harmful. The damage caused by Tuta absoluta on its hosts manifests as the larvae feed on all phenological stages of tomato plants, including leaves, stems, branches, and both green and ripe fruits—except for the roots—resulting in significant economic losses due to quality reduction. Although Tuta absoluta has a wide host range and prefers tomato (Solanum lycopersicum L.) as its main host, eggplant (Solanum melongena L.) is also a significant host. While commercial tomatoes are susceptible to Tuta absoluta attacks, a better understanding of plant defensive responses to this pest will aid in defining plant resistance traits and expanding the range of agronomic tools available for an effective integrated pest management strategy throughout the crop cycle. The reproductive success and survival of herbivorous insects are intricately linked to host plant metabolites associated with plant defense mechanisms. The attack of herbivorous insects triggers the release of specific secretions that either enhance nutrient production in the host plant or diminish its defense responses. The damage caused by T. absoluta larvae leads to specialized metabolic alterations in plants, which play a pivotal role in regulating feeding, mating, and egg-laying behaviors. However, the profile of induced metabolic compounds in host plants is primarily influenced by organ specificity, feeding behavior, and temporal factors. In this study, the aim was to understand the biochemical and transcriptomic responses of tomato and eggplant plants to Tuta absoluta infestation.

Key words: Biochemical, Gene expression, Plant-Pest interaction, Solanaceae

PRODUCTION OF HAPLOID PLANTS BY GYNOGENESIS IN SOME SUGAR BEET (BETA VULGARIS SSP. VULGARIS) GENOTYPES

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ABSTRACT

In Kayseri Sugar R&D Center, a study is being carried out on breeding of local hybrid sugar beets using classical breeding methods. The parent lines used in hybrid variety breeding are genetically purified and the purified parent lines are homozygous. Biotechnological methods are also used. In this study, in order to accelerate classical breeding studies, the aim was to obtain a homozygous pure parent line in sugar beets using the gynogenesis method. Unfertilized ovule cells in the flower branches of genotypes in the generative period were transferred into the nutrient medium and their regeneration abilities were examined. Nine genotypes and ten different nutritional media were studied (BO1 (% 3% sucrose (S), 0.8% agar (A), Murashige and Skoog (MS), BAP 1mg/L), BO2 (% 3% S, 0.8% A, MS, 6-Benzylaminopurine (BAP) 1.25mg/l, Gibberellic Acid (GA) 0.1mg/l), BO3 (% 3% S, 0.8% A, MS, BAP 2mg/l), BO4 (% 10% S, 0.75% A, MS, BAP 1mg/L), BO5 (% 10% S, 0.75% A, MS, BAP 2mg/L), BO6 (% 3% S, 0.8% A, MS, BAP 1.5mg/l), BO7 (% 3% S, 0.8% A, MS, Kinetin (KIN) 0.1mg/l), BO8 (% 3% S, 0.8% A, MS, KIN 1mg/l), BO9 (%3 S, %0.8 A, MS, KIN 0.05mg/l), BO10 (%3 S, %0.8 A, MS, KIN 0.5mg/l)). Explants were incubated in the climate cabinet for 16 hours of light and 8 hours of dark period. 10% regeneration was observed in BO1 and BO3 nutrient media in KST9 genotype, 6.7% in BO4 in KS184 genotype, 6.7% in BO4 and BO5 in KST1 genotype, but regenerated plants could not be obtained in all of them. Regenerated plants, diploid sample with known ploidy level and haploid sample with unknown ploidy level were determined by using Sysmex brand CyStain PI Absolute P Ploidy Kit in Sysmex brand Flow Cytometry device. As a result, obtaining haploid plants in sugar beet and completing the stages of double-haploid plants, which is the continuation of the study, will provide time saving in breeding studies and cost saving in plant breeding, and will be an alternative method to parental line production from heterozygous lines.

Key words: Sugar beet, tissue culture, haploidy, ploidy, regeneration, ovule, gynogenesis

EVALUATION OF BIOLOGICAL EFFECT OF CHLORELLA VULGARIS AND PORPHIRIDIUM AERUGINEUM ON LACTUCA SATIVA SEEDS.

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ABSTRACT

In recent years, many researchers have focused their work on microalgae cultures as an alternative way of sustainable agriculture due to their high content of amino acids, carotenoids, phytohormones and other biologically active substances. The present study was conducted to investigate the endometabolic and exometabolic potential of two microalgae -Chlorella vulgaris and Porphyridium aerugineum as germination stimulants. For this purpose, the biomass and culture supernatant were separated by centrifugation and examined. The experiments were carried out directly and after the breakdown of the cell walls by homogenization. The results showed that after 7 days of incubation, the best stimulatory effect on seed germination, root and shoot length and biomass was observed when treated with biomass from both microalgae . The highest positive effect on the roots of Lactuca sativa was achieved with Porphyridium aerugineum biomass at a concentration of 1g/l, while the effect on the epicotyl part of the germinated seeds was best observed with cell culture of Chlorella vulgaris at a concentration of 1g/l.

Key words: Chlorella sp., Porphyridium sp., germination, seeds, Lactuca sativa

INVESTIGATING THE USE OF FRUIT EXTRACTS FROM DIFFERENT SOURCES IN ALTERNATIVE DAIRY PRODUCTS

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ABSTRACT

This study aims to investigate the alternative use of various fruit extracts in the production of dairy products, which have been produced and consumed in various forms from the past to the present. The enzyme chymosin, which is traditionally used in cheese production, is in short supply and does not fit vegan dietary habits. Although microbial-derived enzymes are produced by recombinant microorganisms, in some countries they may face various legal obstacles in the production process. The aim of this study was to investigate the use of plant proteases in cheese production. Protease rich extracts are extracted from kiwi (Actinidia deliciosa L.), pineapple (Ananas comosus L.) and ginger (Zingiber afficinale L.) fruits were used in combination to investigate the use of plant proteases in alternative dairy product development. The plant materials were selected as economically worthless, damaged and non-consumable products to be discarded. Proteolytic activity, milk coagulation activity and flavor were considered in the selection of enzyme sources. In order to assess curd formation, milk powder with 25% dry matter content was used. Fruit extracts obtained from different sources were treated with milk powder at 60°C, and curd formation was performed. The samples were incubated for 150 minutes for the curd formation reaction from the extracts. According to rheology analysis, it was determined that the most suitable viscosity for cheese production was obtained at proportions of kiwi 0.433, pineapple 0.433 and ginger 0.133. This study may provide a basis for further studies on the realization of sustainable development goals, the utilization of waste foods in the production of an alternative dairy product, and the recycling of plant proteases obtained from these foods into production.

Key words: Fruit extracts, food waste, alternative food, sustainable development goals.

ANTIMICROBIAL EFFECT OF EXTRACTS FROM THE PEELS OF PERSIMMON (Diospyros kaki L.), POMEGRANATE, (Punica granatum L.), AND ARONIA (Aronia melanocarpa) FRUITS WITH HIGH PHENOLIC COMPOUND CONTENT

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ABSTRACT

This study investigates the phenolic compounds and antimicrobial activity of extracts from persimmon (Diospyros kaki L.), pomegranate (Punica granatum L.), and aronia (Aronia melanocarpa) against Escherichia coli O:157 H:7. The study aims to identify effective natural alternatives to artificial preservatives, which are widely used in the food industry but are often associated with health risks and environmental concerns. Phenolic compounds were extracted from the fruits using water extraction and methanol extraction methods. The Mixture Method was used to prepare different combinations of the fruit extracts. The antimicrobial activities of the fruit extracts were tested by using the disk diffusion method. Ten different combinations were evaluated, and the inhibition zones were measured to determine the efficacy of each mixture. The results showed significant differences in antimicrobial activity between the mixtures. The most effective combination, consisting of 0.2 ml persimmon, 0.6 ml pomegranate peel, and 0.2 mL aronia, resulted in an average inhibition zone of 16.93 mm². Statistical analysis confirmed that increasing the proportion of pomegranate peel extract enhanced the antimicrobial effect, indicating its great potential as a natural preservative. The results of this study suggest that the combination of these fruit extracts, especially with a higher concentration of pomegranate peel, may serve as a promising natural preservative in the food industry. The use of such natural compounds could help reduce reliance on synthetic chemicals, contributing to safer food production and more sustainable agricultural practices. This study highlights the need for further research to optimize the application of these natural extracts for food preservation.

Key words: Phenolic compounds, Pomegranate, Persimmon, Aronia, antimicrobial activity, Escherichia coli.

MARENNINE PRODUCTION INSIGHTS

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ABSTRACT

Marennine is a natural blue pigment produced by the marine diatom Halsea ostrearia. This pigment has captured the researcher's attention for its potential applications in diverse domains; aquaculture, cosmetics, and pharmaceuticals. However, the biosynthetic pathway of its production remains unexplored. In the present work, we explored potential links between marennine and other known natural blue pigments. We used bioinformatics analysis for similarities searching in the transcriptome of Haslea Ostrearia NCC527 and key enzymes implicated in the production of known natural blue pigments.

Key words: Marennine, Haslea ostrearia, biopigment, key enzymes, transcriptome

A COMPARISON OF ALOE VERA MORPHOLOGICAL AND PHYSICOCHEMICAL PROPERTIES FROM ALGERIA WITH SAMPLES FROM OTHER COUNTRIES

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ABSTRACT

Several researchers have observed that different agro-climatic conditions have effects on the chemical properties of Aloe vera. Detailed analysis was undertaken on the physicochemical parameters (gel yield, moisture content, organic matter, ash content, turbidity, viscosity, acidity, Brix degree and potential color change) on plants from Skikda region (north-eastern Algeria) to determine if they correspond with those from previous studies conducted in other parts of the world. Some divergence from previous studies was found. This could have implications for the medical and other uses of the species.

Key words: Aloe vera, leaves, morphology, gel, physicochemical parameters, Algeria.

SCREENING LANNAE ACIDA, FICUS SYCOMORUS AND BRIDELIA FERUGINEA FOR ACTIVITY AGAINST TYPE-2 DIABETES

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ABSTRACT

The global rise in the incidence of diabetes has prompted a search for alternative, natural anti-diabetic therapies with fewer side effects than currently available synthetic drugs. This study evaluated the anti-diabetic effect of selected medicinal plants locally used for treating Type-2 diabetes in Katsina State, Nigeria. Standard procedures were employed for phytochemical analyses, pharmacognostic studies (Chemomicroscopy, Physicochemical evaluation and Heavy metal analysis), toxicity and anti-diabetic studies, as well as FT- IR and GC-MS analyses for compound identification. Stem bark of Lannae acida, Ficus sycomorus and Bridelia feruginea were selected from a survey for further research. Chemomicroscopic evaluation indicated presence of cellulose, lignin, suberin, gum, mucilage, starch grains, calcium oxalates crystals and calcium carbonates in the stem bark of the three plant species. Physicochemical analysis revealed values for moisture content, total ash, acid-insoluble ash, water soluble ash, alcohol and water extractive value for the three plant species fall within the range of World Health Organization (WHO) permissible limit for crude drugs from medicinal plants. Heavy metal analysis results indicated that concentration of lead, cadmium and copper were below detection limit, while the levels of iron, zinc, manganese, nickel and arsenic in all the plants were within FAO/WHO maximum permissible limits. Qualitative phytochemical analysis showed the various solvent fractions from the selected plants contained medicinally important bioactive compounds; however, the ethyl acetate fraction of the three plants possessed more bioactive components. Thin layer chromatography of the various fractions also revealed the ethyl acetate fraction of all the three plants had the highest number of bioactive components. Quantitative phytochemical analysis revealed the stem bark of the three plant species contained varying concentrations of phytochemicals; however L. acida stem bark had the highest alkaloids, tannins, terpenoids, and phenols content. An acute toxicity study revealed that the Median Lethal dose (LD50) of the three plant species was greater than 5000 mg/kg. Likewise in the sub-acute toxicity study, the selected plants did not produce toxic effects on the liver, kidney and haematological parameters of diabetic Wistar rats. Administration of L. acida, F. sycomorus, and B. ferruginea fractions significantly decreased blood glucose levels and lipid profiles in diabetic Wistar rats compared to the diabetic untreated group. FTIR and GC-MS analyses identified compounds with potential anti-diabetic and hypolipidemic properties.

Key words: Screening, Lannae acida, Ficus sycomorus, Bridelia feruginea, diabetes

TAXONOMIC IMPLICATIONS OF TRICHOME DIVERSITY IN ECONOMICALLY IMPORTAN POLYGONACEOUS SPECIES FROM PAKISTANT

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ABSTRACT

Comprehensive foliar anatomical investigations Comprehensive foliar anatomical investigations of 38 species belonging to 7 genera of Polygonaceae from Pakistan through light microscopy (LM) showed substantial diversity in glandular and non-glandular trichomes. Seven types of glandular trichomes, i.e. one celled, two celled without striations, two celled with striations, three celled, four celled, spheroidal and peltate glands while five types of non-glandular trichomes i-e., uniseriate hair with swollen base and tapering apex, unicellular and bicellular, unicellular clustered shaggy hair, papillae of different types and short cone like trichomes were recorded. Current study (in narrow geographical range) revealed that trichomes can be employed as vital taxonomic tool in collaboration with information derived from morphological, cytological, palynological and molecular markers.

Key words: Polygonaceae, Peltate, Spheroidal, Trichome

A QUESTIONNAIRE-BASED STUDY ON MEDICINAL PLANT USE IN RESPIRATORY DISEASES IN THE NORTH-EAST OF ALGERIA

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ABSTRACT

Phytotherapy allows the use of numerous active principles found in medicinal plants. It can serve as an alternative and/or complement to conventional treatments. This study contributes to the documentation of medicinal plants used in traditional phytotherapy for the treatment of respiratory diseases by the local population of the state of El Tarf (North-East of Algeria). A series of ethnobotanical surveys carried out on 100 people, using a questionnaire, enabled the collection of various pieces of information on the use of plants by the local population. The results of this study showed that women use plants more than men (71%). People over 60 years old are the dominant age group (52%). Illiterate people and people with a primary education level are those who use medicinal plants the most (46% and 30% respectively).The study of medicinal flora identified 44 species, with Lamiaceae being the most dominant. The foliage is the most used part (28%), and most remedies are prepared as infusions and decoctions (39% and 25%, respectively). Influenza is the most frequently mentioned ailment (34%). The results obtained provide highly valuable information for the studied region and for the national medicinal flora. This information could be useful for future research in the fields of pharmacology.

Key words: Respiratory diseases, Medicinal Plants, Phytotherapy, Algeria

ANTHER WALL STRUCTURE IN JURINEA KILAEA AZN. (ASTERACEAE)

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ABSTRACT

This research aims to provide a detailed analysis of the anther wall structure in *Jurinea kilaea*, a member of the Asteraceae family, which has never been documented before. Capitulas of various sizes, each containing young flower buds of *J. kilaea* was gathered from Tekirdağ, Saray - Kastro coast in July 2022 and 2024. The separated anthers were examined under a stereo microscope and then transferred to a series of arising alcohol solutions and embedded in Hisstore. The sections were treated with toluidine blue solution. The slides were observed under a light microscope and captured using an Olympus E330 camera. Tetrasporangiate type anthers are seen in *J. kilaea*. The anther wall is composed of the outermost epidermis, the endothecium, the middle layer, and the innermost tapetum layer. Tapetum cells are characterized by the presence of either 1 or 2 nuclei. Tapetum is plasmodial type and, tapetum cells begin to degenerate as the tetrad phase comes to an end.

Key Words: *Jurinea kilaea*, Asteraceae, anther wall, tapetum, light microscope

EMBRYOLOGY OF PEUCEDANUM OBTUSIFOLIUM SIBTH. & SM. (APIACEAE) – A RARE SPECIES FROM BALKAN PENINSULA

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ABSTRACT

In this study, male and female reproductive structures of Peucedanum obtusifolium Sibth. & Sm. (coastal celery), a rare species for Balkan Peninsula, were examined histologically by light microscopy. The anthers are tetrasporangiate, and the anther wall development is dicotyledonous type. A secretory tapetum is seen. The tapetum is dual origin and dimorphic. Meiosis is simultaneous. As a result of the second meiosis, tetrahedral type tetrads are formed. Mature pollen is expelled from the anther in three cells. The gynoecium is two-carpelled, syncarp, two-chambered. The placentation is apical. The ovule is anatropous, unitegmic and tenuinucellate. Usually three, rarely four megaspore mother cells form under the nucellus epidermis. As a result of the second meiosis, each megasporocyte forms linear tetrads. One of the megaspores at the chalazal side develops as the functional megaspore, the other megaspores are degenerated. After three mitotic divisions, the eight-nucleated and seven-celled monosporic Polygonum-type embryo sac develops. Before fertilization, the polar nuclei fuse to form the secondary nucleus. There are three antipodal cells are at the chalazal side and a cup-shaped hypostase develops. At the micropylar side, there is an egg apparatus consisting of two synergids and an egg cell. In this study, the embryological features of P. obtusifolium were reported for the first time, and it was determined that it showed the characteristics of the Apiaceae family in terms of these features.

Key words: Apiaceae, coastal celery, female gametophyte, male gametophyte, Peucedanum obtusifolium, rare species

MEDICINAL PLANTS GROWN IN KARS IN TURKEY

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ABSTRACT

In this study, medicinal plants grown in Kars region and used as folk medicine and food were investigated and detailed information about medicinal plants such as botanical characteristics, localities, active ingredients and local uses were given. Forests, lakes, river banks, meadows, mountains in the villages where medicinal plants are densely distributed in the centre and 8 districts of Kars province were selected as the study area. In 2023, firstly; literature investigation were made. After that, medicinal plants used as folk medicine by the people in Kars region were collected. The research was conducted in villages, hamlets, local markets and herbalists in Kars province and districts between 2023 and 2024. In April-May 2024, field studies were carried out and samples of the identified plants were collected and the plants were photographed. At the end of the study; 20 plants were collected and it was recorded which part of these plants, when and how they were collected and how they were used among the people against which disease.

Key words: Kars, medicinal plants, Turkey

COMFREY (SYMPHYTUM OFFICINALE L) ETHANOLIC EXTRACT AS A POTENTIAL COSMETIC INGREDIENT: CHEMICAL AND PHYSICAL EVALUATION

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ABSTRACT

Comfrey (Symphytum officinale L.) has a centuries-old tradition as a medicinal plant. Today, multiple randomized controlled trials have demonstrated the efficacy and safety of comfrey external preparations. In recent years, significant research has focused on evaluating the chemo-biological profile of comfrey. The aim is to broaden the medicinal applications of this genus to encompass new pharmacological uses and to discuss the toxicological effect of comfrey oral preparations considering pyrrolizidine content. Nevertheless, to date there are no previous report on volatile organic compound profile using gas chromatography coupled with mass spectrometry. According to the European Union herbal monograph, Symphytum officinale L., radix herbal preparation should be prepared using ethanol 65% (V/V) as extraction solvent. Prepared in this way, the liquid extract was tested for Volatile organic compounds profile, dynamic viscosity, pH value and antiradical activity. Using gas chromatography coupled with mass spectrometry, a total of 22 compounds were identified: Ethyl 3-(N-butylacetamido) propanoate, C-methyl-scyllo-inositol and lanosterol most abundant one. Conversely, 65% ethanolic extract allantoin content was under the limit of detection. The kinematic viscosity of the obtained extract was 2.25 ±0.06 mm2/s while pH value was 6.55. Antiradical activity, measured with the DPPH test was 59.96 ±0.45%. In conclusion, the 65% ethanolic extract prepared according to European Union herbal monograph standards showed low levels of allantoin, indicating a deviation from traditional expectations while at the same time, the extract demonstrated a wide range of volatile organic compounds and high antiradical activity, suggesting potential therapeutic benefits beyond its traditional uses.

Key words: comfrey; allantoin; volatile organic compounds

DESIGN AND APPLICATION OF AN AUTOMATIC PET FEEDER WITH TWO-WAY SPLITTER SUITABLE FOR GRID-CONNECTED OR SOLAR-POWERED USE

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ABSTRACT

Pet owners see their pets as a source of happiness. When they take care of their pets, they get rid of stress and start to feel better. Besides that, when they adopt a cat or a dog, pet owners take on various responsibilities, including feeding, sheltering, and regular veterinary check-ups. Pet owners like to take care of their pets by feeding them on time. However, the real challenge for most pet owners is feeding their pets when they are away from home, such as busy work schedules or business trips. For this reason, pet owners need an automatic pet feeder to solve the problem of feeding their pets. Especially pet owners who have more than one pet need the automatic pet feeder with high dry food capacity and the ability to dispense equal amounts of food. In this study, the automatic pet feeder designed to feed two dogs at the same time, which can be operated with both the solar energy and the power grid, is performed. The automatic pet feeder with two-way splitter basically consists of an ac-dc converter, 12 Volt photovoltaic (PV) panel, a solar battery charge controller, a battery group, digital timers, a DC motor, a DC motor controller, a sound system, 19 liter dry food reservoir and a food portion dispenser. If mentioned system is operated with the power grid, the ac-dc converter is used, but if it is operated with the solar energy, 12 Volt PV panel is used. With the design, the automatic pet feeder can be positioned both inside the house and in the garden. While it can be operated with the power grid when used indoors, it can be powered either by the solar energy or the power grid when used in the garden. Also, thanks to the battery group inside the automatic pet feeder, it is not affected by power outages or periods of time when the sun is not shining. The designed automatic pet feeder can be operated repeatedly in different time periods, 24 hours a day, 7 days a week, with digital timers. In addition, the amount of dry food to be given to pets at each meal can be easily adjusted by determining the rotation speed and rotation time of the food portion dispenser. Owing to its design, equal amounts of food are given to two dogs at the same time. Also, at each meal, the dogs are notified that it is time to eat with the music given by the sound system in the automatic pet feeder. As a result, this designed and implemented automatic pet feeder provides great convenience to pet owners as has a high dry food capacity, has a two-way splitter, can operated with both the solar energy and the power grid, and can easily adjust the number of meals and the amount of food. When pet owners are away from home, they do not need to ask anyone else for help to feed their pets by using this automatic pet feeder. In addition, pets are fed regularly.

Key words: Automatic pet feeder, Grid-connected system, Off-grid solar system, Renewable energy

DESIGN AND IMPLEMENTATION OF A SOLAR-BASED AUTOMATIC PET FEEDER AND WATER DISPENSER

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ABSTRACT

Nowadays, most people keep pets in their homes or gardens to reduce the negative effects of daily life such as loneliness, stress, boredom and unhappiness. Especially with the pandemic period, there has been an increase in the number of people taking care of pets. Pet owners assume very serious responsibilities. The most important of these responsibilities are to feed pets regularly and meet their water needs. In order for pets to live a healthy and long life, they need to have a regular eating and drinking schedule like humans. However, no matter how much pet owners enjoy taking care of their pets, they may not be able to feed their pets regularly due to some reasons, such as today's busy work schedule or business travel. To eliminate this problem, pet owners need automatic pet feeders and water dispenser systems. Additionally, people who care for their pets in the gardens or in rural areas where there is no electricity, want to use automatic pet feeders and water dispensers powered by renewable energy. In this study, an off-grid solar-based automatic pet feeder and water dispenser that can provide dry food and water is introduced. The offered system has two main functions, namely feeding and water giving, and these functions can operate both manually and automatically in various time periods, 24 hours a day, 7 days a week. The automatic pet feeder and water dispenser basically consists of 12 Volt photovoltaic (PV) panel, a solar battery charge controller, a battery group, digital timers, a DC motor, a DC motor controller, a sound system, 19 liter dry food reservoir, a food portion dispenser, a water level control circuit, a solenoid valve and 38 liter water tank. The water dispenser is always active. The water level in the water bowl is detected through minimum and maximum water level sensors. When the water level drops to the minimum, water flow is provided from the 38 liter water tank to the water bowl through the solenoid valve until the water level reaches the maximum. Additionally, the pet feeder can provide equal portions of dry food at different times of the day. Each pet's feeding amount is different. For this reason, the rotation speed and rotation time of the food dispenser in the automatic pet feeder can be easily adjusted, allowing pets to be fed with the ideal amount of food. Furthermore, the automatic pet feeder provides music during each meal, signaling to the pet that it is time to eat. As a result, this introduced system which works with renewable energy, provides serious convenience to pet owners due to its features such as having high dry food and water capacities, adjusting the portion size of meals, providing regular pet feeding, and not being affected by power outages. By using the proposed automatic pet feeder and water dispenser, there will be no need to leave pets elsewhere to be fed and to ask for help from someone else.

Key words: Automatic pet feeder, Automatic water dispenser, Off-grid solar system, Renewable energy

THE USE OF BLOCKCHAIN TECHNOLOGY IN TRACEABILITY SYSTEMS AND THE ROLE OF SMART CONTRACTS

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ABSTRACT

The aim of this study is to explore the potential of blockchain technology in enhancing food traceability and to share insights on the food supply chain and traceability issues. By leveraging academic and sectoral sources, the study seeks to provide a comprehensive understanding of the food supply chain, food safety, traceability systems, and blockchain technology. In the sectoral context, companies use traceability systems within their workflows, but for end consumers, traceability is mostly confined to food labeling directives. Large companies can relatively develop traceability systems, but small companies face challenges due to costs and IT resources. Traditional traceability systems, developed in a client-server architecture, act as a third party between the producer and the consumer. These systems, controlled by developer companies, fall short in ensuring transparency and traceability, leading to insecurity. We propose that the decentralized and distributed nature of blockchain technology can address this insecurity. Blockchain technology is a decentralized, distributed, and transparent ledger. It is notable for reliable data storage, traceability, verification, and automatic contract execution. Effective management of traceability processes is critical for the food supply chain and safety. Using blockchain technology as a ledger can tackle traceability issues and ensure accountability. By immutably storing data and enabling fast tracking at various stages of the food supply chain, blockchain can enhance transparency in the food industry. In conclusion, the literature reveals various architectural and system proposals using blockchain and smart contracts in the food supply chain, offering new solutions. The success of these proposed systems and architectures suggests that blockchain technology is an inevitable approach to solving existing problems and becoming a crucial link in the food supply chain. This study will provide an overview of food traceability through the topics of Food Supply Chain and Safety, Traceability Systems, Blockchain Technology and Smart Contracts, while also offering suggestions and future perspectives under Innovation Proposals and Future Perspectives.

Key words: Food Supply Chain, Food Traceability, Blockchain Technology, Food Safety, Smart Contracts

COMPARATIVE ANALYSIS OF HORIZONTAL AND VERTICAL AXIS WIND TURBINES IN EDIRNE-TURKEY

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ABSTRACT

In Turkey, where residential electricity consumption accounts for more than 20% of the total electricity consumption, it is becoming increasingly important to use renewable energy sources for micro-scale electricity generation. In this study, two different micro-scale wind power generation systems that can be integrated into buildings have been installed. The performance of these systems is investigated theoretically and experimentally for real field conditions. As part of the study, a hybrid system consisting of a horizontal axis wind turbine and a vertical axis wind turbine with electricity storage and grid connection was installed at the Renewable Energy Systems Test Site of the Faculty of Engineering, Trakya University, and the electricity production of these systems was monitored for a period of two years. The data obtained was used to determine system performance and energy production. According to the measurement and analysis results, the HAWT system produced 153% more electricity in December 2020 and 168% more electricity in January 2021 than the VAWT system.

Key words: Horizontal axis wind turbine, Vertical axis wind turbine, Wind energy, Off-grid

APPLICATION OF OFF-GRID PHOTOVOLTAIC AND PHOTOVOLTAIC/THERMAL SYSTEMS IN EDIRNE-TURKEY

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ABSTRACT

In photovoltaic systems, the increase in panel temperature is one of the main factors that reduces efficiency. Each 1ºC increase in the temperature of the photovoltaic panel reduces electricity production by 0.45%. In this study, off-grid photovoltaic (PV) and photovoltaic/thermal (PV/T) systems are demonstrated in a low-capacity, low-slope roof application in Edirne, Turkey, and the effect of panel temperature on system performance is investigated by analysing the measurements taken simultaneously under the same environmental conditions. The PV/T system uses an air-heated solar collector with a perforated absorber panel. According to the results of 1 month measurements, in January 2021, the PV system produced 7.9 kWh of electricity and the PV/T system produced 11.3 kWh of electricity. The PV/T system produced 41.5% more electricity. The PV/T system also produced 138.24 kWh of thermal energy.

Key words: Photovoltaic, Photovoltaic/Thermal, Solar energy, Off-grid

INVESTIGATION OF PADDY DRYING MACHINES AND ENERGY SOURCES USED IN DRYING

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ABSTRACT

The moisture content of the paddy plant after harvest is over 20%. This moisture content is not suitable for storage and processing. Therefore, the paddy plant needs to be dried. Approximately 600-1000 kg of paddy is harvested from an average of one acre of field. Drying must be fast for paddy harvested in large areas. Drying machines are used for this purpose. There are fixed or portable drying machines for paddy drying. These machines perform the moisture removal process by transferring hot air to the product with the support of a heat source. The paddy moisture removal process must be done at a certain time so that it does not damage the product. Therefore, the drying process of the machines is controlled. Various energy sources are used to provide hot air while drying with hot air. While it is possible to use energy sources such as electricity and fuel oil, they are less preferred due to the cost parameter. Drying can be done by burning coal or organic fuels efficiently. In this study, the structure and drying principles of paddy drying machines will be discussed. In addition, the energy sources used in these machines will be discussed.

Key words: Paddy Drying, Energy Sources, Dryer Machine

A REVIEW ON SENSOR TECHNOLOGY USED IN SMART AGRICULTURE

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ABSTRACT

With the increasing population, the demand for food is also rapidly growing. To meet this demand and enhance current agricultural productivity, smart farming systems provide a viable solution. Smart farming systems are an innovative approach that revolutionizes the agricultural sector by making agricultural processes more efficient and sustainable through the use of sensors and other advanced technologies. Sensors are devices that detect changes in the agricultural environment and collect data, helping farmers make more informed decisions. Sensors used in smart agriculture provide important data by monitoring various environmental and biological parameters. These sensors, which monitor light, temperature, soil moisture, CO2 emissions in the air, plant health, and soil nutrient analysis, offer significant insights for optimizing agricultural activities. For example, soil moisture sensors continuously monitor soil moisture levels, allowing for more efficient use of irrigation systems. This not only conserves water but also prevents plants from experiencing water stress. The advantages offered by smart farming systems enhance the sustainability of agricultural production and strengthen food security. The data collected by sensors enable more informed and efficient decision-making at every stage of agricultural activities. For instance, optimizing irrigation systems ensures more effective use of water resources. Similarly, optimizing fertilization and pesticide programs helps reduce chemical usage and minimize environmental impact. In this context, the potential impacts of advancements in sensor technologies on the agricultural sector are of great importance. By using these technologies, farmers can develop more sustainable and efficient farming practices and increase food production. Moreover, the widespread adoption of these technologies can accelerate the digital transformation in the agricultural sector and facilitate the establishment of smarter farming systems. This study examines the advancements in various sensor technologies used in smart agriculture, such as soil moisture sensors, light sensors, weather sensors, plant health sensors, and soil nutrient analysis sensors. The data provided by these sensors contribute to the more effective and sustainable management of agricultural activities. The knowledge gained from this study serves as a guide on how to monitor the status of the enterprise, equipment efficiency, and other factors using continuously collected data on weather conditions, soil quality, and plant health from sensors used in smart agriculture.

Key words: Smart farming systems, sensors, traceability

VIBRATION ANALYSIS OF TPMS BEAMS

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ABSTRACT

The aim of this study is to perform vibration analysis of truss structures with different cell models. Open source design programs are used to create different cell models for truss structures. The cell models will be transferred to NX design programme and beam geometry with truss structure will be created. Vibration analysis will be performed using Ansys and Simcenter 3D software to determine the natural frequencies of these beams.

Key words: TPMS, Vibration, NX, Simcenter

FREQUENCY OF USE OF MACHINE LEARNING METHODS IN VARIOUS SCIENTIFIC FIELDS

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ABSTRACT

Researchers who use artificial intelligence techniques in their studies have carried out academic studies by specifically incorporating machine learning, which is a sub-branch of this field, into their studies. In these studies, stereotyped algorithms in machine learning were generally used. The algorithms, models and methods used have tasks such as regression, classification, clustering and dimensionality reduction. Related studies vary depending on the area used and the needs. In this study, data about the algorithms, models, methods and usage amounts used in the publications published between 2019 and 2023, where the concept of machine learning is available in the DergiPark database, were processed and tables regarding the usage amounts were made, and a detailed comparison was made about how frequently the algorithms, models and methods were used in which areas. Data were collected in three main areas: science, social and health. Science and social sciences are also divided into subfields. 692 articles were scanned: 273 articles in science, 259 articles in social sciences, and 160 articles in health sciences. 39 of these studies belong to the agricultural field. The algorithms used in studies in the field of agriculture are mainly of the supervised learning type, and deep learning has an important place in this field. The aim of the study is to shed light on which machine learning method can be used more efficiently for researchers in this field.

Key words: Artificial Intelligence, Machine Learning, Agriculture, Data, Statistic

EXPLORING THE IMPACT OF TRANSFORMERS AND STATE SPACE MODELS IN LANGUAGE AND SEQUENCE PROCESSING

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ABSTRACT

In the field of machine learning, the sequential processing technique used especially in natural language processing and the attention mechanism, which has become popular recently, direct the sector and the world of informatics. These two techniques have become even more important with their transformer and space state model architectures. Space state models also appear in finance, signal processing, and control systems. The strong prediction of the converter architecture and its resistance to long-term dependency when used, as well as the dynamic operation and speed of the space state models depending on the variables of the system, play a major role in this regard. Although these architectures are important in the field of natural language processing, they have also been used in science where sequential processing is important, such as bioinformatics. In this study, technical information about the architectures and the studies in the literature are given by comparing these two architectures, which are used in many fields.

Key words: Machine Learning, Transformers, Space State Models, Sequential Processing

TOMATO DISEASE IDENTIFICATION USING DEEP LEARNING

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ABSTRACT

Given the critical role of agriculture in the economy, early detection of plant diseases is essential for boosting production efficiency and minimizing losses. This research aims to use deep learning methods to detect and identify healthy leaves and eight different types of diseases in tomato plants, which are significant in the agricultural sector. We compared three deep learning models, trained using robust methods and libraries like YOLO, PyTorch, and Keras TensorFlow, to determine the model with the highest performance. Our dataset comprises 6493 images, with about 1000 collected from the Roboflow platform and around 2500 collected by visiting a hydroponic tomato greenhouse company in Aydın, Türkiye. We generated the remaining images using data augmentation techniques like reflection, shifting, zooming, resizing, brightness adjustment, and noise addition. These techniques enhanced the dataset and mitigated potential overfitting issues, ensuring the reliability of the models. Among the models tested, YOLO achieved an accuracy of 86.1%, PyTorch 81.8%, and Keras 84%. Because of its superior performance, YOLOv8 appears to be the best-performing model. The rapid and accurate detection of tomato plant diseases through deep learning has enormous potential to enhance agricultural productivity and minimize economic losses. Our findings are particularly beneficial for greenhouse owners in Agriculture-Based Specialized Organized Industrial Zones (OIZSA), enabling more effective management of tomato production.

Keywords: Agriculture, deep learning, organized Industrial Zones, disease, tomato

FLIGHT ALTITUDE AND CAMERA RESOLUTION CHARACTERISTICS OF UAV IMAGES IN ENDEMIC PLANT DETECTION

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ABSTRACT

The conservation of endemic plants is very important for the diversity of flora and their use in medicine. The fact that some endemic plants are endangered due to various reasons increases this importance even more. For this reason, endemic plants need to be identified and protected. The identification process can sometimes take much longer due to regional conditions. In order to prevent this, an algorithm that detects endemic plants in a region with UAV images will make this process much easier. In order for the algorithm to detect the plants of the region, it must first be trained. Since the training data will be from UAV images, the altitude and camera resolution of the UAV images will be of great importance. Because if the pixel quality is low, the endemic plant will not be able to show its distinctive features with other objects in the region and the plant will not be detected.

Key words: Endemic Plants, Detection Algortihm, UAV, Camera Resolution, Flight Altitude

APPLICABILITY OF DATA AUGMENTATION TECHNIQUE IN ENDEMIC PLANT IDENTIFICATION ALGORITHMS

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ABSTRACT

Endemic plants are plants that are distributed in a narrow area and belong only to a certain region. For this reason, they need protection due to their flora diversity and their use in the field of health. Endemic plants can be easily identified and protected by algorithms that can detect them from UAV images. The rarity of most species of endemic plants can make it difficult to create such algorithms. The data set is of great importance in algorithm training. It is only possible for an algorithm to achieve a high level of detection with a large number of data. The rarity of endemic plants will ensure that the image data to be captured will be small, thus making it difficult to train the endemic plant detection algorithm. However, this problem can be solved with various data augmentation methods. In this way, the small number of image data can be increased with data augmentation methods to reach a sufficient number for training.

Key words: Data Augmentation, Endemic Plant Detection, UAV Imagery, Algorithm Training, Algortihm Datasets

OPTIMIZATION OF ZNO-DOPED SILVER NANOCOMPOSITE SYNTHESIS USING DESIGN OF EXPERIMENTS

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ABSTRACT

The optimisation of the synthesis, through the methodology of experimental designs, makes it possible to significantly reduce the number of practices and, consequently, the time and financial costs.
The aim of our study is the synthesis of a ZnO/Ag nanocomposite by chemical co-precipitation, whose desired feature is a small size, which gives it a better antibacterial activity. Factors such as precipitant concentration, calcination temperature and doping percentage can have a significant influence on the size of the synthesised nanocomposite. The interactions between the different synthesis parameters are complex and in order to find the best combinations between them in order to control the size of the synthesised nanocomposites, it is necessary to organise an experimental methodology associated with an experimental design to determine the key factors that will allow the elaboration of small ZnO/Ag nanocomposites with better antibacterial activity.
The use of the full factorial design with 3 factors and 2 levels was carried out with the 8 (23) possible combinations aimed at establishing and analysing the relationships existing between the size (response) and the summary factors, by determining the influential factors. synthesis process, and evaluating the interactions between these factors.
The results show that the concentration of the precipitant and its interaction with the doping rate are the most significant terms, and the use of the established mathematical model allows us to predict the response at within the study area.

Key words: nanocomposite ZnO/Ag, coprecipitation, optimisation, experimental designs

CHEMICAL PROFILING, ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF THE LIPOPHILIC EXTRACT FROM THE ALGERIAN CISTUS SALVIIFOLIUS SPECIES

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ABSTRACT

The aim of this work was to evaluate the lipophilic content as well as the antibacterial and antioxidant potentials of petroleum ether extract (PEE) of Algerian C. salviifolius for the first time. Cistus salviifolius (Cistaceae) is widely distributed in North Africa. In Algeria, its infusions are used to treat diabetes, rheumatism, and gastrointestinal disorders. Identification and quantification of the PEE content were conducted by GC-MS method. Three in vitro tests: DPPH, ABTS+°, and β-carotene linoleic acid bleaching assay were used to evaluate the antioxidant activity. Antibacterial activity was tested against Gram-positive and Gram-negative strains. Fourty-seven (47) compounds were identified and quantified. The predominant metabolite was the clerodane diterpene, kolavenic acid, accounting for 34.61% of the total identified terpenes. The lipophilic extract of C. salviifolius shows very strong antibacterial activity against the tested pathogenic strains as well as a promising antioxidant potential. This species can be used in the development of novel antibacterial agents.

Key words: Cistus salviifolius, lipophilic composition, GC-MS analysis, antibacterial activity, antioxidant activity.

ANTICHOLINESTERASE ACTIVITY AND CHEMICAL COMPOSITION OF SCHINUSGENUS ESSENTIAL OIL

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ABSTRACT

Aromatic plants have long been popular sources of pharmaceutical agents and food additives. Their essential oils and isolated components further extend their utility, contributing asflavorings in food products, fragrance components in perfumes and aftershaves, andfunctionally beneficial additives in pharmaceuticals. Among the most popular plants known as source of the spice, Schinusspeciesare characterized by their pungent-smelling essential oils. These oils are concentrated primarily in the fruits and are produced and stored within specialized plant structures like secretory cells, tissues, and glandular trichomes. The members of Schinusgenus (FamilyAnacardiaceae) comprise approximately 29 species are native to South America and has been introduced to most of the tropical and subtropicalareas of the world.
The aim of this study was to identify the chemecical composition of essential oil of Schinusgenus by GC/MS analysis and to compare the results to bibliographic data in the world as well as the identification of the geographical distribution of chemotypes in Algeria. The freshleaves of Schinusgenus were subjected tohydro-distillation in a Kaiser Lang apparatus, the oil obtained was analysed by GC-MS. As aresult, 19 compounds, accounting for 95.72% of the total oil, were identified. Themajor constituents of the oil were cymol (15.35%), eudesm-4(14)-en-11-ol (12.56%), dl-limonene (12.29%), cyclohexanemethanol,4-ethyl (10.78 %) and a phellandrene (10.29%). Furthermore, the essential oil was screened for their anticholinesterase activity against acetylcholinesterase and butyrylcholinesterase which are the chief enzymes of Alzheimer's disease. The result showed strong activity against butyrylcholinesterase, therefore it could be useful to provide good anticholinesterase agent.

Key words: Aromatic plants, essential oils, GC-MS, Schinus species, anticholinesterase activity

SESQUITERPENE LACTONES FROM ALGERIAN CENTAUREA OMPHALOTRICHA

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ABSTRACT

The genus Centaurea belongs to the Asteraceae family, a large genus containing approximately 700 species. Is the fourth largest genus in this family largely centered in the Mediterranean region and South-West Asia. In Algeria, the genus is represented by 45 species, seven of which occur in the Sahara Desert . The genus Centaurea has been subjected to several phytochemical examinations revealing biologically active secondary metabolic compounds, particularly sesquiterpene lactones. In continuing our investigation on the chemical diversity of Algerian plants, we examined Centaurea omphalotricha, whose chemical composition has been poorly studied. The present work was aimed at characterizing the secondary metabolite pattern of the CHCl3 extract of the aerial parts of this plant that displayed antiproliferative properties in a preliminary screening on HeLa cell line. The chemical analysis led us to characterize a series of compounds belonging to different structural groups including sesquiterpenoids and polyphenols. Among these, two new minor compounds, centaurolide-A (1) and -B (2), with the 12,8-guaianolide framework that has never been reported from the genus Centaurea to date, were isolated.The effect of newcompounds 1 and 2 on HeLa cell has also been evaluated.

Key words: plant secondary metabolites; sesquiterpene lactones; Asteraceae; spectroscopic methods

SEASONAL VARIABILITY IN THE VOLATILE COMPOSITION, WATER CONTENT AND INORGANIC ELEMENTS OF CEDRUS ATLANTICA (MANETTI EX ENDL.) COLLECTED FROM THE ALGERIAN AURÈS MOUNTAINS

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ABSTRACT

This work examined the volatile profile, mineral content, and water content of the aromatic species Cedrus atlantica gathered in the Algerian Aurès zone during the summer. The presence of fifty-seven (57) compounds in C. atlantica oil was revealed by GC-MS and GC-FID analyses, with the major compounds being caryophyllene oxide (35.1%), humulene-2-epoxide II (7.1%), 14-hydroxy-Z-caryophyllene (6.6%), α-terpineol (4.7%), dodecanol (2.3%), and tricosane (2.2%). Furthermore, the species had high water content (11.5%), and ICP-MS data revealed that Mg, Al, Ca, K, Na, S, and Fe were the primary inorganic elements in C. atlantica dry material and crude extract, with low trace element content. In fact, a considerable variation in the volatile composition was observed for our sample compared to the same sample composition collected during the winter from the same area, which might support the impact of collecting time and extraction procedure on chemical composition. These findings might advance our knowledge of the composition of this species and turn it into a valuable future food and medicinal source.

Key words: Cedrus atlantica, water content, GC-MS and ICP-MS.

SECONDARY METABOLITES AND THE CHEMOTAXONOMIC SIGNIFICANCE OF THE ISOLATES FROM CENTAUREA DILUTA AIT. SUBSP. ALGERIENSIS (COSS. & DUR.)

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ABSTRACT

The phytochemical study of the aerial parts of Centaurea diluta Ait. subsp. Algeriensis (Coss. & Dur.) led to the isolation of nine secondary metabolites: β-sitosterol, six flavonoids: eupatilin, jaceosidine, pectolinaringenin, galetin 3,6-dimethyl ether, hispiludin and quercetin, a coumarin: scopoletin, and a sesquiterpene lactone: cebelin G. Spectroscopic methods such as 1H and 13C NMR, COZY, NOESY, HSQ and HMBC studies, as well as comparison with literature data, were used to identify the structures. The chemotaxonomic significance of the isolates was discussed. What stands out from this study is that the majority of these compounds were isolated from C. diluta for the first time. This contributes significantly to expanding our knowledge in this area. It should be noted, however, that some of these compounds have already been identified in other species of the Centaurea genus. But the compound: galetin 3,6-dimethyl ether has not yet been isolated from other Centaurea species; it could act as chemotaxonomic markers, for C. diluta subsp. algeriensis.

Key words: Centaurea diluta Ait. subsp. Algeriensis, Secondary metabolites, Chemotaxonomic significance.

RHUS PENTAPHYLLA: LC-MS/MS PHYTOCHEMICAL PROFILING, AND EVALUATION OF THE ANTIOXIDANT, HYPOGLYCEMIC, AND ANTIBACTERIAL PROPERTIES OF THE AERIAL PART EXTRACTS.

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ABSTRACT

To promote the valorization of aromatic and medicinal plants from Morocco, the present study has focused on the phytochemical analysis and exploration of the biological activities of Rhus pentaphylla from Morocco, often known as "Tizgha". This plant belongs to the Anacardiaceae family that comprises around 70 genus divided into 650 species, it grows in various geographical regions of Morocco. The genus Rhus, which is the most abundant genus of the family, is well-known for its pharmacological activities, including antitumor, hypoglycemic, antiacetylcholinesterase, and antidiarrheal effects. The roots, leaves, and bark of the species Rhus pentaphylla are used in traditional pharmacopeia to treat diarrhea, gastric and gastrointestinal disorders, abdominal colic, and eczema. The study was carried out on the aqueous, ethanolic, and hydro-ethanolic extracts of the aerial plant. The LC-MS/MS analysis of Rhus pentaphylla aerial part extracts allows the identification of 39 compounds. Notably, major constituents were Chlorogenic acid, Cryptochlorogenic acid, Quercetin glucuronide, and Isorhamnetin rutinoside. Additionally, the antioxidant activity of the extracts, as determined by the DPPH and FRAP methods, appears to be interesting. The study of tyrosinase and a-amylase enzyme inhibition activity of the three extracts showed significant inhibition. Moreover, the antibacterial activity study of R. pentaphylla extracts against five bacterial strains affirmed that the ethanolic extract has an inhibitory effect against P. aeruginosa.

Key words: Rhus pentaphylla, Antioxidant activity, Antidiabetic activity, Antibacterial activity, tyrosinase, LC-ESI-MS/MS

PHYTOCHEMICAL STUDY AND BIOLOGICAL ANALYSIS OF AN ALGERIAN MEDICINAL PLANT

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ABSTRACT

The Artemisia genus includes around 400 species distributed across five continents. There are 10 species in Algeria, some rare and others very widespread. Artemisia herba-alba, or white wormwood, called "Chih" in Arabic, is a plant in the Asteraceae family that generally grows in small clumps and is widely used in traditional medicine. In this study, the sample was collected in the Djelfa region of Algeria. It has been the subject of a phytochemical study of its extracts and its essential oil, with an evaluation of their antioxidant potential and their antimicrobial activity. The extraction of polyphenols from the three extracts ($CHCl_3$, $CHCl_3$/MeOH and MeOH) on the species studied showed that the highest yield was obtained by the chloromethanolic extract, and that the extraction of the oil was carried out by hydrodistillation . The plant tested had an essential oil yield of 0.86%. This study consisted of a chemical screening of the aerial parts of Artemisia herba alba, where the presence of several chemical groups was revealed: flavonoids, tannins, quinones, anthraquinones, saponins, terpenes, triterpenes and sterols. The quantitative estimation of total polyphenols and flavonoids in the three extracts analyzed shows that they are rich in metabolites, the chloromethanolic extract having the highest content at 44 µg EAG/mg PS and the flavonoids at 13.08 µg EQ/ mgPS. The three extracts and the essential oil were examined in vitro for their antioxidant activity using the DPPH method and for their antibacterial and antifungal activity using dilution and disk diffusion methods. Artemisia herba-alba essential oil has the highest antioxidant capacity after the more polar chloromethanolic extracts, with methanolic extract following very closely, while the activity of chloroformic extracts is too low. The extracts showed good antifungal activity for methanol and good antimicrobial activity for chloroform, while the chloromethanolic extract had medium antimicrobial activity. In the case of our essential oil, we observe excellent antimicrobial and antifungal activity.

Key words: Artemisia herba alba, DPPH, Essential oil, Antibacterial and Antioxidant activities.

INVESTIGATION OF ANTIOXIDANT ACTIVITY OF ERICA SICULA SUBSP. LIBANOTICA GROWING IN TURKEY

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ABSTRACT

Introduction: Throughout history, many societies have consumed different parts of plants as food and used them to treat various diseases. Turkey has a rich flora due to its geographical location and climatic characteristics and is one of the richest countries in the world in terms of medicinal plant diversity. *Erica* species that are members of the Ericaceae family present in the flora of Turkey and known by common names such as "funda", "püren" or "süpürge çalısı", are consumed as a tea in folk medicine and used for the treatment of diabetes, stomach disorders, hypertension, kidney disorders and wound healing. In this study, the antioxidant activity of *Erica sicula subsp. libanotica*, which has a limited spread in Turkey, was investigated. **Materials and Methods:** Leaves, flowers and aerial parts of *Erica sicula subsp. libanotica* were extracted with solvents of increasing polarity including hexane, dichloromethane, methanol and aqueous and 12 extracts were obtained. The antioxidant activities of the extracts were examined. Antioxidant activity was determined by four different methods: DPPH free radical scavenging, ABTS cation radical scavenging, CUPRAC reducing power and Metal chelating activity. **Results and Conclusion:** The antioxidant activity of all extracts indicated that the most effective result was current in the aqueous extracts of the plant. Especially the aerial parts aqueous extract was found to be the best in terms of DPPH and ABTS radical scavenging, CUPRAC reducing power and metal chelating effect and IC_{50}= 8.08±0.40 µg/mL, IC_{50}= 5.93±0.17 µg/mL, $A_{0.50}$= 19.53±0.35 µg/mL, IC_{50}= 57.90±1.50 µg/mL, respectively. Moreover, it was established that methanol and aqueous extracts obtained from leaves, flowers and aerial parts of the plant had higher activity than the standard antioxidants α-tocopherol (IC_{50}=38.15±0.45 µg/mL) and BHA ($A_{0.50}$=25.50±0.43 µg/mL). The results showed that *Erica sicula subsp. libanotica*, a medicinally valuable plant in Turkey, exhibited significant activity on oxidative stress and may be a promising source of antioxidants.

Keywords: *Erica sicula subsp. libanotica*, antioxidant, DPPH, ABTS, CUPRAC, Metal chelating

PHYSICOCHEMICAL AND MINERAL ANALYSIS OF HONEY FROM THE TLEMCEN REGION

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ABSTRACT

Background: Honey is a complex biological compound with diverse nutritional and therapeutic properties. Understanding its quality and characteristics is crucial for ensuring its safety and efficacy. Objective: The study aimed to verify the quality of 18 honey samples collected from the Tlemcen region (Algeria) through comprehensive physicochemical and mineral analyses. Methods: Approximately ten physicochemical analyses were conducted on each honey sample, assessing parameters such as humidity, pH, free acidity, hydroxymethylfurfural (HMF), electrical conductivity, sugar content, proline levels, optical rotation, and color. Additionally, mineral content analysis was performed to determine the floral origin and variability of the samples. Results: The majority of the physicochemical parameters measured were in accordance with the standards set by the Codex Alimentarius. The mineral analysis indicated that the variability in mineral content could be attributed to geochemical and geographic differences. Importantly, all detected elements were found to be below safety thresholds. Conclusion: The honey samples from the Tlemcen region largely meet international quality standards, and the mineral content analysis provided insights into their floral origins. These findings affirm the quality and safety of the honey produced in this region.

Key words: Honey quality, physicochemical analysis, mineral content, floral origin, Tlemcen REGION

INHIBITORY EFFECTS OF SOME CARNOSOL AND CARNOSIC ACID DERIVATIVES ON LACTOPEROXIDASE USING A STATISTICAL MODELLING APPROACH: AN IN VITRO AND IN SILICO ASSESSMENT

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ABSTRACT

Lactoperoxidase (LPO; EC.:1.11.1.7), an antioxidant enzyme, is favored in both cosmetic and clinical practices. The present study delved into assessing the in vitro inhibition kinetics of selected carnosol and carnosic acid derivatives on LPO. In the first step, LPO was purified 268.817-fold with the help of Amberlite CG-50 H+ resin, as well as Sepharose 4B-L-tyrosine-5-amino-2-methyl-benzenesulfonamide affinity chromatography, yielding 18.51% and specific activity of 806.451 EU/mg protein. The molecules showed IC50 values between 1.017-4.0 μM, while the Ki values were between 34.64 ± 1.93-392.9 ± 59.3 μM. The second step was an in silico study to predict these compounds' inhibition mechanisms. Isorosmanol and carnosol were the most effective ligands on the LPO receptor, with estimated free binding energies of -8.69 kcal/mol and -8.47 kcal/mol, respectively. The statistical model developed in the third step showed that the inhibition of the molecules was dependent on the hydroxylation at position C7, methylation of the hydroxyl group at C12 and carboxylation at C5.

Key words: Lactoperoxidase, carnosic acid, inhibition, molecular docking, statistics

DENSITIES AND EXCESS MOLAR VOLUMES FOR THE BINARY MIXTURES OF 1,2-DICHLOROALKANE WITH 1,3-DIOXOLANE AND 1,4-DIOXANE AT DIFFERENT TEMPERATURES

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ABSTRACT

Experimental data of excess thermodynamic properties, for liquid mixtures, are essential for good design of industrial chemical process and for the development of models describing the thermodynamic behaviour of these mixtures. Excess volume represents, besides many important properties, a good thermodynamic tool to explore the behaviour of liquid mixture.
Chloroalcanes and ethers represent not only two technically important classes of compounds, but also, from a theoretical point of view, two interesting families of molecules. Indeed, Ethers are also industrially important solvents used in several chemical reactions. So, 1,4-dioxane, a cyclic diether with a zero dipole moment, is a good aprotic solvent. Moreover, chloroalcanes, ethers, and their mixtures are used as fuel additives, resulting from increasing fuel demand, environmental concern and occasional oil crises. This work is a theoretical, experimental and theoretical study of the volumetric properties of binary liquid systems 1,2-dichloroethane + Cyclics Ethers (1,3-Dioxolane, 1,4-Dioxane). The first experimental part of this study begins with a determination of the excess molar volumes of the binary systems studied, from the densities of the liquid mixtures and pure constituents, at several temperatures between [283 and 303] K determined by the Densitometric experimentan al technique ogine-with vibrating tube. The second theoretical part of this study consists of pplication of the PrigFlory-Patterson theoretical model to the studied binary systems.

Key words: Densities, mixtures, exess molar, ethers, Flory Patterson theory

SYNTHESIS OF DERIVATIVE COMPOUNDS OF CHOLAPHANES USING THE CLICK METHOD AND DETERMINATION OF THEIR STRUCTURES WITH SPECTRAL DATA

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ABSTRACT

For organic chemists, the synthesis of cholaphane derivative compounds, which have different properties and cavities depending on the characteristics of the groups they contain, is of significant interest. Therefore, in our study, the synthesis of novel cholaphanes was carried out by the click method using lithocholic acid and chenodeoxycholic acid. 2,6-bis(azidomethyl)pyridine was used as the binding intermediate group to obtain cholaphane. In the study, firstly, the carboxylic acid groups on lithocholic acid and chenodeoxycholic acid were reduced to alcohol groups using lithium aluminum hydride. Alcohol groups attached to carbons 3 and 24 on the cholane were converted into esters in the presence of DCC (dicyclohexylcarbodiimide) and DMAP (dimethylaminopyridine) using 4-pentionic acid. In order to produce cholaphane derivative compounds, 2,6-bis(azidomethyl)pyridine and 3,24-di(4-pentinyloxy) cholane were finally treated to a click reaction in the presence of copper. The structures of these compounds were elucidated by taking 1H-NMR, 13C-NMR, and HR-MS spectra. Although they were observed as single spots in thin layer chromatography (TLC), the resulting structures were observed to be dimer and trimer based on the HR-MS data. These compounds are thought to be formed from the interwoven structures present in the structure of cholaphanes.

Key words: click, bile acid, cholaphane

STUDY OF THE PHOTO-DEGRADATION OF A YELLOW TEXTILE DYE BEZACRYL WITH PURE AND ZINC-DOPED TIO2 CATALYSTS

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ABSTRACT

Heterogeneous photo-catalysis has become a much-studied field in recent decades, due to its great potential for solving environmental pollution problems and the global energy crisis. In order to better understand this technique and its practical applications, we have carried out a study on the photo degradation of a yellow textile dye bezacryl, with pure and Zinc-doped TiO2 catalysts at different concentrations, which are elaborated by the sol-gel method, and characterized by several techniques among them: DRX, UV-visible and FTIR. The DRX study showed that pure TiO2 exhibits an anatase structure, while Zn/TiO2 shows no phase change at other zinc doping concentrations. FTIR analysis revealed the presence of OH groups, promoting the photo-catalytic reaction, while UV-visible spectra showed that the optical gap increases with increasing doping. The photo-degradation of the yellow bezacryl dye was studied as a function of several parameters: doping effect, dye concentration, photo-catalyst mass. We found that the dye was eliminated at 98.4% in 180 min with the 2% zinc-doped TiO2 catalyst, following first-order kinetics.

Key words: photo-catalyst, textile dye, sol-gel, dioxyde of titane (TiO2), zinc, doping

ELECTROBLOWN AND ELECTROSPUN POLY(E-CAPROLACTONE)/POLY(P-PHENYLENEDIAMINE)/MANGANESE OXIDE NANOFIBERS

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ABSTRACT

Many studies have been conducted to develop new methods for the production of nanofibers. In addition to traditional nanofiber production methods such as electrospinning, electroblown spinning (EBS) is an emerging hybridized nanofiber production technology that is of great interest for its inclusion in various applications. EBS is a hybridized nanofiber production process that combines the driving forces of solution-blown spinning (SBS) and electrospinning. In this study, manganese oxide was first synthesized from manganese salt, and then poly(p-phenylenediamine)/manganese oxide composites were synthesized by oxidative polymerization. Then, both electroblown and electrospun nanofibers were produced with poly(e-caprolactone) by taking different ratios of poly(p-phenylenediamine)/manganese oxide composites. The morphological properties of these nanofibers were compared. Electrospun nanofibers were found to have smaller diameters and fewer beads than electroblown nanofibers.

Key words: Electroblown spinning; Electrospinning; Poly(p-phenylenediamine); Manganese oxide

EXPLORATION OF THE ADSORPTION CAPABILITY BY DOPING CCP'S@FE3O4 NANOCOMPOSITES (NCS) TO EFFECTIVELY REMOVE DYES FROM SYNTHETIC WASTEWATER: OPTIMIZATION USING BBD-RSM

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ABSTRACT

The environmental impact of dye effluents, released by various dye-using industries such as textiles, leather, paper, and cosmetics, is significant due to the toxic and recalcitrant nature of dyes. To completely eradicate or significantly lessen this issue, it is imperative to implement long-term, sustainable methods for treating these effluents. Effective treatment of dye-containing wastewater is crucial to mitigating its detrimental effects on ecosystems and human health. If untreated, these effluents can lead to severe pollution, harming aquatic life and potentially contaminating drinking water sources. The presence of dyes in industrial effluents or their infiltration into drinking water supplies poses a major public health concern due to their potential for bioaccumulation in the human body, which can lead to various health issues, including cancer and organ damage. The use of plant extracts for the synthesis of bio-nanoparticles, known as green synthesis, represents a promising alternative to conventional synthesis methods. Green synthesis is favored for its environmental sustainability, cost-effectiveness, low energy consumption, ease of production, and eco-friendliness. Plant extracts contain bioactive compounds that can reduce metal ions to nanoparticles, providing a greener and safer approach to nanoparticle synthesis. The purpose of this research was to enhance the adsorption process of dye removal by utilizing bio-nanocomposites synthesized through green methods. Initially, the effects of individual experimental parameters, such as pH, temperature, initial dye concentration, and contact time, were investigated to understand their impact on the adsorption efficiency. Subsequently, the optimization of these experimental factors and their interactions was systematically studied using the Box–Behnken Design (BBD) based on response surface methodology (RSM). This approach aimed to achieve the maximum removal efficiency of dyes by determining the optimal conditions for the adsorption process.

Key words: Nanocomposites; Removal efficiency; Adsorption process; Green synthesis; Box-Behnken Design; Wastewater treatment; Response surface methodology; Industrial effluent

APPLICATION OF RAW-BIO-MATERIAL FOR THE REMOVAL OF INDIGO CARMINE DYE FROM SYNTHETIC WASTEWATER: OPTIMIZING EXPERIMENTAL CONDITIONS

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ABSTRACT

The environmental impact of dye effluents, particularly indigo carmine dye, from various industrial sources, is substantial due to their toxic and persistent nature. Effective treatment methods for these effluents are essential to mitigate their harmful effects on the environment and human health. One promising approach is the use of raw bio-materials for dye removal from synthetic wastewater. These materials are favored for their sustainability, cost-effectiveness, and eco-friendliness. Moreover, many anionic dyes commonly used in textiles, clothing, printing, and dyeing processes are hazardous and toxic to various organisms. As a result, several techniques, such as photocatalysis, ozonolysis, membrane separation processes, the Fenton process and adsorption, have been explored for dye removal from wastewater. Adsorption, a wastewater treatment process that exploits the ability of certain solids to concentrate specific substances on their surfaces, is widely utilized in treating textile effluents. This research focuses on optimizing the application of raw bio-materials for the adsorption and removal of indigo carmine dye from synthetic wastewater. Initially, the effects of individual experimental parameters, including pH, temperature, initial dye concentration, and contact time, were systematically investigated to determine their impact on adsorption efficiency. Subsequently, the optimization of these experimental conditions was carried out using advanced statistical methods, such as the Box–Behnken Design (BBD) based on response surface methodology (RSM). This optimization process aimed to identify the most effective conditions for maximizing dye removal efficiency, providing a sustainable and efficient solution for treating dye-contaminated wastewater.

Key words: Dye effluents; Raw bio-materials; Wastewater treatment; Adsorption; Optimization; Box–Behnken Design (BBD); Response surface methodology (RSM); Environmental sustainability; Cost-effectiveness

ESSENTIAL OIL COMPOSITION OF ARBUTUS UNEDO SPECIES GROWING WILD IN THE EL MILIA-JIJEL REGION

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ABSTRACT

Our research focused on examining the chemical composition of the essential oil extracted from the aerial parts of Arbutus unedo L., which were gathered in the El Milia-Jijel region. This species, which belongs to the Ericaceae family, is widely known for its pharmacological properties, owing to its richness in bioactive compounds. Following hydro-distillation, the essential oil was analyzed using GC-FID and GC-MS, which revealed the presence of thirty-eight components. Approximately 98.69% of the total compounds identified are monoterpenoids, which represent 89.01%, followed by monoterpenes 6.57%, while sesquiterpenes represent only 1.71% and sesquiterpenoids 0.06%. The main compounds are: (2S, trans) menthone (67.13%); pulegone (15.38%); and D-limonene (2.84%).

Key words: Arbutus unedo L., essential oil, GC-MS, monoterpenoids, (2S, trans) menthone, pulegone.

PHYTOCHEMICAL INVESTIGATION AND ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL MOLECULES OF PELARGONIUM GRAVEOLENS L'HÉR SPECIES, FROM MARECHOU-MILA REGION

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ABSTRACT

This study was devoted to the phytochemical investigation and in vitro antibacterial activity of the essential oil obtained from the ripe Pelargonium graveolens L'Hér collected from the Marechou-region (Mila) in June 2021. This species, belonging to the Geraniaceae family, is widely used in perfumery and aromatherapy due to its comfortable flower-scented aroma as well as its use as a pharmaceutical, cosmetic, and flavoring agent. The essential oil of the aerial parts (leaves, flowers and stems) of Pelargonium graveolens L'Hér obtained by hydro-distillation was analyzed using GC-FID and GC-MS techniques, resulting in identification of fifty-nine compounds. The main components are: β-citronellol (**14.46 %**); δ-selinene (**12.32%**); trans-geraniol (**11.73 %**); citronellol acetate (**6.97 %)**, p-menthan-6-one (**4.83 %**), geranyl pentanoate **(4.24 %)** and (-)-germacrene D (**3.41 %**). The antibacterial evaluation showed that tested oil exhibited a promising antimicrobial effect against five pathogenic bacteria (P. aeruginosa, E.coli, K. pneumonia, S. aureus, E. faecalis) with diameter inhibition zones ranging from 10 to 32 mm and MICs values from 3.12 to 6.25 mg/mL.

Key words: Pelargonium graveolens L'Hér, essential oil, GC-MS, antibacterial, β-citronellol, δ-selinene.

IDENTIFICATION AND QUANTIFICATION OF NARINGENIN IN DIFFERENT TYPES OF HONEY IN THE AREA OF THE CITY OF MOSTAR BY HPLC

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ABSTRACT

Honey is a natural food product used as a sweetener for thousands of years, it is produced from honeydew or flower nectar by bees (Apis mellifere). Its chemical composition is influenced by its processing mode, botanical origin, environmental conditions, and seasons. Honey is a valuable food product due to its many components, including phenolic compounds. One of these compounds is naringenin. Naringenin is a phenolic flavonoid, displaying nephroprotective, anti-platelet, anti-ulcer, hepatoprotective, anti-inflammatory, anti-oxidant, anticancer, and vasodilator effects. The research aimed to analyze the naringenin content in nine honey samples from three different types of honey (sage honey, heather honey, and meadow honey), collected from three locations in the municipality or city of Mostar: Rujište, Bijelo Polje, and Podvelezije. High-performance liquid chromatography (HPLC) was used to determine the naringenin content. The analysis results indicated the presence of naringenin in most samples from the Rujište and Podvelezje areas, except for meadow honey from the Bijelo Polje area, where no naringenin was detected.

Key words: honey, naringenin, HPLC, functional food, Mostar

THE PRODUCTION OF ACTIVATED CARBON FROM BIOWASTE MATERIALS FOR THE REMOVAL OF CONTAMINANTS FROM AQUEOUS SOLUTIONS BY ADSORPTION METHOD

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ABSTRACT

Water pollution as a critical problem has considerably become a matter of worldwide concern. Water pollutants are substances that degrade the quality of water by changing its physical and chemical properties. After industrial activities, pollutants such as dyes, heavy metal ions, pesticides, food and medicine wastes are released into underground or surface waters. In general, the removal of pollutants is done by physical, chemical and biological methods. Adsorption, which is one of these methods, is often preferred in the removal of pollutants. Due to their high surface area and pore volume, activated carbons are considered as strong adsorbents in the adsorption method. Recently, biowaste has been used as raw material in the production of activated carbon in order to provide easy supply and reduce production costs. In this review, we focus on the experimental studies in the literature on the production of activated carbon from biowaste materials for the removal of pollutants from aqueous solutions by the adsorption method.

Key words: Biomass, Activated carbon, Biowaste, Adsorption, Contaminant.

PERFORMANCE EVALUATION OF NEW PAINT PRIMERS (PANI/PEDOT:PSS) USING ELECTROCHEMICAL TECHNIQUE

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ABSTRACT

The aim of this work is the development and study of the performance of epoxy primers based on chemically synthesized polyaniline anti-corrosion (PANI), based on polymers PEDOT: PSS, and based on PANI/PEDOT: PSS compared to the primer based on phosphate zinc commercialized by the Algerian National Paint Company (ENAP). The primaries formulated were characterized by electrochemical techniques (OCP, polarization resistance linear, Tafel test, polarization curves, electrochemical impedance spectroscopy) and by physicochemical techniques (FTIR, UV-Visible, SEM) and the salt test. The electrochemical study was carried out in a cell with three electrodes: reference electrode Ag/AgCl, counter electrode a platinum plate and the work electrode coated carbon steel by the formulated primary. The electrochemical results of the different primers presented show than primers based on 0.7% PANI, 0.5% PEDOT: PSS, 0.4 PEDOT: PSS and 0.5PANI present the best anti-corrosion performance compared to other formulated primers and compared to the zinc phosphate primer.

Keywords: Corrosion, PANI, PEDOT: PSS, Tafel, LPR, SIE.

USE OF REAGENTS Na2CO3 AND NaOH IN THE PROCESS OF PURIFICATION OF RAW SALT WATER FOR THE PURPOSE OF PRECIPITATING Ca+2 AND Mg+2 IONS IN THE PRODUCTION OF QUALITY AND SAFE IODIZED SALT

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ABSTRACT

With a well-planned and socially responsible business policy, Solana d.d. Tuzla, founded in 1885, has established itself as a key producer of salt on the Southeast European market. The process of producing salt, NaCl, is created by evaporating salt water in a four-stage vacuum evaporation battery. Raw salt water (SSV) is supplied to the saltwater pipelines circuit through a DN 250 pipe from the source of salt water in Tetima. The aim of this research is to process all stages of the salt production process integrating all the requirements of the implemented standards. This paper will show the process approach and all the benefits of process management using GFSI principles. When all the input parameters of the production process are satisfied, one of the most important process steps is the purification of raw salt water, which obtains a high-quality and safe essential product with all the required parameters. The purification process takes place in reactor 1DC/1,2. The process is based on the reduction of Ca+2 and Mg+2 ions within the permissible limits. The purification process itself takes place by mixing the salt water in the central pipe with the reagents Na2CO3 and NaOH, depending on the composition of the raw salt water. Purified salt water of satisfactory quality produced by process and laboratory monitoring is further transported to the vacuum evaporation plant and continues with the process stages of centrifugation, iodization, drying and screening of iodized salt. The investigation confirmed that Solana d.d. Tuzla manages the process and the implemented requirements of the standards, ensuring traceability and the possibility of monitoring products in the complete chain of production and distribution. It bases its process management on the principles of sustainable technology using mother liquor as a by-product for further purpose and use.

Key words: raw salt water, purified salt water, vacuum evaporation, mother liquor, iodization, traceability, sustainable technology, FSSC 22000

GEOLOGY AND GEOSTATISTICS OF AN OVERTHRUST STRUCTURE DEPOSIT: CASE OF THE IRON DEPOSIT OF CHAABET EL BALLOUT, NORTHEASTERN ALGERIA

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ABSTRACT

The estimation of ore resources in a deposit was traditionally done using conventional methods, but with the development of mining geostatistics from the 1970s onwards, geostatistical methods became favored. These geostatistical methods were applied to the Chaabat El Ballout deposit, for which a specific approach was proposed. The iron deposit of Chaabat El Ballout is located northeast of the city of Souk Ahras. This deposit belongs to the Sellaoua scales zone. Geological studies conducted as part of this thesis revealed a duplex structure. The estimation of iron resources was initially done using vertical geological cross-section methods by EREM. These resources were re-estimated using ordinary kriging geostatistical methods, taking into account the duplex structure. The variograms of the 'thickness of the mineralization-bearing horizon' (EHP) and the 'mineralization coefficient' (CM) show the same zonal anisotropy, where the major axis has a direction of N160° and the minor axis has a direction of N70°. Directional variograms in these two directions were adjusted using spherical models. The direction of the major axis of anisotropy corresponds to that of the thrust direction. The results of estimations using geostatistical methods were compared to those obtained by conventional methods. The large discrepancy between the resources estimated by conventional methods and those obtained by ordinary kriging is surely due to the discontinuity of the mineralization: The mineralization is regular in the horizontal plane but discontinuous in the vertical plane due to the duplex structure. The mineralization coefficient was calculated in the vertical plane and was taken into account for correcting the resource estimates. Thus, to optimize the estimation of ore resources in breccia-type deposits using geostatistical methods, it is necessary to consider mineralization coefficients that resemble a probability coefficient."

Key words: Iron deposit, Geostatistical estimation, mineralization coefficient.

HYDROGEOLOGICAL MODELING USING GEOSTATISTICAL METHODS: CASE STUDY OF THE TEBESSA PLAIN (FAR EAST ALGERIA)

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ABSTRACT

Geostatistical modeling is increasingly recognized as a vital and complementary tool in hydrochemical studies, especially in regions where the chemical composition of water shows significant spatial variation. Selecting the most suitable geostatistical method for such modeling requires consideration of several factors, including the nature of the regionalized variable, the quality and quantity of available data, and the study's objectives. Situated at the border of Algeria and Tunisia, the Tebessa plain is part of the Saharan Atlas region and features a semi-arid climate. The Tebessa alluvial aquifer is composed of sedimentary layers dating from the Mio-Plio-Quaternary period, forming a complex aquifer system. The surface variograms for the regionalized variables such as electrical conductivity (EC), sulfates (SO4), and chlorides (Cl) indicate anisotropy, with the principal axis oriented at N150° and the secondary axis at N60°. The directional variograms for EC, SO4, and Cl display a 5km hole effect along the principal axis direction. Using ordinary kriging, areas with high salinity were identified, which are linked to the dissolution of gypsum formations. These findings were corroborated by thermodynamic analysis and the Sr2+/Ca2+ ratio.

Key words: hole effect, anisotropy, ordinary kriging, salinity, gypsum formations.

IDENTIFICATION AND MAPPING OF NON-AGRICULTURAL AREAS USING REMOTE SENSING METHODS: THE HARRAN PLAIN IN TURKEY

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ABSTRACT

The study was conducted in the Harran Plain (HP), which has high agricultural potential. No severe natural factors limit agricultural activities in the study area. This study aims to determine the uses that cause the loss of agricultural lands in the Harran Plain and to determine the distribution and percentage ratios of these areas within the plain. Among these uses, settlements (CS; Current Settlements and HHS; Historical Harran Structures) and the region used as a Military Border Zone (MBZ) were considered. It has been determined that the non-agricultural area of the study area, which has a surface area of 157,252 ha, is 6474.04 ha due to CS, HHS, and MBZ. This amount means that approximately 4.11% of the Harran Plain is taken out of agriculture by the people. These lands, which were taken out of agriculture, were formed not because of misuse but because of basic needs. Moreover, lands outside agriculture caused by road networks formed over time in the study area are not included in this value. However, another data revealed in the interpretation of the satellite image is that the excessive and unplanned road network also reduces the usage areas of agricultural lands in the plain. The results show that remote sensing methods using up-to-date satellite imagery play an important role in revealing the distribution, amount, and causes of lands taken out of agricultural use in areas where intensive agricultural activities are applied.

Key words: Remote sensing, non-agricultural mapping, land use, Harran Plain.

MULTIDISCIPLINARY ANALYSES OF FRACTURED AQUIFERS IN A PRECAMBRIAN BASEMENT OF AMZIGGAR, AGADEZ REGION (NORTH NIGER)

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ABSTRACT

Amziggar is located in Tabelot municipality west edge of Aîr massif, an arid region. The geological formations are constuted by the basement. The water resources is represented by the alluvuim aquifers which often dry up before the return of rainy saeson. With the devellopement of gold mining activities and it's concomitant attraction of local populations see national and international have highly exert pressure on these weak groundwater resources. The objective of this study is to determine the fractured/altered areas favorable for drillig hydraulic borholes. The methodological approch, which based of the combined methods of Remote sensing and GIS and a field work are allowed to cartogrhy and mapping the fractures network. The fracture map produced shows that the main fractures are oriented N0°-N10°, N90°-N100°,N130°-N150° and N40°-N50° directions. This map will be a precious tool in futur groundwater research for Tabelot municipality.

Key words: DEM, GIS, fractured aquifers, Arid region, Agadez

ENGINEERING PROPERTIES AND DETERIORATION OF IGNIMBRITES FROM WHICH KUŞKAYASI ROCK TOMBS WERE OPENED

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ABSTRACT

The rock tombs subject to the research are in Karaatlı Town of Niğde Province Central District. There are 15 rock tombs located in the southwest of the town, 11 on the southern slope of the valley and 4 on the northern slope. The rock tombs, about which not much information can be found, were opened on ignimbrite rock masses, one of which is different from the others. The tombs located on the southern slope of the valley are more numerous, and the two-story large tomb is also located in this region. The rock tombs subject to the research continue to be subject to significant damage by treasure hunters, as well as deterioration caused by atmospheric effects. Block sample collection was carried out in order to determine the engineering properties of the ignimbrites where the tombs were found. Powder, fragment and core samples were prepared for various studies in the laboratory, and then the chemical, petrographic and geomechanical properties of the rock were determined. Due to the weak rock properties of tuff and ignimbrite type rocks and their easy excavation, there are many underground rock structures in Cappadocia region for different purposes. Rock tombs are also Late Roman Period structures and no research or definitions have been encountered other than their registration. In detailed research, the tombs opened in various sizes along the two slopes of the valley within the ignimbrites are empty and some of the tombs abandoned to neglect continue to be damaged by illegal treasure hunters every passing day. In order to provide a basis for studies to be carried out on the protection of such structures and their transfer to future generations, the engineering properties and deterioration of the rock in which the tombs were opened were tried to be determined within the scope of this study.

Key words: Rock tomb, Ignimbrite, Petrographic properties, Engineering properties, Deterioration

EFFECT OF ROCK PROPERTIES ON WEATHERİNG PROCESSES, ŞAHMELİK TUFF ROCK MONUMENT

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ABSTRACT

Stone heritages are important monuments that transfer the cultural traces of past civilizations to the present day. These monuments are subject to deterioration over time as a result of atmospheric effects, threatening the integrity of cultural heritage. Monuments built with rocks with particularly weak strength properties are more sensitive to atmospheric processes. In this study, the deterioration developments and damages that occurred in the monument carved into the proclastic rock located in the Şahmelik neighborhood of Develi district, Kayseri province were examined. For this purpose, the physical-mechanical properties of the rock and the in-situ deterioration developments were examined in the laboratory using non-destructive testing techniques (Schmidt hardness, P-wave velocity and IR thermography). According to the findings obtained from the study, the rock has low density, high porosity and high capillary water absorption. These features increase the sensitivity of the rock from which the monument is carved to atmospheric deterioration processes. With these features, planning of urgent restoration-protection works will be very important in transferring the monument to future generations.

Key words: Şahmelik Tuff Rock Monument, Deterioration, Non-destructive testing techniques, Atmospheric processes, Kayseri.

CONTROL OF THE HOUSE MOSQUITO CULEX PIPIENS USING A PLANT EXTRACT

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ABSTRACT

Mosquitoes are the first cause of transmission of viral diseases to both humans and animals, as they can transmit some viral diseases. These insects have attracted the attention of specialists, especially in the field of control, because they have controlled their spread in urban areas. Traditionally, they have resorted only to insecticides to eliminate them, and aquatic organisms have long been used to assess the health of aquatic systems. Biodiversity refers to the diversity of organisms in a given area or ecosystem, including species diversity, genetic diversity, and ecosystem diversity including terrestrial, marine, and other aquatic ecosystems. It is important for maintaining healthy and stable ecosystems, as well as for providing humans with food, medicine, and other resources. Mosquito larvae are the immature form of mosquitoes that live in water. It feeds on microorganisms and organic matter in the water and undergoes several molts as it grows and develops into a pupa and then an adult mosquito. The aim of our work is to investigate the effect of 'rosemary oil' on a target species, the larvae of the Culex pipiens mosquito. And to determine its effectiveness as an alternative insecticide in order to control mosquito larvae, while reducing the effect on non-target species. In the light of these findings, rosemary oil is considered an effective means to control mosquito larvae and has positive effects on non-target organisms. Its use as a natural pesticide can promote sustainable pest control practices. So it is considered a biological insecticide.

Key words: Insecticide, Larvae, Extract, Plant, Culex pipiens, Mosquito

THE EFFECT OF ROSEMARY OIL ON A NON-TARGET PLEA MINUTISSIMA LEACH, 1817 (INSECTA, HETEROPTERA)

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ABSTRACT

Aquatic organisms are used to assess the health of aquatic systems. Extensive use of pesticides in agricultural and public health programs causes many environmental problems and toxic effects on aquatic animals especially against non-target organisms such as non-target organisms for mosquito larvae. Biodiversity can be understood as the study of difference. Biodiversity conservation is a global issue that necessarily requires full knowledge of the distribution of animals and plants. The insecticides used are very useful, especially against sucking insects, and are broad-spectrum to effectively control a large number of insects, but they affect humans and the environment. Heteroptera can be considered true ecological indicators because these organisms are closely related to other biological components of the ecosystem through complex relationships of predation and parasitism. Samples were taken from Lake Tonga in El Kala (far northeastern Algeria). The general goal of our work is to determine the effect of rosemary oil on a non-target group of heteroptera and to compare it with previous results on a target group of domestic mosquito larvae. The first test was performed in 200 ml doses, with ten individual heteroptera per replicate in 199.5 ml of filtered water with 0.5 ml of rosemary oil and then 4.5 ml of the same oil with 195.5 ml of filtered water. The experiments consisted of three replicates and one control. Deaths were recorded after 1, 2, and 3 days. The results of the two-dose tests obtained showed no sensitivity to the treated species, translated into small percentages, which indicates and concludes that rosemary oil is not harmful to heteroptera, but it is harmful to mosquito larvae, which is a target group. Experiments were conducted previously and these results were reached.

Key words: Lac Tonga, Ecologie, Larvae, Rosemary, Plant, Mosquito.

LARVICIDAL EFFECT OF AN AGRICULTURAL PESTICIDE ON A NON-TARGET SPECIES

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ABSTRACT

Agricultural pesticides are chemical substances specifically formulated and used to control or eliminate pests that affect agricultural crops, livestock, or stored agricultural products. These pesticides are designed to prevent or reduce damage caused by insects, weeds, fungi, rodents, and other organisms that can harm crops or reduce agricultural productivity. Oxam, typically refers to Oxamyl; is an agricultural pesticide, its active ingredient is Thiamethoxam (25%), it is a nicotinoid compound with broad-spectrum insecticidal properties. It is registered for use on numerous crops in Algeria. It works by inhibiting the activity of acetylcholinesterase, an enzyme essential for proper nerve function in insects and nematodes. By disrupting the nervous system of these pests, oxam effectively kills them or prevents them from causing further damage to crops. The objective of this study is to test this agricultural pesticide on a non target species, *Culex pipiens* mosquito. For this, various concentrations (5, 10, 20, and 50 µg/l) of Oxam (Thiamethoxam 25%) were tested on fourth-instar larvae newly molted from the domestic mosquito *Culex pipiens*. Three repetitions for each concentration were carried out with 15 larvae each. Preliminary trials allowed for the selection of this range of concentrations. The obtained results showed that the used pesticide has a toxic effect on fourth-instar larvae, as evidenced by the mortality recorded in relation to concentration compared to the control. The lethal concentrations LC50 and LC90 were estimated at 9.54 and 22.9 µg/µl respectively.

Keywords: Agricultural pesticides, Oxam, Thiamethoxam, *Culex pipiens*, LC50 and LC90.

MICROPLASTIC EFFECTS ON THE LIVER OF COMMON CARP (CYPRINUS CARPIO LINANEUS, 1758)

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ABSTRACT

Since the 1950s, plastic products have been mass-produced and widely used in modern society because they are flexible and durable, and have a low cost. Several types of plastics are produced worldwide, but the most common are classified into six classes of polymers: polyethylene, polypropylene, polyvinyl chloride, polystyrene, polyurethane, and polyethylene terephthalate. However, the 21st century has witnessed the realization that people have overused plastic, which is one of the most prevalent anthropogenic pollutants today. Unfortunately, today plastic pollution is a widespread environmental problem in many of the world's rivers and seas, with 90% of plastics entering water bodies coming from land. The present study aims to investigate the effects of different concentrations of primary (raw) and secondary (recycled) microplastics (MPs). To achieve this goal, we set out to follow the process of bioaccumulation in waters and MP-exposed fish (common carp Cyprinus carpio Linnaeus, 1785) in laboratory conditions 30 days after the start of exposure and study different biomarkers. Here, we present the results on histochemical alterations in liver, which is the main organ where pollutants accumulate, after applying the PAS and SUDAN III methods. We used raw and recycled high-density polyethylene (HDPE) pellets. The pellets were 1 mm x 1 mm in size, so they did not need to be further cut with metal shears or ground into pieces smaller than 5 mm x 5 mm, which should be done beforehand by standard methodology. Two test concentrations of 10 mg L-1 and 100 mg L-1 HDPE pellets were prepared following the solid-to-liquid (S/L) ratio laid down in the European standards designed for leaching testing of landfilled waste materials with a particle size below 4 mm. The low concentration was considered "environmentally relevant", applying to the second and higher concentration, the principle followed was that higher doses lead to more serious disorders. The MPs pellets were weighed and transferred to 1 L vessels filled with double distilled water and left on a shaker for 72 h at the lowest speed of 20 rpm. After the leaching period, the MPs water was filtered through glass fiber membranes (Whatman GF/F filters with nominal pore size = 0.7 μm) and used for the experiment accordingly. The treated water was changed every two days and MPs were re-dosed in all aquaria. For the purposes of histochemical analyses, after dissection the fish livers were processed using a Leica (Germany) cryostat at the Department of Developmental Biology, Faculty of Biology at Plovdiv University. From the frozen material, 6 μm thick cryosections were prepared. They were stained according to the method of McManus (1948) for the detection of polysaccharides (glycogen, PAS-reaction) described by Pearse (1972) and to the method of Daddy (1896) for the detection of lipids (SUDAN III method). The liver histochemical analysis

revealed a decrease in the amount of glycogen in the common carp hepatocytes compared to the control group in both exposures, more pronounced after the treatment with recycled MPs. In contrast, an increase in lipids was found in the cytoplasm of the cells, which was indicative of fatty degeneration occurring in the organ. Again, a greater degree of fatty degeneration was observed in the recycled MPs exposure, also indicative of the higher toxicity of this type of plastic. Further studies need to be performed to clarify why the recycled MPs were more toxic to common carp's liver.

Key words: microplastics, pollution, fish, biomarkers

Acknowledgements: This study is financed by the Department of Scientific Research at Plovdiv University "Paisii Hilendarski" – SP32BF001 – Study on the exposure to microplastics on various biomarkers in the economically important fish species common carp (Cyprinus carpio Linnaeus, 1785).

NEW DATA ON THE ORCHID FLORA OF NUMIDIA (NORTHEASTERN ALGERIA)

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ABSTRACT

The study carried out on the orchids of Numidia has proved to be very fruitful both in terms of the number of taxa identified and the number of stations sampled. A series of surveys carried out by the authors between 2012 and 2023 resulted in the inventory of 13 genera, including 42 species/ subspecies and 7 hybrids. Some species have a wide distribution across the territory of Numidia (Ophrys tenthredinefera subsp. ficalhouna, Ophrys lutea subsp. lutea), while others are much localized (Ophrys atlantica, O. marmorata subsp. caesiella and O. omegaifera subsp. hayekii). Among the plant formations found in Numidia, the pine forests are affected by great orchidological diversity, followed by the oak groves and neighboring lawns. Several taxa observed are classified as rare, very rare and endemic on a national scale, we cite: Andorchis pauciflora subsp. laeta, A. patens subsp. patens, Dactylorhiza elata, Ophrys battanderi, Opthrys xjoannae, O. numida ect. Two new species were discovered, one for Algeria and the other for North Africa. The orchid flora studied highlights the taxonomic richness of the region and confirms the interest of its prospection.

Key words: Orchidaceae, Biodiversity, Conservation, Endemism, Numidia and Algeria.

PHYSIOLOGICAL MEASUREMENTS OF THE MEDITERRANEAN MUSSEL (MYTILUS GALLOPROVINCIALIS LAMARCK, 1819) FROM THE BULGARIAN BLACK SEA AS BIOMARKERS FOR MULTI-STRESSOR ENVIRONMENT

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ABSTRACT

Wild and farmed mussels from the Bulgarian Black Sea were collected to study and compare the survival rates (stress on stress response) as a biomarker for multi-stressor environment. In sum, the survival time indicated that the farmed mussels were more tolerant to stress, even though they had a similar size and lived in similar conditions. Further research needs to be done to clarify why.

Key words: mussels, biomarkers, pollution, Black Sea

Acknowledgment:. This study is financed by the European Union-NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project № BG-RRP-2.004-0001-C01.

USING SPI AND RDI TO ASSESS THE IMPACT OF CLIMATE CHANGE ON METEOROLOGICAL DROUGHT: A CASE STUDY OF EDIRNE, TÜRKIYE

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ABSTRACT

Drought is a natural phenomenon characterized by a significant decrease in precipitation levels in a given region. This condition can lead to the desiccation of soil and water sources, as well as damage to vegetation and a decline in agricultural productivity. Droughts can arise from the interaction of various factors and typically have serious implications for ecosystems. Consequences may include water scarcity, food security issues, and economic losses. Consequently, drought represents a significant concern from both environmental and socio-economic perspectives. Global warming and climate change have led to more frequent and severe droughts worldwide, including in Turkey. Water resources and the agricultural sector are the most affected by droughts. In this study, drought analysis was conducted in Edirne province, located in the Thrace region of Turkey. Annual average rainfall, maximum temperature, minimum temperature, and average temperature data were used for analysis. Forty years of rainfall data (1984-2023) were analyzed. The Standardized Precipitation Index (SPI) and Reconnaissance Drought Index (RDI) methods were used for drought analysis. SPI and RDI values were calculated for 1-, 3-, 6-, and 12-month periods, and the severity, duration, and distribution of drought periods were determined separately for each station. According to the 12-month analysis results of both methods, moderate to severe drought events were observed during the periods of 1984-85, 1985-86, 1986-87, 1989-90 and 1993-94.

Key words: climate, climate change, drought analysis, Edirne, RDI, SPI

MONITORING SPATIAL AND COASTAL LINE CHANGES IN THE SIVAS 4 EYLÜL DAM USING SATELLITE IMAGERY

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ABSTRACT

The effects of global warming not only alter hydrological systems but also exacerbate environmental issues such as drought and depletion of water resources. This situation increases pressure on water sources and causes harm to ecosystems, including water scarcity, erosion, and habitat loss. Particularly, the increase in frequency of extreme weather events further complicates the efficiency and sustainability of existing water resources. Therefore, water management and infrastructure planning require more sophisticated and knowledge-based approaches. Technologies such as remote sensing (RS), Geographic Information Systems (GIS), and Machine Learning (ML) can assist in making more efficient and robust decisions regarding the management of water resources and the selection of dam sites. These technologies can help optimize the utilization of current and future water resources and minimize environmental impacts. This, in turn, supports the sustainability of water resources and the development of more effective strategies to meet the water needs of communities. Consequently, advancements in satellite technology and computational power have expanded the capacity to manage various hydrological parameters and land characteristics. Conducting hydrological analyses through the integration of remote sensing and geographic information systems offers significant benefits in terms of both cost and time efficiency. In this study, according to DSI data, Sivas 4 September Dam, which decreased to 0 %in 2022, was examined in volumetric and spatial changes. Additionally, the correlation between annual temperature and precipitation levels and their impact on the water surface area of the dam was examined to identify the relationship between these variables.

Key words: climate, climate change, global warming, monitoring, Satellite Imagery, Sivas

STUDY OF MINERAL AND ORGANIC POLLUTION OF WATERS OF OUED SAF-SAF (ALGERIAN NE)

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ABSTRACT

The Saf-Saf wadi located in the sub-watershed which bears its name is located in the central part of the capital of the Wilaya of Skikda, it is considered among the largest rivers in the region, with a length total of around 53.19 km. Its socio-economic interest is marked by the large urban agglomerations located on the banks of this Oued which consider it as a vital source of the urban region characterized by a clearly marked agricultural vocation. The study focuses on the spatio-temporal evolution of physico-chemical parameters during three sampling campaigns. The analysis was carried out at three stations spread across the entire Oued Saf-Saf watershed. The study concerns the analysis of physicochemical parameters (T°, pH, EC, Turbidity, Cl-, Na+, TAC, K+, NO2, NH4, PO4, COD, Cl) along the Essouk wadi in order to establish a diagnosis of the state of pollution of the surface waters of this river. These analyzes show the existence of anthropogenic pollution due to urban wastewater largely evacuated in this wadi, discharges from domestic and industrial sources marked by high concentrations of: Cl-, K+, CE, turbidity, in addition to a possible agricultural origin marked by high levels of phosphates (PO4). Furthermore, the degree of pollution differs from one site to another depending on the distance from the source of pollution.

Key words: Oued Saf-Saf, Skikda, physicochemical parameters, pollution, anthropogenic

REGIONAL DEVELOPMENT, URBANIZATION, AND URBANIZATION PROBLEMS

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ABSTRACT

Nowadays, regional development, urbanization, and urbanization problems have become significant issues worldwide. Urbanization is increasing with the migration of the population from rural areas to cities, leading to the rapid growth of cities. However, this rapid urbanization also brings many problems. Regional development and urbanization are important factors in economic and social development. Due to the deterioration of urban areas, the concept of urban development has emerged. Urban development requires a regional approach that considers economic development, social participation, and environmental protection. Successful urban development requires an integrated approach to the different dimensions of urban life. This study focuses on the impacts of regional development on urbanization problems, the stages it undergoes, and its negative aspects.

Key words: Regional development, Urbanization, Urbanization problems, Environmental protection

THE REMOVAL OF TOXIC METALS FROM CONTAMINATED ENVIRONMENTS BY BIOSORPTION

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ABSTRACT

Environmental pollution is a significant global issue, especially in areas exposed to metal pollution. Remediation techniques for such areas often incur high costs. An alternative and highly effective method involves using biological molecules rather than physical and chemical methods to remove metals from industrial waste. Applications of biological molecules for metal removal include biosorption, adsorption, and phytoremediation methods. Biosorption is the process of metal ion uptake from aqueous environments by biomass. The dissolved substances on the surface of the biosorbent biomass must pass through the film of its surrounding liquid solvent. Optimal conditions are required for the biosorption process, including factors such as the type of metal ion, the amount and type of biomass, concentration, temperature, and pH of the solution, all of which influence the biosorption method.

Key words: Remediation, Biological molecules, Biosorption, Biomass

MONITORING SPATIAL VARIABILITY OF WADI CHEMISTRY IN WETLAND AREA, NORTHEASTERN ALGERIA / EL TAREF (COASTAL ZONE)

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ABSTRACT

This approache was developed to examine the chemical characteristics of the Boukhroufa wadi water, which is part of a rich ecosystem with natural resources. It's part of the El Kala National Park (P.N.E.K), was designated aa international wetland under the Ramsar convention by UNESCO in 1983, also classified as a biosphere reserve in 1990, it is considered the second in Algeria after Tassili N'Ajjer. Multiple data processing methodologies revealed an overall calcium and magnesian bicarbonate facies, which conforms to the lithology of the research region. The simulation of the samples for detecting ions exchanges reveals wadi waters are dominated by minerals dissolution. The PCA results indicate that water chemistry primarily results from geochemical alteration followed by an anthropogenic weathering. Excess fertilizer input produces nitrate and phosphate troubles which have a substantial influence on the wadi water as well as the study area's coastal zone. Nitrate values are quite high, its ranges from 18 to 41 mg/l. in addition, NH4, PO4 and NO2 concentrations are higher than the standard for surface water. For the NH4 100% of samples exceed the requiered standard. For the PO4, 37% of total samples are below the standards the remain 63% are strongly high for surface water. However, in the short and medium term the input of anthropogenic pollutants is considered the major source that influences the surface water quality. The environmental situation of the region must be monitored to ensure the sustainability of good quality water for the various users within the studied watershed and its coastal zone.

Key words: watershed, Boukhroufa wadi, Coastal zone, wetland, quality assessment, pollution.

A REVIEW OF ENERGY POVERTY AND ITS IMPLICATION TO FOOD SECURITY IN RURAL BENIN

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ABSTRACT

Energy insecurity has engendered the lives of many rural dwellers in Benin. One of the main concerns regarding energy access in rural areas rests in the inability of the farmers and other people living in rural areas to access clean energy for cooking, heating and lightening. This consequently affects food security status in rural areas. Moreover, the issue of accessibility to conventional energy facilities (electricity) in the rural areas of the country remains an issue thus most people rely on the traditional methods of generating energy with the use of solid fuels, especially when cooking and heating are involved. This paper is a review of literature based on the past published articles on energy security and food security in rural Benin. The results suggest that energy insecurity has a direct effect of food security as well as the livelihood of rural dwellers. There is therefore an urgent need to boost up the clean energy security status of the rural residents, considering accessibility and affordability in order to achieve rural household food security.

Key words: Energy Security, Food Security, Fuelwood, Environment, Rural.

HUMAN RATIONAL CHOICE OF WATER POLLUTION IN SOUTHERN BENIN

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ABSTRACT

The aim of this study is to critically examine the theory of human rational choice of water pollution, considering of welfare economics but also taking Southern Benin as a case study. This research actually focused on the issue of human rationality in his own living environment. It is an overview of scholars' contribution to rational individual's choice using general equilibrium and welfare economics theories. The discussion focused on neoclassical economists' approaches to understanding consumption and utility, individual's choice, and impossibility of rational choice-making context leading to water pollution in Southern Benin Republic. The country actually faces major challenges as regards to water quality. This review critically examines 10 recent studies from 2013 onward, on the water pollution. This work mainly revealed the implication of rational ignorance for both environmental sustainability and human consumption. Governmental institutions, Policy Makers, Local Organization Leaders, Scholars, NGOs and various stakeholders were identified as key players in the dissemination of accurate information to consumers in order to avoid rational ignorance.

Key words: Human satisfaction, Rational Ignorance, Water Quality, Pollution, Sustainable Water Management.

IMPACT OF HABITAT ON SPATIAL DISTRIBUTION AND BEHAVIOR OF COMMON POCHARD AYTHYA FERINA AT LAKE TONGA (EL-KALA NATIONAL PARK)

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ABSTRACT

Monitoring of the Common Pochard population wintering at Lake Tonga in the El Kala National Park over two consecutive seasons, 2019/2020 and 2020/2021, revealed that the species is a regular visitor to the lake with low numbers, not exceeding 200 individuals. Their peak is reached during the month of January with 160 individuals during the first season. In Lake Tonga, Aythya ferina prefers the Northwestern and western sectors. They are followed by those in the south and south-west. The diurnal behaviour of the species was identical in both seasons, with feeding and resting activities dominating. During the winter cycle, kites devoted 27% of their time in 2019/2020 and 30% in 2020/2021 to feeding, while they allocated 31% and 33% of their time respectively for the two seasons to resting. Resting takes place mainly at the beginning of the season, with 50% of the time spent in September in the first season and 52% in the second. There were also two other peaks, one in January and the other in March. Feeding varies during the winter cycle, peaking in both years, in December with 42% and 36% of the total time and in February with 32% and 41% successively for 2019/2020 and 2020/2021. In terms of other activities, swimming comes in third place, as the kites move around in search of food. Plumage maintenance for this species is low, with the highest value recorded in April at 25%. Flight is rarely observed. Courtship occurs at the end of the wintering period.

Key words: Aythya ferina - Monitoring - Distribution - Behaviour

COMPARISON OF THE TOXICITY OF TWO ESSENTIAL OILS ON *"TRIBOLIUM CASTANEUM".*

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ABSTRACT

The aim of this study was to evaluate the insecticidal effect of essential oils from two medicinal plants, Origanum floribundum and Eucalyptus citriodora, on the stored-product pest Tribolium castaneum, under laboratory conditions. Essential oils were extracted by hydrodistillation. Four doses were tested. Essential oil toxicity was assessed by inhalation-contact. Mortality was 100% after 8 hours' exposure to O. floribundum essential oil, compared with 16 hours' exposure to E. citriodora essential oil. However, statistical analysis of the comparative results showed that there was no significant difference (P>5%) between the insecticidal activity of the two essential oils.

Key words: Insecticidal activity, Origanum floribundum, Eucalyptus citriodora, Tribolium castaneum, essential oil (EO)

N2O EMISSIONS FROM TWO DIFFERENT SOIL TYPES (FOREST AND CROPLAND).

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ABSTRACT

Globally, soils constitute an important source of greenhouse gases, therefore it is of crucial importance to develop a better understanding of the source and sink activities. Where nitrous oxide acts to deplete stratospheric ozone and acts as a GHG. That is why an accurate quantification of nitrous oxide emission is of primary importance. Hence the main objectives of the present study was to measure lab N2O emission averages in bare soils from two different soil types (forest and cropland), under different rates of sodium nitrate fertilizer, and under 40% soil water content levels, and amended with glucose and microbial solution, during more than 849 h. For the lab N2O emission experiment, the top part of the pots served as closed chambers connected to an N2O gas analyzer Thermo Scientific 46i. Comparing the two soil types, it was shown that forest soil emitted more N2O than the other soil type. Before fertilization forest emitted more than 18 times higher N2O compared with the cropland soil. Even after fertilization, forest soil emitted more N2O than the cropland soil, In addition the 1st glucose addition was necessary for forest soil just after 251 h from fertilization, contrary to cropland soil where an addition of glucose was needed after 120 h from fertilization. Based on the observed results from the two different soil types, it could be clearly concluded that N fertilizer addition and the easily decomposable carbon together had a significant effect on the emissions. Their presence enhanced the N2O emission when no other drivers were limiting. For that more understanding about the different effects of different C sources on the bacterial community over longer time scales is needed, that may help in understanding the complex interaction between N2O and the different drivers as well as its production and reduction.

Key words: Forest, Cropland, N2O, C sources.

THE EFFECT OF BIOTIC AND ABIOTIC FACTORS ON CO2 EFFLUX IN AGRICULTURAL SOILS

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ABSTRACT

The progressing global climate change caused by human-induced increases in greenhouse gases represents one of the biggest scientific and political challenges of the 21st century. One of the greatest scientific challenges is the need to better understand the biological mechanisms regulating carbon exchanges between the land, oceans and atmosphere and how these exchanges will respond to climate change through climate-ecosystem feedbacks, which could amplify or dampen regional and global climate change. CO2 efflux are under the control of a complex set of biotic and abiotic factors, and as croplands are one of the main sources of greenhouse gases into the atmosphere a study of the temporal dynamics of soil respiration has great significance. However, a wide range of reaserchers proved that several factors, like vegetation, N treatments, soil temperature, SWC and management practices like tillage, harvesting, loosening and sowing can affect soil respiration rates. The large uncertainty in Rs estimations could be caused by the fact that Rs is regulated by these multiple biotic and environmental factors and because of the error of measurement. Our main goals was to study the effects of the different factors on CO2 efflus in agricultural soils, thats why a fiel measurments were conducted. According to our field results there was a positive effect of plant growth (biotic factor), of Soil water content and N treatments (abiotic factors) and also the management practices which plays a principal role in the carbon cycle of the seasonally covered ecosystem in a temperate continental climate while the soil temperature was the principal factor influencing soil respiration.

Key words: global climate change, CO2 efflux, soil respiration, biotic factors, abiotic factors

IMPACT OF SEWAGE SLUDGE SPREADING ON AGRICULTURAL SOIL QUALITY: CASE STUDY OF THE AIN SFIHA WASTEWATER TREATMENT PLANT IN SÉTIF, ALGERIA

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ABSTRACT

In this study, we conducted the characterization of sludge samples collected from the Ain Sfiha wastewater treatment plant located in Sétif. After collection, these samples underwent a process of drying, grinding, and sieving to prepare them for analysis. The identification of elements present in the sludge primarily relied on the use of X-ray fluorescence spectroscopy. The results revealed the presence of a set of elements, wich are Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Br, Rb, Sr, Zr, Ba, Lu, Os, and Pb. Among these elements, some are regulated by environmental standards, notably Cr, Ni, Cu, Zn, and Pb. Their respective concentrations in the sludge were determined to be 0.033%, 0.009%, 0.085%, 0.389%, and 0.106%. Additionally, we determined the chemical oxygen demand, nitrate concentration, and pH after extraction in distilled water. The results indicated a pH of 6.83, a nitrate concentration of 0.186 mg/g, and a chemical oxygen demand of 1.15 mg/g for the studied sludge samples.

Key words: Sewage Sludge, Agricultural Soil Quality, Heavy Metals, X-ray Fluorescence Spectroscopy, Ain Sfiha Wastewater Treatment Plant, Land Spreading.

WATER RESOURCES FOR IRRIGATION FACING CLIMATE CHANGE IN A SEMI-ARID ENVIRONMENT: CASE OF TEBESSA - ALGERIA

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ABSTRACT

In Algeria, several estimates indicate a decrease in rainfall ranging from 20 to 36% since the 1970s. The Tébessa region (Southeast Algeria) is part of the North Aurès region, in the Medjerda Mellègue watershed, with a semi-arid climate where precipitation is less than 400mm/year. Over the past twenty years, the region has experienced a very clear climate change that has led to significant impacts such as a decrease in river runoff and a decline in groundwater levels. This change was characterized by a hydro-pluviometric deficit evaluated at 30%, which had repercussions on all socio-economic activities in this region, especially on its agricultural development. Groundwater constitutes the main source of irrigation water for the plain. This study aims to assess the influence of climate change on groundwater quality. This evaluation was approached by the combined study of the evolution of two climatic parameters (precipitation and temperature) during the period (1986-2020), groundwater levels, and the physico-chemical parameters of groundwater. Thematic maps were developed using Geographic Information System (GIS) to identify the chemical facies of the waters, their quality, and their suitability for irrigation purposes. The results obtained showed that according to the sodium adsorption ratio and percentage sodium, more than eighty percent of the samples are suitable for irrigation. By exploring this data, we can gain a comprehensive understanding of the challenges and opportunities associated with water resources in Tebessa within the context of climate change

Key words: climate change, quality, groundwater, irrigation, GIS

IMPACT OF METAL CONTAMINATION ON AGRICULTURAL VALORIZATION OF SEWAGE SLUDGE: CASE STUDY OF IBN ZIAD STATION IN CONSTANTINE

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ABSTRACT

In this study, we examined the evolution of the quality of sewage sludge produced by Ibn Ziad station between 2014 and 2024, focusing on their potential for agricultural valorization and associated risks. Fluorescence X-ray analysis revealed the presence of the following elements in the sludge: sodium, magnesium, aluminum, silicon, phosphorus, sulfur, chlorine, potassium, calcium, titanium, vanadium, chromium, manganese, iron, nickel, copper, zinc, gallium, arsenic, selenium, bromine, rubidium, strontium, yttrium, zirconium, molybdenum, cadmium, barium, europium, and lead. In 2014, the sludge met agricultural valorization standards, but subsequent analyses showed concerning concentrations of heavy metals, particularly cadmium and lead. By 2019, the cadmium concentration had reached an alarming level of 208 mg/kg dry weight (DW), well above regulatory limits, before decreasing slightly to 178 mg/kg DW by 2024. Similarly, the lead concentration remained stable at 35 mg/kg DW between 2014 and 2019, before dropping to 15 mg/kg DW in 2024.

Key words: Ibn Ziad wastewater treatment plant, X-ray fluorescence spectroscopy, Agricultural spreading, Sewage sludge management, Soil pollution.

ASSESMENT OF SURFACE WATER QUALITY INTENDED FOR IRRIGATION PURPOSES IN THE LOWER VALLEY OF THE KEBIR-EAST WADI (NORTH-EASTERN ALGERIA)

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ABSTRACT

The region of El Tarf by its agricultural vocation comes in second position accounting for an area of 105,118 ha and its pedoclimatic conditions, is an important agricultural pole in eastern Algeria. The study area is located in the eastern part of Algeria, at the extreme east of the alluvial plain of Annaba, spread over the communes of Boutheldja and Berrihane. It is part of the Mafragh watershed with an area of approximately 2660 km2, i.e. 70.30% of the total area of the East Constantinian coastal area. This area consists mainly of an alluvial plain resulting from the deposits of the Kebir Est wadi and its tributaries over an area of 40 km2 and a dune massif with an area of about 160 km2. The water resources inventory is one of the most important steps in the assessment of the water resources of a region. A quantitative and qualitative diagnosis of water resources was established, and we were specifically interested in surface water, since it is the most important source for irrigation of the basin under study. In this study, we concluded that the surface water resources of the basin are more or less abundant, are suitable for the irrigation of different agricultural surfaces.

Key words: El Taref, water quality, Irrigation, assesment, Kebir east wadi, Wilcox.

AN APPLICATION OF HEAVY METAL POLLUTION INDEX AND HEAVY METAL EVALUATION INDEX TO EVALUATE THE WATER QUALITY OF ATIKHISAR DAM LAKE (ÇANAKKALE, TÜRKIYE)

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ABSTRACT

Environmental pollution is a significant global problem today and the concentrations of potentially toxic elements (PTEs) in especially freshwater habitats are rising day by day. Dam Lakes are artificial stagnant water bodies built for various purposes such as irrigation and drinking water supply and flood protection. However, over the years, they can become unusable as a result of various factors such as pollution and sedimentation. The Atikhisar Dam Lake that is located in the south-west part of the Marmara Region has a great importance for the local people and for the region. In this research, concentrations of 9 PTEs including chromium (Cr), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), cadmium (Cd), lead (Pb), manganese (Mn) and boron (B) were investigated in water of Atikhisar Dam Lake. Heavy Metal Pollution Index (HPI) and Heavy Metal Evaluation Index (HEI) were used to evaluate the water qualities of investigated locations in terms of PTEs contamination. According to the applied heavy metal risk assessment indices, water of Atikhisar Dam Lake was recorded as "Low heavy metal contamination (HPI < 100)" in terms of applied HPI and "Low contamination (HEI < 10)" in terms of HEI.

Key words: Atikhisar Dam Lake, Heavy Metal Pollution Index, Heavy Metal Evaluation Index

USE OF HAZARDOUS ELEMENT RISK ASSESSMENT INDICES TO EVALUATE THE WATER QUALITY OF SAZLIDERE DAM LAKE (İSTANBUL, TÜRKIYE)

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ABSTRACT

Certainly, environmental pollution and its impact on freshwater habitats are critical issues that require attention. Large dams are constructed worldwide for various purposes, including flood control, water supply, hydroelectric power generation and recreation and reservoirs may alter the aquatic ecology and river hydrology both upstream and downstream, affecting water quality and quantity. The Sazlıdere Dam Lake is located in the north part of Marmara Region and meets the drinking water needs of İstanbul Province of Türkiye. Therefore, it has an important effect on the health of many people. In this research, concentrations of 9 PTEs including chromium (Cr), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), cadmium (Cd), lead (Pb), manganese (Mn) and boron (B) were investigated in water of Sazlıdere Dam Lake. Heavy Metal Pollution Index (HPI) and Heavy Metal Evaluation Index (HEI) were used to evaluate the water qualities of investigated locations in terms of PTEs contamination. According to the applied heavy metal risk assessment indices, water of Sazlıdere Dam Lake was recorded as "Low heavy metal contamination (HPI < 100)" in terms of applied HPI and "Low contamination (HEI < 10)" in terms of HEI.

Key words: Sazlıdere Dam Lake, İstanbul Province, Risk Assessment Indices

SYNTHESIS AND CHARACTERIZATION OF POLY (ETHYLENE TEREPHTHALATE) POLYMER WITH ACID END GROUPS

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ABSTRACT

Food packaging material poly (ethylene terephthalate) (PET) is a polymer that causes environmental pollution with its inert and stable molecular structure and degradation that lasts for decades. Synthesizing the polymer with an acid end group allows various molecules to be attached to this group. In particular, the binding of biodegradable polymers and the change in bond energies can enable microorganisms to degrade the polymer faster. In this study, PET polymer with acid end groups was synthesized and characterized by fourier-transform infrared spectroscopy (FTIR) and differential scanning calorimetry (DSC). The melting temperature was measured as 204.5 ºC and the melting enthalpy was 48.1 J/g.

Key words: Food packaging material, poly (ethylene terephthalate), acid end group, biodegradable materials

REGIONAL ASPECTS OF THE HONEYBEE COLONY LOSSES IN BULGARIA

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ABSTRACT

During past years the Bulgarian beekeeping is under great danger. For a period of the last 5 years honeybee colony losses have increased from 2.04% to over 14%. Two main reasons could be mentioned for that: 1) the uncontrolled imports of honeybee queens with foreign origin, although the Bulgarian law forbids it and 2) the usage of different pesticides in the agricultural activities which seem to be in relation to the reported high mortality rate of bee colonies in some regions in Bulgaria. The rate and the reasons for honeybee colony losses were investigated among all regions of Bulgaria by the standardized international COLOSS questionnaire. By the survey, data were summarized for about 50 apiaries in locations throughout the country. The most significant losses were reported in apiaries located in northern and central Bulgaria. The following losses were detected among the total lost colonies due to objective reason: problems with the queen bee –14%, natural disaster – 1% and mortality in the hive or a sharp decrease in the number of bees with the family to several hundred – 85%. The most significant losses were found for apiaries located near agricultural areas with sunflower, rapeseed, corn, orchards and autumn fodder crops. Oxalic acid, coumaphos and amitraz and less frequently – flumethrin, thymol and lactic acid were the most frequently applied against varroatosis among the beekeepers surveyed. Residual amounts of 27 pesticides were found in the areas with the highest mortality. Among the group of the pesticides detected were insecticides (including acaricides), fungicides, herbicides and growth regulators. The presented and analyzed data should be considered when developing activities to protect the honeybee health status in Bulgaria.

Key words: Apis mellifera, regional honeybee colony losses, reasons

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ASSESING CARBON STOCK POTENTIAL OF MANGROVE ECOSYSTEM FOR CARBON SEQUESTRATION AT MAROS REGENCY, SOUTH SULAWESI, INDONESIA

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ABSTRACT

Mangrove forests offer various valuable ecosystem services, with a significant role as effective blue carbon storage areas. Apart from their capability to absorb CO2, these tropical forests along the coast can retain substantial carbon quantities in their soils because waterlogging encourages a gradual breakdown of organic matter, thereby slowing decomposition rates. The aim of the study is to assess the carbon stock potential of the mangrove ecosystem at Maros Regency, South Sulawesi. The study was conducted at three locations of the mangrove ecosystem at Maros Regency, namely: Bonto Bahari, Borongkalukua, and Ampekale Village, using a line transect method with a 10 x 10 m2 quadrat placed seaward perpendicular to the shore. Biomass was assessed using allometric equations, and calculations of carbon stock relied on estimating biomass and applying a carbon fraction as a conversion factor. Carbon stock in the sediment was also measured by taking soil samples using a corer with a length of 50 cm and a diameter of 5 cm. Five mangrove species were found in the three study sites: Rhizophora mucronata, R. apiculata, Avicennia alba, A. marina, and Sonneratia alba. The highest total biomass of mangrove was found at Borongkalua site, accounting for 16,858.31 Mg ha-1 and the lowest total biomass was 1351.07 Mg ha-1 at Bontobahari. Carbon stock in the upper biomass of mangroves (above ground) ranges from 60.83 – 142.21 Mg ha-1, the lowest in Bontobahari and the highest in Borongkalukua. The increasing trend in carbon stocks is an implication of the trend in bulk density and organic carbon concentration, which increases with increasing depth at these two locations. The total carbon stock in the sediment at Bontobahari was the lowest compared to the other two locations, namely 399.44 Mg C, while in Borongkalukua, it is the highest, almost ten times higher than in Bontobahari, namely 3,741.41 Mg C. In conclusions, the study indicated that the mangrove ecosystem in Maros Regency contained a substantial amount of carbon stock and a high potential as a carbon sequestration for coastal areas.

Key words: Carbon stock, sediment, biomass, carbon sequestration, and Maros Regency.

USE OF HYDROALCOHOLIC EXTRACTS OF ARTEMISIA HERBA ALBA, AND THEIR INSECTICIDAL EFFECT ON THE TOMATO LEAFMINER TUTA ABSOLUTA (GELECHIIDAE, LEPIDOPTERA).

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ABSTRACT

In 2008, Algeria experienced devastating damage caused by a new pest: “The tomato lifeminer” Tuta absoluta. The insect spread rapidly throughout the country's tomato-growing regions, causing substantial production losses. This study aims to propose alternative solutions based on the use of natural "bio-insecticide" products to fight the larvae population of the pest Tuta absoluta, against this background we have evaluated the insecticidal effect of the hydro-alcoholic extract of Artemisia herba Alba which grows on sandy soils in arid regions, and produces new shoots throughout the dry season. It was selected for its therapeutic properties and its bio-pesticidal effect. Three doses were tested to estimate larval mortality: Three replicates were carried out for each treatment, with the controls receiving sterilised distilled water (containing no additives). -1st dose (D1 =100%) (pure dose: stock solution), treated directly with the stock solution of the extract (100mg/ml) -2nd dose (D2 =50%), obtained by diluting the stock solution to 50% (5ml) of the pure extract and adding 50% (5ml) of distilled water, the dose used is (50mg/ml). -3rd dose (D3 = 25%), obtained by diluting the stock solution to 25% (2.5 ml) of the pure extract with 75% (7.5 ml) of distilled water, the dose used is (25 mg/ml) Analysis of the results shows that the plant has a toxicity against Tuta absoluta , indeed on days 4 and 5 of treatment we note an increase and a stability of mortality for all the doses, this one becomes strongly toxic > 60% with values reached (D1=61.27±4.89 ; D2= 63.06±3.37 and D3=60.71±6.41) identical on days four and five and fifth day.

Key words: bio insecticides; hydro-alcoholic extract;Artemisia herba Alba; mortality

THE ONGOING FOURTH INDUSTRIAL REVOLUTION AND THE CIRCULAR ECONOMY

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ABSTRACT

We are already facing the consequences of using the linear economy model. Many alarm signals have been raised that this model involves the excessive exploitation of the environment with the aim of increasing consumption and implicitly profit. This cannot go on indefinitely. However, we see a hope given by the Circular Economy model supported by the fourth industrial revolution. This refers to new technologies from artificial intelligence, digitization, renewable energies, sustainability. Many researchers see a singularity point soon, a point where the changes brought to society by developments in technology will occur at an unimaginable pace. This paper argues (based on some concrete examples) that the solution to sustainable development is the Circular Economy based on the innovations of the fourth industrial revolution. In the era of IND 4.0 the Circular Economy will be digital, automated and augmented or it will not exist at all.

Key words: History of Economics, IND 4.0, Circular Economy, singularity, Succes Stories for Circular Economy

RECENT DEVELOPMENTS IN THE DEGRADATION OF POLYCYCLIC AROMATIC HYDROCARBONS BY MICROORGANISMS

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ABSTRACT

Polycyclic aromatic hydrocarbon (PAH) pollution has increased dramatically over the past century as a result of increased industrial activity such as the use of fertilizers, pesticides, petrochemicals, and pharmaceuticals. PAHs are harmful to both the environment and people. Numerous environments, including the air, soil, sea water, and sediments, have large concentrations of these PAHs. The hazards connected to exposure to PAHs support the need for a thorough remediation plan for an area contaminated by PAHs. The greatest agents for bioremediation at oil spill sites are, reportedly, microorganisms. Using a variety of microorganisms, such as bacteria, fungus, and algae, that are easily able to biodegrade or biotransform PAHs into H2O, CO2 in an aerobic environment, or CH4 in an anaerobic environment, is the process of microbial degradation of PAHs. Many bacterial species, such as Pseudomonas fluorescence, Pseudomonas aeruginosa, Rhodococcus species, Paenibacillus species, Mycobacterium species, and Haemophilus species, use a range of degradation mechanisms, such as biosurfactant, bioaugmentation, biostimulation, and biofilm-mediated processes, to degrade PAHs. Conversely, the ligninolytic enzymes of Pleurotus ostreatus, Polyporus sulphureus, and Fusarium oxysporum catalyze the decomposition of PAHs through their activity. These enzymes include laccase, manganese peroxidase, and lignin peroxidase. The type of PAH, the amount of total and degrading bacteria or fungus in soils, and their composition all have an impact on the biodegradation of PAHs. In addition, bacterial cluster migration makes many bacteria chemotactic to PAHs by shortening the distance between them. Chemotaxis allows bacteria to move more quickly than substrate mass transfer in the aqueous phase, which speeds up the pace at which substrate is acquired. Bacterial-secreted extracellular polymeric substances (EPS) have a key role in increasing PAH solubility in soil, which facilitates their degradation. Lastly, the most advanced studies on PAH degradation are those conducted with genetically modified microorganisms.

Key words: Bioremediation; Degradation, Polycyclic aromatic hydrocarbons, Soil pollution.

SUSTAINABILITY OF BLACK SEA ECOSYSTEMS IN THE CONTEXT OF INDUSTRIAL DEVELOPMENT, CLIMATE CHANGE AND ARMED CONFLICTS

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ABSTRACT

The Black Sea's importance stems from its strategic geopolitical position, economic potential, environmental significance, and rich cultural heritage. It plays a critical role in international trade, energy security, regional cooperation, and global geopolitics. Ensuring the sustainable and peaceful use of the Black Sea is essential for the stability and prosperity of the surrounding regions and beyond. Sustainability defines the ability of a system or process to endure over a period. How sustainable something is, can be understood in terms of its overall efficiency in terms of how effective the whole activity is at operating within its environment. The war in Ukraine significantly impacts the ecosystems of the Black Sea in several ways. These impacts can be broadly categorized into pollution, habitat destruction, effects on wildlife, radioactive contamination risks, reduced conservation efforts, human displacement, and economic consequences. In this article we see what has been done till the present for the sustainability of Black Sea ecosystems, try to draw viable solutions for the future and rise several alarm signals.

Key words: Sustainability, Black Sea, Ecosystems, Climate Change, Armed Conflicts

PRODUCTION OF ACTIVATED CARBON FROM AGRICULTURAL BIOWASTES WITH INNOVATIVE APPROACHES AND THEIR USE IN WASTEWATER TREATMENT

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ABSTRACT

Nowadays, with industrial development and rapid population growth, the release of wastewater containing organic and inorganic pollutants (dyes, heavy metals, pharmaceuticals, and personal care products) into the receiving water environment is gradually increasing. These pollutants negatively affect the ecosystem and human health due to their accumulation in surface-ground water resources and soil. There are many physicochemical methods in wastewater treatment (coagulation-flotation, membrane filtration, electrochemical advanced oxidation methods, and adsorption). Adsorption has many advantages, such as being environmentally friendly, low-cost, high removal efficiency, and easy to apply. Due to the high surface area and surface activity value of activated carbon (AC), it is a very effective adsorbent for removing toxic pollutants. Commercially produced ACs are obtained by passing substances such as coconut shell, wood, and coal through various processes. Agricultural biowastes are important alternatives to traditional methods for ACs production due to their selective properties, large pores, and surface areas. Producing activated carbon from different biowastes not only adds financial value to these wastes, but also prevents additional costs for the disposal of biowastes. In addition, many physical and chemical activation methods are used to increase the pollutant removal capacity of activated carbon. In this study, the wastewater treatment potentials of modified and hybrid ACS using innovative approaches produced from biowastes are discussed. In addition, information is given about the future of biomass-based AC production and the challenges that may be encountered.

Key words: Actived carbon, adsorption, biowaste, inorganic pollutants, organic pollutants, wastewater treatment.

UV DIRECT PHOTOLYSIS OF HALOGENATED DISINFECTION BY-PRODUCTS: QSAR AND KINETIC MODELLING

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ABSTRACT

Ultraviolet direct photolysis has been used as a promising process for the photodegradation of halogenated disinfection by-products (DBPs) in aqueous media. Although their photodegradation was previously studied, information on the removal of commercially unavailable compounds is still lacking. A fast and convenient solution that can be used to bridge the knowledge gaps for such cases is the application of predictive methods. A well-established strategy for studying their removal is the use of a combined modelling approach: quantitative structure property relationship (QSPR) and kinetic. These modelling methods represent valuable solutions for untested molecules owing to financial, experimental and/or technical reasons and they also avoid time-consuming experiences. This study aims to elucidate the relevance of computational predictive models that can be used to fill the lack of knowledge on photochemical properties for environmental issues. QSPR models were used to predict the photochemical properties of 3 halogenated DBPs whose standards are commercially unavailable; the molar absorption coefficient (Ɛ) and the quantum yield (F) at 254 nm. The Ɛ and F assessed values of the 3 halogenated DBPs were then integrated in the kinetic model to estimate their UV direct photolysis rate constants. The stiff differential equations that describe the organic contaminants photodegradation were implemented and solved within the MATLAB environment. QSPR models were constructed with QSARINS software by multiple linear regression and genetic algorithm analysis with the use of Dragon generated molecular descriptors and quantum descriptors performed with Gaussian software on the basis of density functional theory method.

Key words: Disinfection by-products, UV direct photolysis, QSPR models, kinetic model

PHOTODEGRADATION OF P-CRESOL BY H2O2/UV PROCESS IN AQUEOUS MEDIA: PREDICTIVE STUDY USING QSPR AND KINETIC MODELLING

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ABSTRACT

Benzene derivatives are extensively used as raw materials in chemicals, petrochemicals, agricultural and pharmaceutical industries. These compounds are considered as priority pollutants due to their high toxicity, even at low concentrations. In drinking water, for example, their concentrations should not exceed 0.1 μg L-1. P-Cresol, one of benzene derivatives, originates mainly from coal tar or petroleum and is used for the manufacturing of disinfectants, preservatives, antioxidants, etc. It is known by its stability and solubility in water (21.5 g L-1 at 25 °C) which threat aquatic environment. Besides its classification as a possible human carcinogen, it is reported that repeated exposure of low concentrations of p-Cresol have an adverse effect on human respiratory tract, eyes, skin and mental health. This study reports on the development of a kinetic model that estimates the photodegradation of p-Cresol by hydrogen peroxide ultraviolet irradiation (H2O2/UV) process in aqueous media. The formation and fate of its intermediate compounds during the degradation are considered. A quantitative structure property relationship (QSPR) model is used to predict the second-order rate constant ($k_{HO^{\bullet}}$) values of the intermediate compounds of the first generation of p-Cresol oxidation by $HO^{\bullet}$ radicals, which are afterwards integrated in the kinetic model. QSPR models are constructed using multiple linear regression (MLR) and genetic algorithm (GA) analysis with the use of Dragon generated descriptors and quantum descriptors computed employing density function theory (DFT) method. The validation of the combined model QSPR / kinetic was demonstrated by testing the prediction of p-Cresol degradation under different initial concentrations of p-Cresol and H2O2. The developed model has shown good agreement with experimental results issued from the literature.

Key words: Kinetic model, QSPR model, H2O2/UV process, p-Cresol, benzene derivatives

OPTIMISATION OF THE CHEMICAL COMPOSTING OF CATTLE MANURE BY MEANS OF NITRIC ACID

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ABSTRACT

Cattle manure composting is an essential practice for turning this organic waste into a nutrient-rich soil amendment, helping to reduce landfill waste and greenhouse emissions. This environmentally friendly method sustainably enriches soils, which improves crop quality and plant health. There are two main types of composting: biological and chemical. While beneficial, biological composting is slow and requires rigorous management of environmental conditions to optimise decomposition by microorganisms. In contrast, chemical composting is faster and more economical, where chemical additives are used to accelerate decomposition.
In this study we investigated a chemical method using nitric acid to oxidise cattle manure. The excess acid was neutralised with potassium hydroxide, leaving harmless residues such as potassium and nitrates, which are also powerful fertilisers. Scanning electron microscopy and energy dispersive X-ray spectroscopy (SEM-EDX) analyses showed that the concentration of nitric acid had a significant effect on compost quality. The results show a decrease in carbon concentration and an increase in nitrogen and potassium concentrations with higher nitric acid concentrations used in the composting process, illustrating the oxidation of organic matter and the incorporation of nitrogen and potassium into the compost. The C/N ratio, which is crucial for decomposition and plant nutrition, is optimal within a range of nitric acid concentrations from 0.05 N to 1.00 N, facilitating the production of high-quality compost. The texture of the samples analysed by SEM also varies with nitric acid concentration, with higher more uniform degradation of organic matter and a finer texture with improved porosity.

Key words: Cattle manure composting, chemical composting, sem-edx, soil amendments, fertilizer production

ROLES OF BENTHIC MACROINVERTEBRATES IN THE FOOD WEB

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ABSTRACT

Benthic macroinvertebrates are small animals that spend all or part of their lives in water. They play a critical role in aquatic ecosystems. It is an integral part of the aquatic food web. By eating leaves, algae and bacteria in the environment, they convert organic matter into a food source that fish and other vertebrates can use. Fish are considered highly effective top predators for aquatic creatures in the food web. Fish are known to have strong effects on the abundance, species richness and community structure of macroinvertebrates and constitute the primary diet of many of them. For this reason, the number of insects is much higher in ponds and coastal vegetation where there are no fish. Coastal vegetation can play a very important role as a refuge for invertebrates that are vulnerable to predation. In this study, the roles and importance of benthic macroinvertebrates in the food web, which are found in increasingly decreasing water resources today, are examined.

Key words: Benthic macroinvertebrate, Food web, Water resources

GREEN BUILDINGS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

In this study, a general evaluation of the green building concept, its importance, benefits and certification systems, which is evaluated within the concept of sustainability and whose importance has been increasing in the world in recent years, has been made. Among the most important reasons for the increase in global warming, climate changes, increasing environmental pollution, rapid decrease in natural resources and depletion of energy resources in the world are buildings produced with traditionally built building construction technology. In today's conditions, environmental protection has become more important in housing construction, and interest in new environmentally friendly buildings, called green buildings, has increased. The concept of green building has started to develop all over the world and in Europe in recent years, new institutions have been established in this direction, new certification programs have been created and the concept of green building has started to spread in all countries. The most important features of green buildings are that they contribute to a healthier environment in the future by ensuring that buildings, which have a significant impact on environmental and air pollution, are sustainable. Green buildings are buildings that respect nature, are healthy, comfortable, ecological and can use renewable energies. Green, ecological, climate and environment friendly, zero carbon emission, high performance buildings are rapidly becoming part of our agenda. With the spread of the green building concept, developed countries have developed certification systems to evaluate and classify the environmental impacts of buildings that require certain standards related to sustainable buildings. Certification systems generally evaluate buildings based on several parameters, such as the existence of systems to reduce energy and water consumption, the environmental friendliness of the building materials used, lighting, air quality and comfort related to user comfort within the building, and buildings are certified in this way.

Key words: Sustainability, Green building, Green building certification systems, Environmentally friendly

PHOTOCATALYTIC DEGRADATION OF TEXTILE AZO IN AQUEOUS SOLUTION USING NEODYMIUM (III) OXIDE

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ABSTRACT

Nowadays, a significant water pollution issue is related to the contamination of industrial effluent-induced textile dyes. Improper discharge of industrial wastewater can be the main source of water contamination and a potential threat to aquatic life and human health since it is highly resistant to conventional treatment methods. Photocatalysis arises as a promising alternative method to eliminate azo dyes. Rare earth metal oxides, particularly neodymium (III) oxide (Nd2O3) have emerged as catalysts in photocatalytic applications. In this study, Nd2O3 nanoparticles were characterized by FT-IR, SEM, and Raman spectroscopy. FT-IR spectroscopy revealed the characteristic bands related to the metal-oxygen groups. Reactive Red 194 (RR-194) is an azo dye containing an azo group as a chromophore commonly used to color cotton fabrics in the textile industry. The photocatalytic degradation efficiencies of RR-194 dye were compared under both UV and solar-simulated light conditions. Test conditions such as catalyst dose (0.25 g/L and 0.50 g/L) and initial RR-194 dye concentration (10 mg/L, 20 mg/L, 30 mg/L) were also investigated. Results revealed that the maximum decolorization rate of RR-194 was observed with the increased catalyst dosage and decreased initial dye concentration.

Key words: Azo dye, decolorization, heterogeneous photocatalysis, neodymium (III) oxide, Reactive Red-194.

AGRICULTURAL SUSTAINABILITY AND ECO-FRIENDLY PRACTICES

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ABSTRACT

According to the Intergovernmental Panel on Climate Change (IPCC) Reports, an increase of 3 to 4 °C in surface average temperature values is expected by 2100 due to the increase in greenhouse gas emissions. Accordingly, a similar temperature increase is expected to be observed in Turkey. This situation, which appears as a global climate crisis, directly affects agricultural production. While sustainable and environmentally friendly production methods are supported with green transformation studies in industry, the implementation of similar approaches in agricultural activities is an important agenda item for the future of sustainable and environmentally friendly agriculture. For this purpose, it is necessary to identify important greenhouse gas sources that occur during agricultural activities and have an impact on global warming. In addition to the chemicals and fertilisers used during agricultural activities, water management is one of the most important focal points of sustainable agriculture. Therefore, adopting sustainable agricultural practices by moving away from traditional agriculture and making these practices a state policy will provide significant benefits in terms of sustainability in the long term. In this study, information is provided on strategies in agricultural systems for adaptation to climate change and technologies required to reduce greenhouse gas emissions. In addition, a comprehensive framework for agricultural sustainable development is presented by integrating literature studies in these areas.

Key words: Sustainable agriculture; climate change; fertiliser management; water management

APPLICATION OF WATER TREATMENT METHODS IN REMOVAL OF ENVIRONMENTAL RESIDUAL ANTIBIOTICS

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ABSTRACT

Antibiotics are chemical substances that have specific actions for microorganisms and have been commonly used in different fields such as medicine, veterinary medicine, aquaculture, and agriculture for many years. The presence of residual antibiotics in the environment can act as a microbial inhibitor, leading to adverse effects on the life activities of animals and plants in the ecosystem. As a result of the limited absorption capability of antibiotics through animal intestines, the excessive release of veterinary antibiotics to the environment has become an urgent concern to meet, particularly in countries with extensive animal husbandry. Furthermore, environmental residual antibiotics can pose a potential direct or indirect threat to human health resulting in various symptoms (allergic shock, neurological toxicity, cardiotoxicity, mitochondrial toxicity, etc.). Conventional methods including physical, chemical, and biological treatments are not capable of large-scale removal of antibiotics from water, and these methods can cause secondary pollution. Therefore, efficient strategies are needed relying on the elimination of persistent and stable antibiotic residues from water. Advanced oxidation processes (AOPs) are environmentally friendly technologies currently under development and based on the generation of hydroxyl radicals as powerful oxidizing agents. This study summarized a comprehensive overview of the implemented water treatment methods, primarily AOPs in removing antibiotics, and discussed potential treatment solutions for future research.

Key words: Advanced oxidation processes, antibiotics, Fenton, ozonation, photocatalysis.

ABRUPT SHIFTS OF ADRIATIC SEA FISH POPULATIONS

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ABSTRACT

Management and sustainable use of fish stocks are considered to be a challenging task due to the continuous interaction of internal and external drivers. These forces can move the stocks out of their equilibrium state, which can result in abrupt shifts. Identifying the possible causes of such changes in the natural systems remains difficult, as they can arise under various circumstances. Threats are often not recognized until the species have suffered large population declines. Moreover, substantial changes in one of the ecosystems key species can lead to structural and functional changes of the whole ecosystem. Abrupt changes may hinder the success of management measures and may have severe ecological, economic and social consequences. In this study we used a systematic approach that classifies a time series to a trajectory type (no-change, linear, quadratic and abrupt change) along with statistical changepoint analysis to identify past abrupt changes in the spawning stock biomass (SSB) of the most important commercial fish species in the Adriatic Sea. This classification approach allowed us to identify the best-fitted trajectory and also investigate additional change points in the SSB. Our analysis shows that an abrupt trajectory better explains the dynamics of five out of seven species we investigated, compared to the other trajectories considered. This study represents the first step towards the identification of non-linear dynamics in the biomass of Adriatic Sea fish species and evaluating their potential drivers. Considering the magnitude and rapid change of many drivers during the Anthropocene, makes it particularly important to diagnose abrupt changes and their underlying causes, due to the profound and increasing consequences for the sustainability of fish stocks.

Key words: abrupt change; fish stocks; biomass; Adriatic Sea

ASSESSMENT OF TREATMENT WATER EFFECTS ON MACROBENTHIC INVERTEBRATES IN AN URBAN STREAM

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ABSTRACT

Many environmental changes, especially urbanization, are causing alterations in freshwater ecosystems. Therefore, dense human settlements, and increased use of fertilizers and detergents accelerate the eutrophication in freshwater. To reduce this pollution factor, wastewater treatment plants are being used and discharged to natural streams. This treated water can alter physicochemical properties of the environment, thereby affecting macroinvertebrates. The effects of wastewater treatment plants discharge into urban streams have not been fully studied yet. This study investigates the effects treatment water on macrobenthic invertebrates in an urban stream. The following questions were investigated: (a) What are the differences in physicochemical parameters of the stream where it mixes with the treated water? (b) Is there a relationship between physicochemical properties and macrobenthic invertebrates? (c) Are there significant differences in ecological parameters and biological variables before and after the introduction of treated water? The study was conducted on a stream located in the Sarıyer district of Istanbul, Türkiye. Sampling was carried out at three stations in summer and winter of 2023. For data evaluation, BMWP, ASPT Score, Shannon-Wiener, Margalef indexes, nMDS, and RDA analyses were performed. According to the index results, all stations were found to be high in terms of pollution and poor in terms of diversity. nMDS results showed no significant difference between stations and seasons. This result shows that the source coming from treatment water was not effective to the stream. According to RDA results, Physidae showed a positive correlation with TDS and pH, while dissolved oxygen and Chironomidae family were grouped together. As a result of the study, it was observed that the treated water did not have a healing effect on the polluted branch, the physicochemical values of the treated water were very similar to the stream coming from the polluted lake, therefore, releasing poorly treated water into the environment did not have a positive effect on the studied area.

Key words: treatment water, pollution, invertebrates, urbanization, urban ecology

ASSESSMENT OF WATER QUALITY IN THE MIRUSHA RIVER USING MACROINVERTEBRATE INDICES

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ABSTRACT

This study evaluates the water quality of the Mirusha River in Kosovo through the analysis of macroinvertebrate communities. Measurements were taken across three seasons: spring, summer, and autumn-during the year 2023. Sampling was conducted in accordance with EN ISO 10870:2012 and EN 16150:2012 standards. Macroinvertebrates specimens were collected with D-frame net of 30×20 cm (600 cm2) diameter. Samples were taken from all available habitats represented with more than 5% of total habitat area on the sampling stretch (multi-habitat sampling procedure). Five biotic indices were employed: EPT taxa index, Biological Monitoring Working Party (BMWP) score, Average Score Per Taxon (ASPT), Hilsenhoff Family Biotic Index (FBI), and Stroud Water Research Center (SWRC) Biotic Index. The results indicate varying water quality across eleven sampling stations, with classifications ranging from clean to severely polluted. The average values of the indices across the stations showed the following ranges: EPT (0-11), FBI (3.26-7.80), BMWP (0-95), ASPT (0-7.31), and SWRC (0-7.23). Ecological statuses derived from these indices indicate conditions from bad to good. Additionally, various physico-chemical parameters were measured, providing a comprehensive understanding of the river's ecological health. These findings highlight the necessity for ongoing monitoring and targeted remediation efforts to improve the river's ecological health.

Key words: biotic Index, ecological status, bioassessment, organic pollution, freshwater ecosystems

IMPACT OF THE TECHNICAL LANDFILL CENTER ON THE ENVIRONMENT: CASE STUDY BERKA ZARGA - ANNABA (NORTH EAST ALGERIA)

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ABSTRACT

Waste generation has increased alarmingly in recent years, leading to serious environmental problems and adverse health effects. Landfill BERKA ZARGA is one of many uncontrolled. Landfill in Algeria it is located 15 kw west of the city of Annaba, in a very vulnerable environment in presence of a fairly dense urban network, intense agricultural activity. This work is part of the study of the impact of the technical landfill of BERKA ZARGA (leachate) on the environment (water from wells located near the landfill and Lake Fetzara in the Annaba city in north east Algeria). We did physicochemical and microbiological analyses of leachate and well water and Lake Fetzara. The results obtained show a significant pollutant load carried by leachate from the landfill (high level). They also show a significant qualitative degradation of groundwater and Lake.

Key words: landfill, leachate, technical landfill, Lake Fetzara, physicochemical and microbiological analyses, well water.

HEAVY METAL CONTENTS AND POLLUTION STATUS OF SOILS UNDER DIFFERENT LAND USE TYPES IN SULTAN MARSHES

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ABSTRACT

The aim of this study is to determine some heavy metal contents and contamination status of soils under different land use types around the Sultan Sazlığı ecosystem. For this purpose, 36 topsoil (0-20 cm) samples were taken from some of the different land use types in the wetland ecosystem (rangeland. agriculture, marsh and dry lake) and Cr, Pb, Fe, Zn, Cu, Co, Mn, Cd, Mo, As, Ni) were determined by ICP MS and ICP OES devices. Relationships between heavy metals were found by Pearson correlation analysis. Pollution status of the soils according to land use patterns was evaluated according to the contamination factor (Cf) the degree of contamination (Cd). Soils taken from the southern marshes had higher values than other land use types in terms of average Cr, Fe, Zn, Co, Cu and Ni concentrations. According to Cf, dry lake soils were exposed to extreme pollution in terms of As and moderate pollution in terms of Cd. Soils under other land use types have been exposed to low-moderate pollution in terms of various heavy metals according to this factor. According to the Cd factor, rangeland and agricultural areas were exposed to significant levels of pollution in terms of Cd, and the dry lake area was exposed to a very high level of pollution in terms of As. Monitoring and taking measures to control heavy metal pollution in soils under all land use types is necessary for ecosystem sustainability. This study was financially supported by Scientific and Technological Research Council of Turkey (TUBITAK). Project number:122Y062.

Key words: Sultan marshes, land use types, heavy metal, pollution

THE PLASTIC ERA'S ENVIRONMENTAL ISSUES: MICRO- AND NANOPLASTICS

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ABSTRACT

Microplastics (MP) and nanoplastics (NP) are small plastic particles that have become a significant environmental concern due to their widespread presence and potential impact on ecosystems. These plastic particles have emerged as significant environmental contaminants due to their widespread distribution and persistent nature. These particles originate from a multitude of sources, including the breakdown of larger plastic debris, industrial processes, and consumer products such as cosmetics and synthetic textiles. Their pervasive presence across various ecosystems, from the depths of the oceans to terrestrial environments, raises critical environmental concerns. The infiltration of MPs and NPs into natural habitats can disrupt ecosystem functions, affecting soil quality, altering species behavior, and potentially leading to biodiversity loss. Their ability to interact with the environment in complex ways further complicates the assessment of their full ecological impact. MPs and NPs are highly resistant to degradation, leading to their accumulation in terrestrial and aquatic ecosystems. Their persistence poses long-term environmental challenges, contributing to the ongoing pollution crisis. These particles are ubiquitous in marine environments, where they are ingested by a diverse range of organisms, from plankton to large marine animals. This ingestion can lead to physical blockages, impaired feeding, and toxicological effects due to the leaching of harmful chemicals, which not only threaten individual species but also have broader ecological ramifications. The presence of MPs and NPs in the food chain, particularly through seafood consumption, raises concerns about potential health risks to humans. These risks include exposure to hazardous chemicals associated with plastics and the unknown long-term effects of particle accumulation in the human body. Addressing the environmental challenges posed by microplastics and nanoplastics necessitates a comprehensive approach, including the reduction of plastic production, improvement in waste management practices, and the development of biodegradable alternatives. Furthermore, ongoing research is essential to fully understand the long-term environmental and health impacts of these contaminants and to guide informed policy decisions aimed at mitigating their effects on a global scale.

Key words: Mikroplastic, Nanoplastic, Ecological Risk, The Plastic Era

CHARACTERIZATION AND ENVIRONMENTAL IMPACT OF OLIVE MILL WASTEWATER GENERATED FROM THE THREE-PHASE EXTRACTION PROCESS

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ABSTRACT

Olive mill wastewater (OMWW) is the main pollutant from the three-phase extraction system of olive oil production. The disposal of OMWW into surface waters represents an important environmental problem in Albania due to huge quantities in short periods (November-February) and high concentrations of organic compounds mainly phenols which cause ecological issues for the ecosystem, such as soil contamination and water pollution. This study was focused on characterization of vegetation water effluents generated from three –phase extraction processes of olive oil production to evaluate their environmental impact. Samples of OMWW were collected from different three-phase olive mills operating in southern and central parts of Albania. Physicochemical characterization and multivariate analysis were performed. The results of the physicochemical analysis showed that samples of OMWW had an acid pH (4.4-5.3), high levels of organic load expressed in terms of BOD5 (42.5-50.8 g/l), and COD (126-206 g/l), higher levels of total nitrogen (453-625mg/L), oils and grease (5.9-8.2 mg/L) compared to allowed effluent discharge limits according to Albanian standards. The biodegradability index of OMWW analyzed exceeds the threshold of 5, confirming that our samples are partially or no biodegradable and the polyphenol concentration was 5.5 -8.35 g/l

Key words: olive mill wastewater, total phenolic content, environmental impact, characterization

DETERMINATION OF LEAD (PB) AND CADMIUM (CD) ELEMENTS IN MONOFLORAL HONEY PRODUCED FROM PALIURUS SPINA-CHRISTI IN THE THRACE REGION BY INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (ICP-MS)

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ABSTRACT

Honey is a sugary food substance produced by honeybees through the collection of plant nectar and secretions or the excretions of insects living on plants, combined with their own secretions, and matured in honeycombs. During the process from plants to honey production, metal exposure occurs. Heavy metals accumulate in plant tissues from the soil, and bees transfer these heavy metals to the hive during nectar collection, eventually incorporating them into honey. Consuming honey can lead to the accumulation of these heavy metals in the tissues of consumers. It is important to acknowledge that honey is affected by environmental factors and can be exposed to various harmful chemicals. The plant Paliurus spina-christi Mill., a member of the Rhamnaceae family, commonly known as "Karaçalı," is distributed in Southern Europe, the Balkans, the Caucasus, and Turkey. Among the five known species worldwide, only Paliurus spina-christi Mill. is naturally distributed in the Thrace, Marmara, and Black Sea regions of Turkey. Due to its high nectar yield, it is a preferred plant for honeybees. Lead can cause a wide range of adverse effects in humans, depending on dose and exposure duration. Its toxic effects can result in enzyme inhibitions leading to various pathologies and even death. Chronic poisoning may begin if daily lead intake exceeds 1 mg. Lead affects multiple organs and systems in humans, depending on the duration and amount of exposure. The most affected systems are the hematopoietic system, motor nerves, and kidneys. Generally, the greatest cadmium exposure comes from food and smoking. Cadmium (Cd) levels are low in fruits and beverages but high in fibrous vegetables and potatoes. A study conducted in the United States found that approximately 30 micrograms of cadmium are ingested daily through food, with 1-3 micrograms being absorbed into the body. Therefore, it is crucial to ensure that honey intended for human consumption is clean and to monitor it through analyses. A total of 24 honey samples were obtained from three provinces in the Thrace region (Edirne, Kırklareli, Tekirdağ), where the natural and dense distribution of the Paliurus spina-christi plant is found. In this study, the elements Pb and Cd were analyzed in 24 honey samples using ICP-MS. The standard addition method was applied to the honey samples to prove the accuracy of the method and to eliminate chemical interferences. The honey samples were digested in a microwave oven. Each sample container was weighed with 1 g of honey sample, and 3 ml of concentrated 65% HNO3 and 1 ml of 30% H2O2 were added. The digested honey samples were placed in Teflon microwave vials. Sensors were appropriately attached for pressure and temperature

adjustments. After setting the device parameters from the menu, the samples were subjected to digestion for 45 minutes. The digested samples were then determined using the ICP-MS device. The average sample values for Pb and Cd were 0.019±0.01 mg/kg and 0.001±0.01 mg/kg, respectively. The Turkish Food Codex, according to the Bee Products Regulation No. 32527 and the Honey Regulation No. 31107, refers to the Turkish Food Codex Contaminants Regulation No. 32306 for the maximum limits of heavy metals in honey. The regulation specifies the maximum limits for certain elements in honey, and for others not specifically mentioned, the limits for food supplements apply. Based on these regulations, the levels of Pb and Cd are below the specified limits.

Key words: ICP-MS, Paliurus spina-christi Honey, Heavy Metal

AN OVERVIEW OF BIOHYTHANE PRODUCTION

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ABSTRACT

The economy of an industrialized country is largely dependent on fossil fuels. However, these non-renewable energy sources are in danger of extinction and cause serious negative effects on the environment. For this reason, it should focus on bioenergy production from renewable energy sources. Recently, research has been directed towards the co-production of biohydrogen and biomethane, called "biohythane". Biohythane, a balanced mixture of 10% – 30% v/v biohydrogen and 70% – 90% v/v biomethane, could be the backbone of a multi-purpose future energy source. One-stage and two-stage (bio-H2 + bio CH4) methods are the main biohytane production methods, and this research area of investigating green biofuels is gradually gaining ground. In this article, salient aspects of biohythane research today are reviewed and an overview of biohythane production is presented based on the findings of a relatively small number of publications in this field.

Key words: Biohythane, Biomethane, Biohydrogen, Biohythane production

NATURE'S TINY WARRIORS: UNLEASHING THE POTENTIAL OF ENDOPHYTIC FUNGI IN MOSQUITO- BORN DISEASE

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ABSTRACT

Chemical pesticides have become a real threat to human life and causing a huge imbalance in the environment. Therefore, the search for an alternative has become necessary, the biological control is one of the best solutions since it depends on the use of organisms that harms diffrent insects. for this reason, the main objective of this study is to limit and fight against harmful mosquitoes by entomopathogenic fungus isolated from the rhizospheric zone of Launea arborescens. our results have shown that the highest mortality rate was recorded by Preconia and Alternaria that were the most toxic species that reached 100% of mortality from the first five days. and other genras such as Penicilium, Aspergillus and fusarium were less performing and took even longer.

Key words: biological control, endophyte, entomopathogenic, Culex, Launea arborescens

THE EFFECTS OF MULCHING ON EROSION AND SURFACE RUNOFF IN SOILS GENERATED ON SEDIMENTARY PARENT MATERIAL

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ABSTRACT

Soil and water are among the natural resources that provide crucial services to humans. Water erosion is one of the most significant global problems threatening the sustainable use of these two essential natural resources. To reduce or prevent water erosion, various soil conservation practices are implemented worldwide. Mulching is one such practice used to protect both soil and water. The aim of this study is to determine the effects of different mulch types and application rates on some hydrological (surface runoff, runoff coefficient, time to runoff initiation) and erosional (soil loss, sediment concentration) behaviors of soils developed on metamorphic parent material under artificial rainfall conditions in the laboratory. For this purpose, three different mulch types (wheat straw, dry grass, and pistachio straw) were applied at three different rates (2, 4, 6 tons/ha) to experimental plots created under laboratory conditions. Artificial rainfall was applied at a rate of 97 mm/h for one hour. During the application, the time to runoff initiation was measured, and surface runoff and percolation water were collected to measure the mentioned parameters. The results of the study showed that pistachio mulch was the most effective application in reducing surface runoff and runoff coefficient. All three mulch types reduced soil loss, with straw mulch being the most effective. The most effective mulch application rate in reducing erosion was found to be 6 tons/ha.

Key words: mulching,runoff, rainfall simulation, erosion

CITRUS LIMON AS AN ALTERNATIVE INSECTICIDE FOR MOSQUITO CONTROL.

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ABSTRACT

The mosquito Culex pipiens is a well-known vector for diseases such as West Nile virus and filariasis, posing significant public health challenges. Traditional control methods depend on chemical insecticides, which can lead to environmental pollution and the development of insecticide resistance. As a result, natural alternatives, such as plant extracts, are gaining attention for their potential in mosquito control. In this study, the larvicidal effect of the aqueous extract of Citrus limon leaves on Culex pipiens larvae was investigated. Fresh Citrus limon leaves were collected, dried, and ground into a fine powder. An aqueous extract was prepared by soaking 100 grams of the leaf powder in one liter of distilled water, followed by filtration to obtain a clear solution. Various concentrations of the extract, ranging from 100 g/L to 180 g/L, were tested on fourth instar (L4) larvae of Culex pipiens. Larvae were exposed to each concentration for 24 hours, and the mortality rates were recorded. The results indicated a concentration-dependent larvicidal effect, with higher concentrations of the extract causing significantly greater mortality. The highest concentration (180 g/L) achieved the maximum larval mortality, suggesting that Citrus limon extract has strong larvicidal properties

Key words: Culex pipiens, plant extract, Citrus limon, larvicidal effect.

COMPARATIVE STUDY OF COMPOSITION AND NUTRITIONAL VALUE OF CHICKEN AND QUAIL EGGS

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ABSTRACT

This study aims to evaluate and to compare the composition and nutritional value of chikken and quail differnt egg's parts : schell, white and yolk. Results show that shell mass of chicken egg and quail egg presents 12.5 % and 7.5 % respectively, Albumen rate represents 53% and 60% respectively and yolk rate represents 30% and 35% of total egg mass respectively. Water content of chicken egg and quail egg is 65% and 70% of total egg mass. As to nutritional value, albumen proteins rate of chicken egg and quail egg is 11.5% and 11.4% of albumen total mass respectively. Concerning mineral content for both chicken and quail egg, the yolk is richer than albumen in calcium, magnisium and iron, and their concentrations are higher in chicken egg in comparison with quail egg and the concentrations of vitamins A, D, E, B1, B2, B3 in quail egg are higher than chicken egg. Based on previous results, it can be confirmed that the special and taditional interest given to quail egg as an important source of nutrients is validated, at the same time chicken egg is considerated as an important source of minerals.

Key words: chicken – quail - egg- albumen – yolk

IDENTIFICATION OF MATURE BOVINE MILK AND COLOSTRUM PROTEINS

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ABSTRACT

The objectif of this study is to identify the different protein fractions of whey and curd in bovine mature milk BBM and bovine colostrum BC by separation on sodium dodecyl sulfate polyacrylamide gel electrophoresis and the quantification of different casein fractions in BMM and BC after total casein separation and urea fractionation. The results showed that BMM and BC contain the same different protein fractions but the quantities are different, caseins are more abundant in BMM, while whey proteins are more abundant in BC. Total caseins TC urea fractionation of BMM and BC confirmed that TC fractions types α-, β- and κ-casein in both BMM and BC are present but their estimated quantities are different, α-, β- and κ-casein's concentrations in BMM are 1.5, 1.2 and 0.045 mg/ml respectively, and in BC are 0.13, 0.11 and 0.018 mg/ml respectively. It can be concluded that the containment of bovine mature milk and bovine colostrum in diffrent protein fractions is identical but their quantification demonstrate a significant difference.

Key words: bovine milk – colostrum – whey - caseins – electrophoresis

ELABORATION OF A DIETARY BREAD ENRICHED WITH RYE BRAN

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ABSTRACT

The aim of this work is to increase the value of the dietary fiber contained under covers of grains, called commonly« Bran » presenting a growing interest in therapy and in a prevention of several diseases. This investigation played a part to determine the physicochemical, microbiologic and toxicological characteristics of rye bran. The introduction of the bran on productions tests of special products like rye bread with a percentage of 30%. The physicochemical analysis of rye bran showed that bran contains considerable quantities of cellulose and starch. There is a total absence of any germs and any toxin and our rye bran has a good hygienic and toxicological quality. The finished product shows a good acceptability by the sensory panel.

Key words: Rye -Dietary fiber - Incorporation- Bran – Bread.

EFFECT OF HIGH PRESSURE HOMOGENIZATION ON EDIBLE FILM PROPERTIES OBTAINED FROM PUMPKIN SEED PROTEIN

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ABSTRACT

High-pressure homogenization is one of the non-thermal methods used to modify the physical, chemical and techno-functional properties of edible films obtained from proteins. In this study, high pressures of 25, 50, 75, 100 and 150 MPa were applied to the protein suspension (containing 4% protein concentration) obtained using proteins isolated from pumpkin seeds, a member of the Cucurbitaceae family. Then, it was mixed in a magnetic stirrer for 30 minutes at 90°C. After cooled room temperature, glycerol (30% of the protein amount) was added to the protein suspension to form a film solution and centrifuged at 5000 rpm for 10 minutes. The film solution, which was cleared of bubbles by centrifugation, was placed in 25 ml quantities in petri dishes with a diameter of 9 cm and dried in an oven with air circulation at 40°C for 24 hours. Thickness, color, transparency, water vapor permeability and texture analyzes were performed on the dried films. A decrease in thickness and water vapor permeability was observed as the homogenization pressure increased. The thickness of the film samples varied between 0.20-0.31 mm. The transparency values varied from 2.63 to 3.57. When the mechanical properties were examined, with the increase in high pressure, more flexible films were formed and the elongation at break value increased. The 150 MPa high pressure film sample had the least water vapor permeability (0.93 g.mm/m2.h.kPa) and the highest elongation at break value (151.32%). In this case, it can be concluded that high pressure improved the barrier and physicochemical properties of edible films prepared with proteins isolated from pumpkin seeds.

Key words: pumpkin seed protein; high pressure homogenization; edible film

CHARACTERISTICS OF DANGKE CHEESE INOCULATED BY STARTER CULTURE OF LACTOCOCCUS LACTIS SUBSP. LACTIS 0086, RIPENING AND COATING

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ABSTRACT

Dangke is a dairy product classified as a cheese type, a traditional product of the Enrekang Regency in South Sulawesi, Indonesia. Traditional Dangke has a short durability. The development of this product needs to be innovative by inoculating a bacteria starter culture to make a cultured cheese kind and to manufacture cheeses that have more extended durability by inoculating starter milk cultures. Dangke cheese was made from fresh cow's milk, then coagulated using papaya sap, diluted with aquades 1:10, and added to milk pasteurized at 85oC for 1 minute. After the curd reached 30oC, the starter culture of Lactococcus latcis subsp. lactis FNCC-0086 was added. The curd was formed using a semicircular mold with a diameter of 10 cm, pressed, placed on a cheese rack, ripening at 5, 15, and 25oC for 3, 6, 9, and 12 days, and coated with beewax. The Dangke cheese was then tested for its physical characteristics and nutritional composition and the ripening time of 12 days. The best characteristics of Dangke cheese: 78.4 % curd yield, pH 4.36, 0.53% lactic acid, 21.53 % protein, 48.98% water, 13.05% fat, 13.52% lactose, and 2.92% minerals after coating with beeswax.

Key words: Beewax, coating, dangke, Lactococcus subsp. lactis, ripening

CONVERSION OF BREAD WASTE TO VALUE-ADDED PRODUCTS

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ABSTRACT

In many countries of the world, waste bread is one of the most important components of food waste. Due to short shelf life and overproduction, ~10% of bread (900,000 tonnes) is wasted globally along the supply chain from producer to consumer consumption. This leads to a large amount of unused bread in supermarkets and households. However, waste bread has a high potential to be utilised as a renewable raw material. Bread waste is a potential biosource for the production of fermentable sugars. Starchy food waste is easily degradable and therefore a good choice as an alternative biomass source. Fermentation is the most researched strategy for the recycling of bakery waste. The saccharification and hydrolysis of starch in bread with the help of enzymes results in the release of simple sugars. These simple sugars can then be utilised by microorganisms and converted into valuable products. Ethanol, hydrogen, lactic acid, 2,3-butanediol, paramylon, and xanthan gum can be produced by microorganisms through further fermentation of the hydrolysate following hydrolysis. In this review, the most recent developments in the recycling of bread waste are discussed, the potential of producing novel chemicals is investigated, and the efficiency of using bread waste to produce the sugar used to make a new product through fermentation is determined.

Key words: Waste bread; Biomass, Food waste

PREVENTION OF MELANOSIS IN SHRIMP WITH THE COMBINATION OF ANTIMELANOTIC AGENTS AND VACUUM PACKAGING

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ABSTRACT

Rich protein and low-fat content make shrimp a valuable food. Shrimps have a short shelf life due to microbial spoilage and melanosis. Melanosis is an enzymatic phenomenon in shrimps that reduces their quality and market value. For melanosis, which develops quickly, the necessary prevention method should be applied immediately after catching it. Various techniques and mechanisms have been developed to prevent enzyme activity. The most common and most effective method is the use of sulfites. However, the fact that sulfite causes allergic reactions has led researchers to develop new methods. This study investigated the effects of using grape seed extract and sodium metabisulfite combined with vacuum packaging on melanosis formation in shrimp (Aristaeomorpha foliacea). The shrimps, which were obtained from the fishermen immediately after being caught, were treated with grape seed extract and sodium metabisulfite, and packaged with and without vacuum. Packaged shrimps were stored at 4°C. Melanosis development and color values (L*, a*, b*) were measured during storage at daily intervals. Grape seed and sodium metabisulfite applications were effective in delaying melanosis. Additionally, vacuum packaging showed a synergistic effect with antimelanotic agents in preventing melanosis. Compared to the control group, the most effective application was the sulfite vacuum combination, followed by the grape seed vacuum combination.

Key words: Shrimp, melanosis, prevention, grape seed, antimelanotic

INFLUENCE OF BOTANICAL SOURCE ON STARCH PROPERTIES MODIFIED BY COLD PLASMA PROCESSING

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ABSTRACT

Starch, an essential component of the food, cosmetics, and pharmaceutical sectors, is an abundant natural polysaccharide derived from various botanical sources. However, its inherent properties often restrict its applicability. Cold plasma treatment, an emerging tool, offers a promising approach to tailor starch characteristics for specific purposes. This study explores the influence of cereal botanical sources (corn, wheat, and rice) on plasma-induced starch modification, aiming to enhance starch functionality. Starches were subjected to radio-frequency (RF) plasma treatment under air at 40 W for 10 minutes following a 60-minute vacuum pre-treatment. Subsequent evaluations included moisture content, pH, solubility, swelling power, rheological behavior, molecular weight distribution, and crystalline degree for treated samples. Plasma treatment significantly altered the starches' physicochemical and structural properties, with the extent of modification varying among botanical sources due to their inherent structural differences. The amylose-to-amylopectin ratio, molecular weight distribution, moisture content, and crystalline degree strongly influenced the rheological behavior, as indicated by the fluid consistency coefficient and flow behavior index. Moisture content and the molecular weight distribution of amylose and amylopectin significantly impacted starch acidity and solubility, while swelling power was slightly influenced by moisture content and apparent amylose content. Wheat starch, with its higher amylose content, degree of polymerization, and lower polydispersity index exhibited greater resistance to RF plasma treatment compared to corn and rice starches. The order of sensitivity to plasma treatment was: rice > corn > wheat. Understanding the interplay between starch source and plasma treatment enables the development of optimized protocols for achieving desired starch characteristics for diverse applications.

Key words: corn, rice, RF plasma, starch modification, tailored properties, wheat

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DEGRADATION VS. CROSS-LINKING IN COLD PLASMA-MODIFIED STARCH

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ABSTRACT

Starch is a complex carbohydrate with diverse applications in both food and non-food industries but has certain limitations in its native form. Composed of glucose units organized in linear (amylose) and branched (amylopectin) structures, starch offers distinct functional properties. Cold plasma treatment can alter these properties through two competing processes: degradation or cross-linking. This study investigates the complex interaction between the amylose-to-amylopectin ratio and vacuum level as factors influencing these competing processes in plasma-modified starches. Two corn starches with different amylose-to-amylopectin ratios (normal and waxy) were exposed to radio-frequency (RF) plasma treatment under air at constant RF power (40 W) and treatment duration (10 minutes), using different vacuum times (10 and 60 minutes). The impact of plasma treatment on starch properties was evaluated through moisture content, pH, solubility, swelling power, rheological behavior, molecular weight distribution, and crystalline degree. The results revealed significant differences in starch properties based on amylose content and vacuum time. Both types of starch showed enhanced rheological properties after RF plasma treatment with a short vacuum time due to predominant cross-linking. Conversely, normal starch treated with RF plasma using a long vacuum time was more prone to degradation compared to waxy starch, indicating amylose's higher sensitivity to plasma treatment under low moisture conditions caused by a long vacuum time. These findings highlight the importance of controlling both starch composition and plasma treatment parameters to determine the dominance of competing processes (degradation, crosslinking, or molecular rearrangement) and achieve desired starch characteristics.

Key words: amylose, corn, interaction, RF plasma, vacuum

Acknowledgment: This work was supported by a grant from the Romanian Ministry of Research, Innovation and Digitalization, CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-1778, within PNCDI III.

CONTRIBUTION TO THE STUDY OF THE PHYSICO-CHEMICAL AND MICROBIOLOGICAL QUALITY OF DOUBLE TOMATO CONCENTRATE ENRICHED WITH OLIVE OIL

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ABSTRACT

The agri-food industry sector in Algeria constitutes an important link in the national industrial fabric due to the significant role it plays in the country's economy. This work aimed to contribute to the establishment of a database on the quality of double concentrated tomatoes preserved using a traditional Algerian method. The objective of our work is to evaluate the quality of double concentrated tomato enriched with different doses of olive oil, and its effect on physico-chemical parameters (pH, Brix), as well as microbiological parameters during one month of storage. Both types of analyses were conducted at the Microbiology Pedagogical Laboratory of the University 8 May 1945 - Guelma. Physico-chemical analyses revealed variations in pH, Brix, but always remained compliant with JORA standards. Microbiological analyses indicate that our product is free from any contamination, with a total absence of Staphylococcus aureus, Clostridium sulfite reducers, salmonella, fecal coliforms, and total coliforms. However, a decrease in total mesophilic aerobic flora, as well as yeasts and molds, is observed depending on the increase in the dose of added olive oil, specifically in the case of tomato concentrate supplemented with 20 ml of olive oil. Overall, the addition of olive oil has significantly reduced the bacterial flora of double concentrated tomatoes, while ensuring acceptable physico-chemical quality.

Key words: Double tomato concentrate; Olive oil; Physico-chemical quality; Microbiological quality.

EVALUATION OF THE MICROBIOLOGICAL QUALITY OF READY-TO-EAT FOOD PREPARATION (MAYONNAISE)

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ABSTRACT

Ready-to-eat foods are foodstuffs that do not require any further preparation before consumption. The objective of this work is to study the microbiological quality of ready-toeat foods such as mayonnaise and to contribute to the evaluation of the microbiological quality of this food we used different samples, namely artisanal mayonnaise, mayonnaise industrial packaged in glass and industrial mayonnaise packaged in plastic. Physico-chemical measurements were carried out at regular intervals (0, 7, 15, 30, 45, and 60 days) to demonstrate the quality of the three samples in terms of pH, acidity, humidity level, sugar content, matter (dry, fatty, mineral, and organic), the results obtained vary greatly between the different products studied. Where artisanal mayonnaise degrades quickly on a physicochemical level (acidification, lipid oxidation) while industrial mayonnaise packaged in glass presents the best physicochemical stability, slightly of higher quality than that packaged in plastic. As well as microbiological analyzes were also carried out in order to detect quality indicator germs: (FMAT, total and fecal coliforms, fecal streptococcus, Salmonella, Staphylococcus, Pseudomonas, ASR, yeasts and molds and psychrophilic flora). The microbiological results showed a progressive increase in the microbial load from the 15th day for artisanal mayonnaise for most germs. On the other hand, industrial mayonnaise presents low initial loads, with a slight increase up to 45 days therefore they remain compliant with standards just 30 days. It results that both types of packaging ensure good control of the overall microbial load thanks to highly controlled and sterile industrial production processes compared to artisanal mayonnaise which represents a fragile product.

Key words: Industrial mayonnaise, plastic, glass, Artisanal, microbiological.

CONTRIBUTION TO THE STUDY OF THE MICROBIOLOGICAL QUALITY OF PRESERVED VEGETABLES (MUSHROOMS, CORN AND PEAS)

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ABSTRACT

The agri-food industry in Algeria, in particular the canned food sector, has experienced a considerable boom in recent years to meet the growing demand of a rapidly expanding urban population. Canned food of vegetable origin, such as mushrooms, corn and peas, represent an important part of this market due to their practicality, long shelf life and nutritional value. The main objectif of the present work was to study and monitor the microbiological quality of canned food of vegetable origin (mushrooms, corn and peas) during their conservation for 1 month. The analyzes were carried out within a period of 30 days where t0; time of opning the cans, t1 (After 7 days, t2 (After 21 days) and t3 (After 1 month). Microbiological analyzes were done (Research and enumeration of FMAT, CT, CF, Yeasts and molds, Staphylococcus, fecal streptococcus, pseudomonas, Salmonella and shegella). The microbiological analysis showing that several germs appeared in the 3 canned samples. Values have been found within the limits of the standards concerning FMAT. For yeasts and mold appeared after t2 with varied values between (5 CFU/ml and 60 CFU /ml), the presence of CT and CF with values varying between (100 CFU /ml and 190 CFU/ml) at t3. With the presence of a very high load of anaerobic sulfito-reducing bacteria ASR their concentration presents an unsatisfactory quality food. Tolal absence of pathogenic germs were detected (Staphylococcus, Pseudomonas, fecal Streptococcus and Shegella). Our study allows us to conclude that our results are within the standards despite the presence of some bacterial and pathogenic germs but it stays within the limits of the algerian standards

Key words: Canned food, mushrooms, corn, peas, microbiological quality, phatogenic germs

SEAFOOD FRAUD: ITS ASPECTS ON TRADE, MARKETING AND FOOD SAFETY

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ABSTRACT

Intentional manipulation of the structure of foods for economic gain is called food fraud. Food fraud is an issue of increasing awareness, concern, and hazard. It is a global problem encountered in food supply chains. The increasing complexity of supply chain networks and the rapid development of technology contribute to increased opportunities for fraud. In addition to causing economic losses for food businesses, food fraud also causes losses to the image of countries in exporting products and poses a risk to consumer safety. Seafood is highly susceptible to fraud due to factors such as the similar appearance of many species, increasing global trade, and varying quality, supply, and demand. The extent of fraud in the seafood sector is difficult to ascertain because much fraudulent activity likely goes undetected. However, several studies in multiple countries have uncovered high rates of mislabeled seafood species. Mislabeling, species substitution, species adulteration, overglazing of frozen products, short weighting, and undeclared additives are the main food fraud examples in seafood. To protect consumers against food fraud it is necessary to detect food fraud by testing foods. For this, more effective and reliable test methods should be used. There is a need to combat food fraud effectively. For this, national food programs should be strengthened, new regulations should be developed, and intergovernmental cooperation should be increased.

Key words: Fraud, Seafood, Food safety, Economic loss

EFFECT OF STORAGE IN REFRIGERATOR SHELVES AND CARDBOARD VIOL ON EGG QUALITY AND SHELF LIFE

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ABSTRACT

The egg is a food, that is extremely important for balanced nutrition and health for humans due to the nutrients it contains and its high biological value. And it is a protein source that can be easily consumed by people from all walks of life out of its affordable prices. Shelled eggs are one of the best-protected foods against microorganisms on account of their structure. However, the high nutritional value creates a suitable environment for the development of microorganisms and prepares the conditions for the egg to spoil. Therefore, to prevent spoilage, some precautions must be taken. Storing in cold conditions, especially at home in the refrigerator, is a common practice for this purpose. Egg storage conditions and duration are among the most important criteria affecting egg quality and shelf life. The current study investigated the effects of storing eggs in refrigerator shelves or cardboard viols on the internal and external quality criteria of eggs. For this purpose, a total of 125 eggs obtained from 44-week-old Lohman Brown hens were used. Within the scope of the study, the initial, 15th and 30th day internal and external quality characteristics of the eggs were determined. According to the research results, the effect of storing eggs in the refrigerator shelves and the cardboard viol on weight loss, albumen width, albumen length, albumen index, Ph, Haugh Unit, yolk color L, a* and b* values was found to be statistically significant, while the effect on breaking resistance, shell weight, yolk weight, albumen weight, yolk height, yolk width, albumen height, albumen width, albumen length and yolk index was found to be insignificant. Egg weight loss, yolk and albumen index and Haugh Unit were found to be higher in eggs stored in the refrigerator shelves, while pH was higher in eggs stored in the cardboard viols. Although weight loss was higher in eggs stored in the refrigerator shelves, they were of better quality and darker color than eggs stored in the cardboard viols. In light of these results, it is recommended to store eggs on refrigerator shelves without using cardboard viols in terms of the shelf life of eggs.

Key words: Internal-external quality, egg, storage in the refrigerator, shelf life

PREPARATION AND CHARACTERIZATION OF PARAFFIN LOADED POLYLACTIC ACID BASED NANOFIBER USING THE SOLUTION BLOW SPINING METHOD

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ABSTRACT

Preventing temperature fluctuations in the cold chain and slowing down the development of microorganisms are important to prevent food waste. Phase change materials have the ability to store ambient heat and release it back to the environment during temperature changes, and their use in food packaging materials can maintain the ambient temperature in case the temperature rises or falls. n-tetradecane is paraffin and can store latent heat, and poly (lactic acid) is a biodegradable, nature-friendly polymer. In this study, polylactic acid (PLA) based paraffin loaded nanofiber was prepared useing solution blow spinning method and nanofiber was characterized by Scanning Electron Microscope (SEM) and Differential Scanning Calorimetry (DSC). Paraffin in nanofiber structures was observed in SEM images. According to DSC results, a latent heat storage ability of 228kj/kg. PLA-based paraffin-loaded nanofibers can prevent cold chain fluctuations when applied as packaging material for foods stored at low temperatures.

Key words: Phase change material, nanofiber, tetradecane, PLA.

ANTI-ADHESIVE PROPERTIES OF CULINARY AND MEDICINAL PLANTS AGAINST STAPHYLOCOCCUS AUREUS ADHESION TO MATERIALS COMMONLY FOUND IN CATERING AND DOMESTIC KITCHENS

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ABSTRACT

The aim of this work was to investigate the effect of extracts of four plants (Allium sativum, Zingiber officinale, Thymus leptobotrys and Lavandula dentata) on physicochemical properties of marble and granite, surfaces commonly found in catering and domestic kitchens, and on the S. aureus adhesion on these surfaces as pathogen bacteria that cause outbreak disease. Indeed, hydrophobicity, electrons donor (γ-) and electrons acceptor (γ+) characters of untreated and treated granite and marble were assessed using contact angle measurement. The both supports indicated less hydrophobic character after treatment with extracts of plants. For treated granite, the electrons donor and electrons acceptor characters were high than untreated one. While, for treated marble the electrons donor and electrons acceptor character were less than untreated one except the high value of electrons acceptor character after treatment by Allium sativum. The adhesion of S. aureus to marble and granite is largely influenced by the extracts of the plants. Before treatment with the extracts of the plants, the adhesion is very high on both surfaces, reaches 30 106 CFU/cm2 for marble, and 17.5 106 CFU/cm2 for granite. Whereas, after treatment with the extracts of the plants, the level of S. aureus adhesion on marble and granite decreased according to the plant tested reaches a maximum of 100% of inhibition. Based on these results, the natural products tested could be considered as an alternative source of bioactive molecules for limited and inhibited the S. aureus adhesion on marble and granite surfaces.

Key words: biofilm, adhesion, physicochemical properties, Staphylococcus aureus, culinary and medicinal plants, granite and marble.

THE REPULSIVE EFFECT OF THE THREE SPECIES OF THE GENUS CITRUS (C. RETICULATA, C. SINENSIS AND C. LIMON) AGAINST STORED GRAIN PEST SPECIES OF STORED PRODUCT

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ABSTRACT

This work aims to evaluate and compare the repulsive effect of essential oils extracted from the medicinal plants Citrus reticulata, Citrus sinensis and Citrus limon against three grain pest species of stored foods Ephestia kuehniella, Ectomyelois ceratoniae, and Tribolium castaneum. The Essential Oils extracted by hydrodistillation from the fruit peel of the genus Citrus presented a very high and notable percentage of the yield in the order of 1.91%, 4.06% and 3.6% for C. reticulate, C. sinensis, and C. limon respectively. The repulsion test shows that the essential oils of the three citrus fruits have a significant repulsive effect against the adults of T. castanum, with a repulsion rate of 83.33%, 68.33%, and 83.33% for C. réticulata, C. sinensis, and C. limon respectively. Their effectiveness remains less against the larvae of Ephestia kuehniella and Ectomyelois ceratoniae whose essential oil of Citrus limon has a feeble repulsive effect with a repulsion rate of about 11.33% and 16.66% respectively, while essential oils C. reticulata is considered weakly repulsive with a repulsion rate of about 29.99% and 24.99% respectively. Concerning the essential oils of C. sinensis, it has a moderately repellent and very weakly repellent effect on the larvae of the flour borer and the larvae of the carob with a repulsion rate of about 54.99% and 9.99% respectively. Our results are very encouraging and will allow a better valorization of the peel of the genus Citrus of our region, that they constitute by-products that can be used as bioinsecticide on pests of stored products such as T. castaneum and E. kuehniella.

Key words: Essential Oils, Citrus reticulata, Citrus sinensis, Citrus limon, Ephestia kuehniella, Ectomyelois ceratoniae, Tribolium confusum, Repellent test, bioinsecticide

PHYSICAL PROPERTIES AND FLOWABILITY OF COMMERCIAL TOMATO CREAM SOUP AND TARHANA SOUP POWDERS

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ABSTRACT

The aim of this study was to investigate physical and thermophysical properties of commercial powdered tomato soups and tomato soups with tarhana noodles. Six samples obtained from different producer were analyzed, from which: three samples of tomato cream soup without noodles and three samples of tomato soup with tarhana noodles. Samples were analyzed for physical (liquid density, viscosity, bulk density, tapped density, angle of repose and powder flowability properties) and thermophysical properties (specific heat capacity, heat conductivity coefficient, thermal diffusion coefficient). Thermophysical properties were estimated from moisture content in samples. Results showed that tomato soup samples with tarhana noodles had thinner consistency, lower viscosity, higher liquid, bulk and tapped densities, lower adhesiveness and lower angle of repose in comparison to tomato cream soups. Density of liquid soups ranged from 979.6 to 1340 kg/m3 for cream soups and between 993.2 and 1030 for tarhana soups. Angle of repose had values 39.44 – 43.15 degrees for tomato cream soups and 36.16 – 39.16 degrees for tarhana soups. Considering values of Hausner ratio and angle of repose, it can be concluded that tomato soups with tarhana noodles had higher flowability and lower cohesiveness in comparison to tomato cream soup without noodles. Values of angle of repose indicated that tarhana soup powders had moderate/fair flowability, while tomato cream soup powder had very poor flowability. Samples with higher noodle content had lower angle of repose, higher flowability, higher density and lower dispersibility. Kinematic viscosity ranged between 15.72 and 132 mm2/s. Thermophysical properties values increased increasing of water content in samples.

Key words: tomato soup, tarhan soup, physical properties, flowability, thermophysical properties

IS CARROT A SAFE FOOD OR A SILENT KILLER?

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ABSTRACT

Carrot (Daucus carota L) is one of the most consumed root vegetables worldwide, with abundant global production every year. It is important natural source of bioactive compounds having significant health-promoting properties. Therefore, carrots are considered as a functional food. Along with beneficial compounds present, edible part of carrot might contain various toxic substances, such as heavy metals. Prospective accumulation of heavy metals diminishes carrot nutritional quality and safety, and raises serious human health concern due to conditions resulting from ingestion and accumulation of these metals in human body. Nickel is ubiquitous metal in the environment, air, water, and soil, deriving from natural and anthropogenic sources. Since long-term ingestion of nickel enriched food seriously impairs the health of the consumer, the European Food Safety Authority has recently set a limit of tolerable daily intake of nickel. Furthermore, European Commission defined maximum permitted level of nickel in root vegetables of 0.9 mg/kg wet weight. Since agricultural practice might affect nickel concentration in vegetables, aims of the present investigation were (a) to determine the concentrations of nickel in edible parts of carrots produced by conventional or organic practice; (b) to estimate human health risks related to consumption of potentially contaminated vegetables. Concentration of nickel was below abovementioned permitted level in all samples. However, average nickel concentration of conventional carrots was lower than of organic ones, contrary to our expectation. The safety of analyzed carrot samples was confirmed by most of assessed hazard quotients. However, high carcinogenic risk due to consumption of carrots analyzed in this work was evident. Results of this study suggest the necessity and encourage authorities to urgently proscribe strict legislatives related to permissible nickel concentration in edible plants, and to establish their regular control and monitoring of the safety in countries outside of the European Union.

Key words: carrot, human health risk, nickel, vegetables

HEAVY METALS ACCUMULATION (AS, CU, FE, MN, NI, CU AND CD) IN VEGETABLES RELATED TO SOIL POLLUTION; HEALTH ASSESSMENT

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ABSTRACT

The loading of agricultural soil with various potentially toxic trace elements have become a serious concern across the world, due to their possible translocation in cultivated plants. Accumulation of these elements in plant organs reduces their quality and safety for human consumption, due to a plant's pollution and modification of metabolic pathways and bioactive compounds production. The cultivation of vegetables and medicinal plants should be strictly regulated and controlled in accordance with the standards of healthy food production. The aim of the present study was evaluation of quality and safety of celery (Apium graveolens) and parsley (Petroselinum crispum) cultivated in Cd polluted soil. We examined the presence of potentially toxic trace elements (PTEs): As, Cu, Fe, Mn, Ni, Cu and Cd in soil and studied species, as well as their physiological responses to different Cd exposures (control–without Cd addition, 3 and 6 µg/g Cd of dry soil). The plants were grown in greenhouse using sandy fluvisol for 5 weeks in a completely randomized block design, in 6 treatments: C0–celery control, C3–celery with 3 µg/g Cd, C6–celery with 6 µg/g Cd, P0–parsley control, P3–parsley with 3 µg/g Cd, P6–parsley with 6 µg/g Cd, with 3 replicates per treatment. Optimal soil moisture of 60–70% was kept. Temperature ranged between 22 and 30°C, while light condition was 16/8 h day/night. The concentration of PTEs was measured by inductively coupled plasma mass spectrometry. The tolerance index, bioaccumulation factor, human health risk, plant tolerance and physiological parameters were determined. Following elevation of Cd in plants, both species showed increasing trend of As, Pb and Cu in plants, which overcome safe limits, with exception for Cu. Celery showed strong phytoextraction ability with high potential to tolerate Cd due to the efficient antioxidative machinery. Investigated hazard quotients (HQ), hazard index (HI) and cancerogenic risk (CR), indicated that chronic consumption of contaminated herbs can consequently endanger human health. Toxicological analyzes must be carried out continuously, and the (bio) chemical characteristics of the plants consumed should represent the most important parameters that determine the use / further purpose.

Key words: soil Cd-contamination, celery, parsley, phytoextraction potential, human health risk

PHYTOCHEMICAL PROPERTIES AND APPLICATIONS OF FIG SEEDS IN THE FOOD INDUSTRY: NUTRITIONAL VALUE, HEALTH BENEFITS, AND COMMERCIAL POTENTIAL

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ABSTRACT

The fig (Ficus carica L.) is a deciduous fruit tree in temperate climates. The cultivation of figs dates back to ancient Anatolia, coinciding with human history. Historical records indicate that figs were first cultivated in the Arabian Peninsula and Middle East. In the Mediterranean diet, figs are consumed as a symbol of healthy and long life, and in recent years, they have gained considerable attention as an exotic fruit in Western and Northern countries. This interest is primarily due to the high nutritional content of figs, their richness in fiber, minerals, and polyphenols, and the fact that they contain no fat or cholesterol, thereby increasing their commercial value. Fig seeds aid digestion due to their high fiber content, helping to lower cholesterol levels and protect against cardiovascular diseases. Additionally, fig seeds have a protective effect on metabolism due to their content of vitamins E and D. Studies have shown that fig seeds are rich in omega-3, omega-6, and omega-9 fatty acids. Fig seed oil is richer in unsaturated fatty acids than saturated ones, suggesting its potential use as a dietary supplement. Furthermore, fig seeds are found to have a lactogenic effect, provide energy, and be beneficial for diabetics and those with weight issues. Fig seeds, with their high-fat content, carbohydrates, calcium, potassium, phosphorus, and unsaturated fatty acids, enhance the nutritional value and stability of food products. When used in bicuit formulations, Fig seed powder increases fiber content, total phenolic content, and antioxidant activity, and also improves the nutritional value and stability of bakery products, dairy products, and beverages. This study aims to determine the phytochemical properties of fig seed oil and its usability in terms of food and human health. The potential health benefits, commercial value, and applications of fig seed oil in food products have been examined in this context.

Key words: Fig, Ficus carica L., Human Health, Food Industry, Fig Seed Oil

APPLICATION OF EMULSION BASED ENCAPSULATION METHODS IN FOOD TECHNOLOGY: A REVIEW

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ABSTRACT

Encapsulation is a method of entrapping and protecting sensitive active compounds into the structure of an encapsulation carrier (coating material). Capsules of different dimensions (macro, micro, and nano) are obtained as encapsulation products. Each capsule consists of two main materials: 1) active compound (encapsulant) and 2) carrier (coating material). The main aim of encapsulation is to protect active compounds from degradation influenced by different external factors. Encapsulation is a technique that can increase the stability and improve the usability and availability of many active and biologically valuable natural ingredients. It is mostly used in the pharmaceutical industry, but in recent times it is increasingly used in food technology. Emulsification is one of the most important encapsulation methods suitable for use in food technology. It can be used alone or in combination with other encapsulation methods. Formation of emulsion can be used for the encapsulation of hydrosoluble and liposoluble liquid substances. The size of droplets within such emulsions ranges from 0.1-5000 μm. The main adventages of this encapsulation method are good protection of the encapsulated substance from high temperatures and oxidation during heat treatment and drying, the possibility of encapsulating liposoluble and hydrosoluble substances, and controlled release of the active substance. Emulsion-based techniques are widespread encapsulation methods suitable for the food industry. A wide range of active substances can be encapsulated, such as probiotic bacteria, proteins, amino acids, essential oils, flavonoids, vitamin E, lutein, beta carotene, fish oil, omega 3 fatty acids, aspartame and other sweeteners, xylitol and menthol in chewing gum (prolonged cooling effect), curcumin, catechin, vitamin C, vitamin B12 (for the enrichment of dairy products), vitamin B1 and herbal extracts. Obtained capsules can be applied in the production of functional milk and dairy products, salad sauces and dressings, fruit juices, dried soup mixtures, functional meat products, the oil industry, and confectionery.

Key words: Encapsulation, emulsions, food technology, stability, functional food

ANTIMICROBIAL EFFECTS OF POLYPHENOLIC EXTRACTS FROM AGRI-FOOD BY-PRODUCTS AGAINST LISTERIA MONOCYTOGENES STRAINS

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ABSTRACT

Listeriosis, a severe zoonotic disease caused by Listeria monocytogenes (LMO), is one of the most frequently reported zoonoses in the European Union, with 2,739 confirmed cases of illness in 2022, including 1,330 hospitalizations and 286 deaths. This disease is associated with different food types such as meat, dairy products, vegetables, and ready-to-eat products due to the microorganism's ability to survive in diverse environmental conditions, including low pH, high salt concentrations, and cold temperatures. Therefore, effective control and prevention measures are crucial. Moreover, consumers' mistrust regarding synthetic additives has promoted interest towards natural substances as food preservatives. Food industry by-products are often rich in bioactive compounds, which could have antibacterial and antioxidant properties and can therefore be used to improve food safety and quality, in a circular economy perspective. This study aimed to evaluate the antimicrobial efficacy of various agri-food by-products, such as spent coffee grounds, hazelnut skin extract (800 mg/g polyphenols), and different types of olive mill wastewater extracts (liquid extract with 50 mg/g of polyphenols mainly hydroxytyrosol and tyrosol, spray-dry extract with 50 mg/g of polyphenols mainly hydroxytyrosol and tyrosol, and a liquid extract with 732,2 mg/g of polyphenols mainly secoiridoids), against reference strains (WDCM 00020, WDCM 00021) and wild strains (from smoked trout and surface of a meat processing plant) of LMO. Furthermore, also benzalkonium chloride, an antiseptic and disinfectant quaternary ammonium compound, was tested. The antibacterial activity was assessed by broth microdilution method to determine the Minimal Inhibitory Concentration (MIC) and Minimal Bactericidal Concentration (MBC) values. Spent coffee ground did not exhibit any antibacterial activity; hazelnut skin extract and olive mill wastewater extract with secoiridoids showed MIC/MBC values ranging from 2 to 8 mg polyphenols/ml; both liquid and spray-dried olive mill wastewater extracts reported MIC/MBC values ranging from 0,4 to 1,6 mg polyphenols/ml. Benzalkonium chloride displayed potent antibacterial activity at very low concentrations, with MIC values ranging from 0,0005 to 0,002 mg/ml and MBC values from 0,0001 to 0,004 mg/ml. Differences in MIC and MBC values were observed depending on the LMO strains, indicating varying antimicrobial resistance. The promising antimicrobial activity of some agri-food by products, especially olive mill wastewaters, suggests their potential application as natural preservatives in the food industry.
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Key words: food preservation, by-products reuse, food safety, olive mill wastewater, spent coffee ground, hazelnut skin

AN ASSESSMENT OF THE PROTEINS AT THE BASIC FOODS RECOMMENDED FOR A SIMPLE BREAKFAST AND ROLE OF PROTEINS IN A HEALTHY DIET

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ABSTRACT

Breakfast is the most important meal in the diet, especially for children, and breakfast consumers tend to have a diet richer in nutrients and micronutrients. Getting enough protein daily is essential for the overall health. Researches about the effects of the quantity of protein consumed on appetitive peptide concentrations began in the mid 2000's (1, 3). Findings were for positive effects of proteins, but not compelling. Meals containing 14%, 25% and 50% protein (1, 3) increased GLP-1, PYY, and glucagon dose dependently but had no effect on GIP, CCK, or ghrelin. Feelings of fullness also increased dose dependently; however, this had no effect on ad libitum energy intake (1,2). Based on recent evidence higher-protein diets are suggested for improvements in cardiometabolic risk factors. This article provides an overview of the literature that explores the role of proteins in a healthy diet and to present an evaluation of proteins presence at some basic food than can be recommended for a simple and fast breakfast. Khejdal method is used for the determination of proteins levels at some foods (eggs, milk, cheese, bread). Based on the study results, we can say that Current evidence suggests that higher-protein diets that contain between 1.2 and 1.6 g protein · kg-1 · d-1 and potentially include meal-specific protein quantities of at least ~25-30 g protein/meal provide improvements in appetite, body weight management, cardiometabolic risk factors, or all of these health outcomes (2). In many studies are incorporated a mixture of proteins which typically vary within and between the lower- and higher-protein meals, and so it is difficult to assess the contribution of protein quantity due to the protein quality effects (2). However, it is necessary to provide further strategies to increase dietary compliance with long-term dietary interventions.

ABBREVIATIONS

GLP-1: glucagon-like peptide 1
PYY: peptide tyrosine tyrosine
CCK: Cholecystokinin
GIP: gastrointestinal (GI) physiology,

Key words: healthy diet, proteins' role, breakfast

LISTERIA MONOCYTOGENES GROWTH KINETICS DURING THE SHELF LIFE OF EXPERIMENTALLY FORMULATED PORK BURGERS

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ABSTRACT

Although the use of low storage temperatures is a common and effective practice to limit microbial growth, it does not completely eliminate the risk to consumers, as some harmuful pathogens can still proliferate. Listeria monocytogenes (LM), for example, can grow at refrigeration temperatures, posing a potential hazard. Moreover, ground meat preparations are highly vulnerable to microbial proliferation, which can reduce their shelf life and, more importantly, facilitate the presence of pathogens with potential risks to food safety.To ensure safe food for consumers, numerous recent studies have explored the antimicrobial activity of various natural extracts containing bioactive molecules. Among these, polyphenolic compounds derived from olive mill wastewater (OMWW), the main by-product of olive oil production, are of particular interest. These molecules, alone or in combination, appear capable of inhibiting or slowing the growth of various bacterial species, both Gram-positive and Gram-negative, in vitro. The aim of this study was to evaluate the antibacterial effect of a powder produced from a polyphenolic concentrate obtained from OMWW and a mixture of natural flavors commonly used in the local production of pork burgers against LM. To assess the capability of the polyphenolic extract and the commercial mix in limiting the LM growth in food systems, the effect of adding these substances to experimentally produced pork burgers was evaluated. Experimental hamburger formulations included the inoculation of LM into the meat batter and the addition of OMWW extracts or the commercial mix. Positive and negative controls were also set up. For the burger formulation, a concentration of 70 g/kg of the OMWW extract was used, while for the commercial mix, the manufacturer's recommended dose of 10 g/kg was applied. Once produced, the experimental samples were stored at refrigeration temperature for a 10-days shelf life, to simulate domestic storage. The behavior of LM during the shelf life showed differences among some of the experimental groups. Specifically, the OMWW treated samples (LMO) showed a significant modulation of microbial growth compared to the control sample (CLM) and the sample produced with commercial mix (LMM) ($P<0.05$). Preliminary results suggest that polyphenols influenced the growth of LMO primarily by affecting the microorganism's adaptation phase. Further investigations will be necessary to define the best strategies for using these natural extracts from agronomic by-products to enhance food safety for the benefit of the consumer.

Key words: food safety, olive mill waste waters, poliphenolic extracts, natural compounds,

DETERMINATION OF THE PHYTOCHEMICAL PROPERTIES OF MULBERRY (MORUS SPP.) SEED OIL AND ITS USAGE POTENTIAL IN THE FOOD INDUSTRY AND HUMAN HEALTH

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ABSTRACT

Mulberry is a berry known worldwide for its over 150 species, commonly represented by Morus alba L. (white mulberry), Morus nigra L. (black mulberry), and Morus rubra L. (red mulberry). The mulberry plant has a wide cultivation area, growing in both the northern hemisphere and tropical and subtropical climates. Mulberries are consumed in various forms depending on traditional methods, including fresh, dried, juice, concentrate, molasses, and fruit leather. Mulberries offer numerous health benefits. They can be used medicinally as anthelmintic, anti-anemic, anti-diabetic, odontalgic, expectorant, laxative, emetic, hypoglycemic, and for treating dysentery and oral lesions. Additionally, mulberry seed oil is rich in δ-tocopherol, providing high antioxidant capacity, and can be added to other edible vegetable oils to enhance nutritional value in dietary food products. Significant amounts of tocopherols and sterols in mulberry seed oil serve as antioxidants in diets and dietary supplements. The essential oils in mulberry seeds are mainly composed of monoterpenes, alkanes, and aldehydes. With its L-limonene content, mulberry seeds are also utilized as by-products in the juice and wine industries. The oil content of mulberry seeds is similar to that of high-oil sesame. Obtaining bioactive substances from seed waste in mulberry processing facilities is natural, low-cost, and straightforward. These mulberry wastes can be converted into high-value compounds for the production of food, pharmaceuticals, cosmetics, and other industrial products. This study aims to investigate the chemical properties of mulberry seed oil in detail and highlight its potential applications in the food and pharmaceutical industries. Mulberry seed oil is notable for its high antioxidant capacity and rich tocopherol content, making it a valuable component in dietary supplements and food products. Furthermore, the use of mulberry seed oil in phytotherapeutic applications is important for its health benefits. Converting the waste produced in mulberry seed processing facilities into bioactive substances at a low cost enables the production of high-value products for food, pharmaceuticals, cosmetics, and other industries. In this context, the study aims to demonstrate the multifaceted industrial and health potential of mulberry seed oil.

Key words: Mulberry, mulberry seed, mulberry seed oil, fatty acids, tocopherols

INVESTIGATION OF THE EFFECT OF MEMBRANE REUSE ON ULTRAFILTRATION PERFORMANCE IN THE RECOVERY OF PHENOLIC COMPOUNDS FROM GRAPE POMACE

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ABSTRACT

This study aims to reveal the effect of membrane reuse on the process performance in ultrafiltration (UF) in concentrating phenolic compounds from red grape pomace (GP). For this purpose, the feed prepared with pomace was obtained from fermentation and maceration of Vitis vinifera cv. Syrah was ultrafiltrated with a 10 kDa PES membrane for 180 minutes at room temperature at 2 bar TMP and 40 L h-1 axial feed flow rate. The same membrane was reused 5 times in UF and the process performance was evaluated for each UF in terms of permeate flow behaviour, weight reduction factor, hydraulic permeability and cleaning efficiency. The highest initial permeation flux value was obtained in the 1st use (29.6 kg m-2 h-1) of the membrane, followed by the 2nd (28.6 kg m-2 h-1), 3rd (28.1 kg m-2 h-1), 4th (27.1 kg m-2 h-1) and 5th (24.4 kg m-2 h-1) uses, respectively. A total flux decrease of approximately 40% was detected with each use of the UF membrane, with the largest decrease of 42.9% occurring in the 5th use. The 1st use was found to be more advantageous than the other membranes in terms of weight reduction factor. The hydraulic permeability value of the membrane decreased from 94.1% to 80.4% as the number of uses increased. Parallel to this, the intrinsic membrane resistances were listed from highest to lowest as 5th use > 4th use > 3rd use > 2nd use > 1st use. The cleaning efficiency obtained after alkaline cleaning using 0.1% (w/w) NaOH was found to be the highest at 87% in the first use of the membrane. This was followed by the 2nd and 4th uses, respectively, while the 3rd and 5th uses had the same cleaning efficiency of 83%. Considering all the results, it was determined that the sequential use of the membrane for the recovery of phenolics from red grape pomace was suitable in terms of concentration and cleaning performance due to the structural properties such as hydrophilicity thought to be imparted in the production of the membrane.

Key words: Grape pomace, valorization, ultrafiltration, bioactive substances, membrane performance

THE COMPARISON OF FUNCTIONAL BEVERAGES BASED ON THEIR NUTRITIONAL VALUES

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ABSTRACT

Functional foods are similar to conventional foods (beverage, food matrix) and have essential nutritional functions. They are biologically active foods that can reduce the risk of chronic diseases and be consumed as part of daily nutrition. Functional drinks in this group are generally rich in vitamins, minerals, amino acids, plant extracts, or other bioactive ingredients. They are formulated to meet various needs, such as increasing energy, providing vitality, increasing concentration, and supporting immunity. Examples of functional drinks: Energy drinks, sports drinks, vitamin waters, probiotic drinks and antioxidant drinks can be given. Unlike everyday beverages, these drinks are usually enriched with special ingredients and are generally low in calories. The popularity of functional beverages is increasing among consumers who want to adapt to the intense pace brought by the modern lifestyle. As a result, functional drinks are generally formulated for various purposes and are preferred by consumers to improve their health and performance.

Key words: Functional food, Probiotic, Drinks

USE OF NETTLE AS A FOOD SOURCE AND FOR MEDICAL PURPOSES

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ABSTRACT

Nettle (Urtica dioica) is a plant with serrated leaves and tough fibrous stems belonging to the Urticaceae family. Its flowers are generally greenish in color. It is widespread worldwide, especially in temperate climates and moist soils. Nettle has been used by humans for both nutritional and medicinal purposes for thousands of years. Its young leaves are usually consumed and have a spinach-like flavor when cooked. Dried leaves can also be consumed as tea. Nettle seeds can also be ground into flour or used as grains, providing a gluten-free alternative, especially for celiac patients. Its nutritional content is rich in iron, calcium, magnesium, and vitamins A and C. Its iron content is an essential source for those with iron deficiency anemia. Also rich in antioxidants, nettle supports the immune system, can reduce inflammation, and improve skin health. It has been frequently used in traditional medicine as a diuretic, blood purifier, and against skin diseases. Additionally, studies have shown that nettle has anti-inflammatory properties. This feature can be used to treat joint inflammations and skin problems such as acne and eczema. Nettle also has blood sugar-lowering effects and can be considered supportive in diabetes. Additionally, nettle can support hair and nail health and reduce hair loss.

Key words: nettle, health, food, antioxidant

CHARACTERIZATION OF DOMESTICALLY SYNTHESIZED COPPER PHTHALOCYANINE BLUE PIGMENTS AND EVALUATION OF THEIR USE AS COLORANTS IN AQUACULTURE PACKAGING MATERIALS

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ABSTRACT

The blue color is often associated with aquaculture making it a common choice for seafood product packaging. Therefore, in this study, domestically synthesized copper phthalocyanine-derived blue pigments are characterized and their use as colorants in gelatin-based materials is evaluated. For characterization, synthesized samples were compared with imported commercial PB15:1 (control) in terms of FTIR, HPLC analysis, and Cu amount. Ash content and the amount of copper present in the existing compound were also determined and compared with the commercial control. It was determined that D1 and D2 samples were the ones closest to the commercial powder in terms of both Cu amount and FTIR results. The selected sample coded D1 was further added to gelatine-containing solutions at 0.5 wt% with respect to the solution. After stirring and drying, blue pigment containing film texture profile properties such as hardness, and L, a, b, ΔE parameters were measured. Results indicated that blue pigment-added gelatine films can be used for aquaculture packaging purposes.

Key words: Phthalocyanine, Blue pigment, Food contact substance, Aquaculture packaging, Texture, Color

FATTY ACID COMPOSITION OF ÇAKILDAK HAZELNUTS STORED UNDER VARIOUS CONDITIONS

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ABSTRACT

This project, conducted at the Hazelnut Research Institute Directorate between 2017 and 2020, investigated the effects of different storage conditions on the fatty acid composition of the Çakıldak hazelnut variety. The hazelnuts were stored under three different conditions: room conditions (ordinary and traditional method), 60% relative humidity at +4°C, and a modified atmosphere (1% oxygen, 99% nitrogen). To assess the impact of these storage conditions on hazelnut quality, fatty acids were periodically analyzed over a 20-month period.
The primary fatty acid in the Çakıldak hazelnut variety is oleic acid (C18:1), followed by linoleic acid (C18:2) and palmitic acid (C16:0). It was found that the unsaturated fatty acid ratio in Çakıldak hazelnuts was higher than the saturated fatty acid ratio. Notably, the modified atmosphere storage method was found to be particularly effective in maintaining the oleic acid content during storage.

Key words: hazelnut, oleic acid, humidity, modified atmosphere, Çakıldak

AN INSIGHT INTO TUNISIAN CONSUMERS' KNOWLEDGE AND ATTITUDES TOWARDS MICROALGAE

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ABSTRACT

The continuous growth of world population and the scarcity of natural resources make food security a hot research topic. In this context, using alternatives resources becomes urgent. Microalgae are among main component of aquatic ecosystem that could be suggested for food consumption thanks to their nutritional attributes. Meanwhile, introduction of microalgae as a common ingredient in diet relies on consumers' acceptance and acceptability. This research aimed to evaluate Tunisian consumers' knowledge and attitude toward microalgae. An online survey with conducted with 335 respondents (50.5% Women and 49.5% Men), from January 15th to February 14th, 2022. Respondents were asked about their knowledge about their demographics, microalgae, their production, uses and to which extent would they be willing to consume them. 58.1% of respondents did not know about microalgae and 82.9% ignore how they could be produced. When different names of microalgae were suggested 49.4% of respondent reported that they heard about spirulina while 41.9%. Meanwhile, 58.1% did not know that spirulina is a microalga. Interestingly, when nutritional interests of aquatic organisms 74.6% of interviewees were willing to consuming them. These results highlight the narrow knowledge of Tunisian consumers. Accordingly, introducing them in Tunisian diet would require the use of effective strategies in terms of communication campaign, food formulation and marketing strategy.

Key words: Microalgae, survey, knowledge, consumer acceptability

EFFECT OF GERMINATION ON PHYSICOCHEMICAL, CHEMICAL AND NUTRITIONAL PROPERTIES OF LEGUMES

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ABSTRACT

Legumes are a very healthy and important part of millions of people's diets around the world. All over the world, the production of legumes has grown. The most common types of legumes eaten are beans, lentils, peas, chickpeas, and broad beans. This is because they are low in lipids and high in complex carbohydrates, vitamins, and minerals. Often, their high protein content necessitates their addition to other protein sources. Most of the proteins in legumes are storage proteins. The other proteins are enzymes, as well as two types of macromolecules called antinutrients (lectins and protease inhibitors). Many people germinate legume seeds to make sprouts that you can eat. This simple bioprocess allows legume seeds to have more health benefits. Germination generally enhances the bioavailability of minerals, improves the digestibility of proteins and essential amino acids, and increases the availability of vitamins. It also makes starch, lipids, and antinutritional factors less present in legumes. This process also alters the physicochemical properties of flours derived from germinated legumes, thereby influencing the functional properties of the resulting foods. This study examined the physicochemical, chemical, and nutritional values of legumes following their germination.

Key words: Legumes, Germination, Bioactive Compounds, Physicochemical Properties, Nutritional Profile

IMPACT OF LEGUME GERMINATION ON BIOACTIVE COMPOUNDS AND THEIR BENEFITS TO HUMAN HEALTH

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ABSTRACT

Plants that are legumes are in the family Leguminosae. Chickpeas, lentils, beans and peas are the varieties of legumes that are consumed the most commonly in the worldwide. They have a high nutritional content and are an excellent source of proteins, dietary fiber, vitamins and minerals. The germination of legumes is a simple and inexpensive process. Recent research has shown that the process of germination can further enhance the medical and nutritional properties of legumes. In addition, germination has the potential to enhance human nutrition and health by preventing malnutrition and chronic diseases. This is because it can augment the levels of certain nutrients, bioactive compounds and biological activities in edible seeds. Germination can accumulate various bioactive compounds in germinated legumes, such as g-aminobutyric acid (GABA), polyphenols and vitamins. Several biological activities, including as anti-inflammatory, antidiabetic, anticancer, antioxidant, antibacterial, antihypertensive and immunomodulatory capabilities have been discovered for bioactive compounds as a result of their investigation. Overall, germinated legumes rich in bioactive compounds and nutrients can be considered for the prevention of some chronic diseases and malnutrition as functional foods. In this study, the effect of germination on bioactive components in legumes and their benefits for human health were examined.

Key words: Bioactive compounds, Legumes, Germination of legumes, Human health

SOME PHYSICOCHEMICAL PROPERTIES OF THE FRUITS AND SEEDS OF VIBURNUM L. SPECIES GROWING IN TURKEY

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ABSTRACT

In this study, it was aimed to determine some physicochemical properties of fruits and seeds of Viburnum L. species collected in two different years and grown naturally in different provinces of Turkey (Kayseri/Melikgazi, Ankara/Yenimahalle, Amasya/Taşova, Balıkesir/Erdek) and to determine the oil yield and mineral substance contents of the seeds and to compare between species. According to the results of the study, when the averages of the two-year data of the fruits of Viburnum species were evaluated, the averages of moisture content, ash content, dietary fiber content and protein content varied between 7,10-8,83 %, 2,44-5,64 %, 35,92- 65,03 g/100g, 2,35-3,88 %, respectively. On the other hand, when the averages of the two-year data of the seeds of Viburnum species were evaluated, seed length, seed width, thousand grain weight, fruit flesh/seed weight, moisture content, ash content, dietary fiber content, protein and fat content, respectively; 5,19- 7,52 mm, 3,89- 7,06 mm, 25,73- 35,21 g, 1,74- 6,56, 6,40- 7,54 %, 1,49- 2,88 %, 58,07- 71,62 g/100g, 7,84-10,79 %, 7,92-18,83 %, respectively. In addition, the mineral matter concentrations of the seeds of Viburnum L. species were analyzed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). It was determined that each of the species was rich in Ca, K, Mg, P minerals and also had a significant content of Al, Fe, Zn minerals.

Key words: Viburnum L., Fruit, Seed, Physicochemical, Food

EDIBLE INSECTS AS ALTERNATIVE PROTEIN SOURCES

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ABSTRACT

With the increase in the world's population, possible deficiencies in protein sources have come to the fore. Inadequacies in protein sources will also bring nutritional deficiencies. With the limited natural resources, the fact that accessible, affordable, nutritious, healthy, reliable and sustainable food production will become even more important in the future emerges. For this purpose, insects, seaweed, genetically modified organisms and artificial meat are thought to be used as food or food components needed as a protein source in the future. Although reasons such as not being accepted by the society and ethical concerns are among the factors preventing the commercialization of artificial meat, it is thought that artificial meat produced in a controlled manner can be presented as a healthier and safer production by reducing the risk of disease originating from raw materials. Algae, which are rich in protein, essential amino acids and vitamins, are also considered to be among the alternative food sources with their biomass and rich biodiversity. In addition, edible insects provide the opportunity for high-volume production in smaller areas with lower feeding costs and less waste compared to traditional production. In this context, the nutritional properties of edible insects, which are seen as alternative food or food ingredients and contain high amounts of bioactive substances as well as high protein content, are examined in this compilation study, focusing on their production and use as food and their effects on the environment and human health.

Key words: Nutritional deficiencies, protein sources, edible insects, alternative foods

THE USE OF NANOTECHNOLOGY IN FOOD PACKAGING: THE EFFECT ON THE SHELF LIFE OF FOOD.

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ABSTRACT

Foods are packaged to safeguard them from a variety of external factors, including heat, light, moisture, chemical contamination and microbial contamination. Traditional packaging is a passive application that serves to safeguard foods from external environmental factors by merely covering them. In this application, the most suitable packaging material for food is determined by using different materials. Active packaging, which is a new approach in packaging, has been developed to extend the shelf life of the food and to ensure minimum loss of food quality in this process. Nanotechnological applications, one of the latest strategies used in food packaging, is one of the active packaging methods. Nanotechnology is a field that deals with nano materials with a size between 1-100 nm. Nanotechnological applications can be grouped as organic and inorganic according to their origin, as well as nanosheets, nanotubes and nanoparticles according to their size. Moisture and gas barrier properties and mechanical properties can be improved in edible films and coatings developed with nanotechnological applications. Furthermore, the development of edible films and coatings has the potential to prevent or delay microbial and oxidative spoilage in foods, thereby extending their shelf life. Nanoparticles added to the packaging material both improve the properties of the food packaging material and ensure the continuous release of antioxidants and other active ingredients from the food surface. Metal nanoparticles such as silver, gold, titanium dioxide, magnesium oxide and zinc oxide are the most used in packaging materials due to their antioxidant and antimicrobial properties. This review presents a comprehensive overview of the studies investigating the impact of nanotechnological processes applied to food packaging on the shelf life of diverse foods.

Key words: nanotechnology, nanoparticle, shelf life, active packaging

ANALYTICAL VALIDATION AND APPLICATION OF THE QUECHERS D-SPE METHOD AND LC-MS/MS FOR THE ANALYSIS OF PESTICIDE RESIDUES IN GREEN PEPPERS.

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ABSTRACT

Contamination of food by pesticide residues is a major concern in food safety, as it can have significant impacts on consumer health and the environment. Therefore, this study was conducted at the Regional Laboratory of Analysis and Research of the National Office for Food Safety (ONSSA TANGIER) to validate an analytical method for analyzing pesticide residues in plants, specifically on green peppers, a vegetable often treated with various pesticides to control pests and improve yields. The QuEChERS method followed by liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS) was employed for the extraction and purification of the samples. This technique involves a quick extraction of analytical compounds with a mixture of acetonitrile and water, followed by purification using magnesium and sodium salts. The purified samples were then analyzed to detect eight targeted pesticides (Abamectin, Chlorantraniliprole, Indoxacarb, Imidacloprid, Methomyl, Spirodiclofen, Thiacloprid, and Trichlorfon) by LC-MS/MS. The results show an overall linearity of 0.999748 for the calibration curves of the eight pesticides at 1 ppb, 10 ppb, and 100 ppb. The analysis yields generally range between 70% and 120% with acceptable coefficients of variation (CVs). The yields and CVs for the 1 ppb fortifications are 70% and 130%, while for the 10 ppb fortifications, they range between 96% and 113% with CVs ≤ 20%, and for 100 ppb, the yields range between 95% and 107% with CVs ≤ 20%, indicating good precision of the method. The limit of quantification (LOQ) was set at 10 ppb, in line with the maximum residue limit (MRL) of the studied molecules. The concentration of 1 ppb was not retained as the LOQ. The matrix effect is less than 20% for each pesticide. The analysis of green pepper samples from the local market in the Tangier-Tetouan-Al Hoceima region revealed residue levels well below the recommended MRLs, thus confirming the health safety of the products. These results ensure that the green peppers available in the market do not pose any health risks to consumers in the Tangier-Tetouan-Al Hoceima region and comply with strict food safety standards.

Key words: Pesticide residues, Green peppers, QuEChERS method, LC-MS/MS

PRELIMINARY ANALYSIS OF PESTICIDE RESIDUE CONTAMINATION IN RED FRUITS FROM NORTHERN MOROCCO BY LC-MS/MS.

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ABSTRACT

The widespread use of pesticides is a common practice in global agriculture, including in Morocco. These substances are extensively utilized to optimize crop yields and enhance their quality. However, despite the benefits they offer, pesticide residues can pose a risk to human health if they persist in food after harvest. In this exploratory study, we focused on evaluating the residual levels of pesticides in red fruits. To this end, 83 samples, including 35 raspberry samples, 27 strawberry samples, and 21 blueberry samples, collected from various regions in northern Morocco, were analyzed. To determine the levels of pesticide residues, we employed a well-established methodology. The pesticide residues present in the samples were extracted and purified using the QUECHERS method (Quick, Easy, Cheap, Effective, Rugged, and Safe), known for its efficiency in food products. The samples were then analyzed using liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS), a sensitive and selective technique allowing for the precise detection and quantification of pesticide residues.
The results reveal a predominant contamination in compliance with by three fungicides: The first fungicide was detected in 14% of the samples, notably in 15% of raspberries, 14% of strawberries, and 13% of blueberries. The second fungicide was present in 13% of the samples, particularly in blueberries (37%), followed by raspberries (13%) and strawberries (4%). The third fungicide was also found in 13% of the samples, primarily in blueberries (48%), with a lesser presence in strawberries (6%) and raspberries (4%). Additionally, besides these three fungicides, other pesticides were also detected in the red fruit samples, highlighting multiple and varied contamination.

Key words: Contamination, Pesticides, Residues, Berries, Analysis.

INFLUENCE OF CHIA SEED INCORPORATION ON THE COMPOSITION AND QUALITY OF SAUSAGES

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ABSTRACT

The incorporation of functional components into food items has garnered considerable attention owing to their potential health advantages and their capacity to augment food characteristics. Chia seeds (Salvia hispanica L.) are recognized for their elevated nutritional content, encompassing omega-3 fatty acids, dietary fiber, and antioxidants... The principal aim of this research is to assess the impact of diverse levels of chia seed integration on the constitution and excellence of sausages. Precisely, the research is focused on evaluating the variations in pH, peroxide index, and acidity index across different time points (t_0, t_1, t_2, and t_3). Sausage samples were formulated with three different concentrations of chia seeds (1%, 1.5%, and 2%). Each sample was subjected to thorough physicochemical analysis to ascertain its composition. The pH, peroxide index, and acidity index were measured at four different time points: immediately after preparation (t_0), and after storage periods (t_1, t_2, and t_3). Preliminary findings suggest that the addition of chia seeds impacts the physicochemical characteristics of the sausages. The pH, peroxide index, and acidity index exhibited notable fluctuations based on the chia seed percentage and storage duration. Elaborate results will be disclosed, emphasizing the ideal chia seed concentration for enhancing sausage quality and prolonging shelf life. The research offers valuable insights into the potential of chia seeds as a functional component in meat items. The inclusion of chia seeds not only enriches the nutritional composition of sausages but also enhances their resistance to oxidation and extends their shelf life. These results aid in the advancement of healthier and more environmentally friendly meat products, aligning with consumer preferences for functional food choices.

Key words: Chia seeds, Sausages, Physicochemical properties, pH, Peroxide index, Acidity index

CHEMICAL PROFILE AND ANTIOXIDANT ACTIVITIES OF THE HYDRO-METHANOLIC EXTRACT OF PUNICA GRANATUM L. PEELS

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ABSTRACT

Pomegranate is an ancient fruit originated from Iran and the Mediterranean basin, not only consumed as a fruit and molasses but also its bark is used in folk medicine. In this paper, the LC-ESI-MS/MS method is used to establish the phytochemical profile of the hydro-methanolic extract of pomegranate peels. Antioxidant activity was determined by two methods: 2,2-diphenyl-1-picrylhydrazyl (DPPH) against BHA and BHT standards and Ferric reducing antioxidant power assay FRAP against ascorbic acid and alpha tocopherol standards**.** The findings indicate the abundance of the hydro-methanolic peel extract in phenolic compounds where we could identify 22 compounds with a higher content of Riboflavin, Epicatechin, Oleanolic acid, Naringenin and p-Coumaric acid. The extract presents a substantial antioxidant activity at low concentrations in which we recorded an IC50 value of 5.79±0.15 µg/ml for DPPH and an A0,5 value of 1.49±0.05 µg/ml for FRAP. This study showed that the peel extract of Punica granatum L is an excellent antioxidant due to its richness in phenolic compounds. As a result, it opens up prospects in pharmaceutical and nutraceutical applications.

Key words: DPPH, FRAP, Hydro-methanolic extract, LC-ESI-MS/MS, Punica granatum L.
Exploring Albanian Consumer Preferences for Organic, Sulfite-Free, and Health-Oriented

WINES: KEY FACTORS INFLUENCING PURCHASING DECISION

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ABSTRACT

The global wine industry is experiencing a growing demand for organic, sulfite-free, and health-oriented wines. This trend is driven by increasing consumer awareness of health benefits and environmental sustainability. In Albania, understanding consumer attitudes toward these wine categories is essential for local producers aiming to meet market demands and enhance their competitive edge. This study explores Albanian consumer attitudes toward organic, sulfite-free, and health-oriented wines, identifying key factors that influence their purchasing decisions and preferences. Through a survey of Albanian wine consumers, the research examines awareness, purchasing behaviors, and attitudes toward these specialized wine categories. The findings indicate a positive attitude among Albanian consumers toward organic and health-oriented wines, with a strong preference for products perceived as natural and beneficial for health. However, there is limited awareness and understanding of sulfite-free wines. Key factors influencing purchasing decisions include health benefits, price, environmental impact, and product quality. The study highlights the potential for growth in the market for organic and health-oriented wines in Albania. To capitalize on this opportunity, producers should focus on educating consumers about the benefits of sulfite-free wines and emphasizing the health and environmental advantages of their products. These insights can guide marketing strategies and product development to better align with consumer preferences.

Key words: Organic wine, Sulfite-free wine, Health-oriented wine, Consumer preferences, Albanian wine market.

ALTERNATIVE PROTEIN SOURCES FOR HUMAN CONSUMPTION

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ABSTRACT

The increasing human population and shortage of protein sources are leading societies to seek sustainable, innovative, alternative and natural new non-meat protein sources. In addition, the search for new sources has accelerated, as the increase in traditional meat consumption causes global warming, increased greenhouse gas emissions, higher water/land use. Edible insects, underutilized legume crops, seeds, fungi, terrestrial and aquatic plants, algaes, meat alternatives (plant-based, mycoprotein-based, insect-based, cultured meat) and dairy alternatives (milk analogs) are alternative protein sources for human consumption. Especially edible insects are promising sources of protein. The protein content of edible insects can vary between 40 and 77% depending on the species and developmental stage. They also contain other nutrients such as oil, vitamins, minerals and fiber. It is known that underutilized legume crops are rich in nutritional value and can be grown under difficult environmental conditions. Proteins obtained from edible fungi attract a lot of attention with their healthy nutritional profiles. In addition, algae, whose protein content varies between 39-71%, are also a good source of ω-3. Today's meat alternatives exhibit very similar chemical properties to animal protein. They are also very similar to traditional meat products in terms of texture, flavor and appearance. Many plant-based foods have become extremely popular meat alternatives. These sources seem quite promising as they are environmentally friendly and can cope with the effects of climate change worldwide. It is also thought that more consumers will prefer these protein sources because they have important roles in reducing adverse effects to environment, meeting nutritional needs and a sustainable future.

Key words: Alternative proteins, edible insects, meat alternatives, novel foods, plant proteins.

INVESTIGATION OF 3-MONOCHLOROPROPANE-1,2-DIOL AND GLYCIDYL ESTER FORMATION DURING HOT AIR FRYING

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ABSTRACT

Frying is one of the oldest cooking techniques used in food industry, homes, and restaurants. However, excessive fat consumption through fried products may cause diseases such as obesity, cardiovascular problems, diabetes, and hypertension. Hence, alternative frying techniques are being searched to produce low fat products. Hot air frying is a newer technique used to cook foods in hot air with small amounts of oil. The technique is used to obtain low-fat products with a texture and taste similar to the foods fried with traditional methods. 3-monochloropropane-1,2-diol (3-MCPD) and glycidyl esters are undesirable process contaminants found in fatty foods. These contaminants are degraded into 3-MCPD and glycidol during digestion. International Agency for Research on Cancer classified 3-MCPD as “possibly carcinogenic to humans” (Group 2B) and glycidol as “possibly carcinogenic to humans” (Group 2A). The aim of the current study was to optimize the conditions of the hot air frying process by using response surface methodology, so that the amount of 3-MCPD and glycidyl ester in the fried product is minimum. Central composite design was utilized to optimize the process conditions such as temperature (160-200ºC), time (7.5-25 minutes), oil content (10-50 g/kg) and NaCl concentration (0-10%). The optimum conditions were determined as follows: Temperature 181.76 ºC, time 15.59 minutes, oil content 44.06 g/kg and NaCl concentration 0.11%. The results of the study showed that NaCl concentration had significant effect on 3-MCPD ester and process time had significant effect on glycidyl ester formation during hot air frying.

Key words: Hot air frying, 3-MCPD-esters, glycidyl esters, optimization.

PURCHASING BEHAVIOR: DO TUNISIAN CONSUMERS READ FOOD LABELS?

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ABSTRACT

Food labels are a vehicle of several information (shelf-life of the product, nutritional value, health and nutritional claims, ways of preparation, consumption, or other commercial aspects) which may allow them to play a key role in communication. The use of food labels could even represent a cost-effective marketing strategy to influence consumer's purchasing decision. Meanwhile, the success of this strategy may rely on the interest that consumers would accord to food label and the good understanding of meaning. This research aimed to assess Tunisian consumers purchasing habits and their relation with reading food labels. On online survey was conducted with 516 respondents on September, 2023 (64.3% women, 35.7% men). When asked if they ever go to grocery shopping, 91.9% of respondents answered yes. Regarding main places of shopping, 52.7% of respondents reported supermarket, 28.5% convenience store and only 14.1% hypermarket. Respondents were asked also if they read products labels and their composition. Interestingly, 43.8% said they often do and 13.2% always. Moreover, 54.7% of respondents declared that they need to know what they are eating. These findings highlight the evolution of consumers' behaviour. In fact, consumers are more aware about the importance of their safety and diet's link with health statues. Though, there still have a need of more effective communication about food labels and their importance.

Key words: food label, survey, consumer behaviour, knowledge, purchasing decision

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF WILD-GROWN ORIGANUM VULGARE L. SUBSP. VULGARE AND THYMUS CAPITATUS ESSENTIAL OILS FROM ALBANIA

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ABSTRACT

The objective of this study was to chemically characterise and evaluate the antimicrobial activity of essential oils (EOs) from red oregano (Origanum vulgare L. subsp. vulgare) and thyme (Thymus capitatus) grown in the wild in Albania against foodborne pathogens and key spoilage microorganisms. The antimicrobial activity was tested against five bacteria (Escherichia coli, Salmonella enteritidis, Pseudomonas aeruginosa, Micrococcus luteus, Stenotrophomonas maltophilia) and one yeast (Candida albicans), all sourced from the American Type Collection Cultures (ATTC). Plants were collected in the wild in 2 different geographic locations in Albania, subsequently air-dried, and their essential oils were extracted by hydrodistillation method. EO yields (% v/w) were 0.25% for oregano and 0.75% for thyme. The chemical compositions of the EOs were determined using Gas Chromatography-Mass Spectrometry (GC-MS). GS-MS analysis revealed that red oregano and thyme main components were gremacrene D (15.2%), carvacrol (12%), β-caryophyllene (13.8%) and carvacrol (76.74%), p-cymene (6.4%), γ-terpinene (4.5%) respectively. The antimicrobial activity was performed evaluating the Minimal Inhibitory Concentration (MIC). Thyme EO was effective against all tested microorganisms, whereas red oregano did not show activity against Salmonella enteritidis and Pseudomonas aeruginosa. Both EOs were equally effective against Micrococcus luteus and Candida albicans, however, thyme EO showed stronger activity towards Escherichia coli and Stenotrophomonas maltophilia.

Key words: Origanum vulgare L. subsp. vulgare, Thymus capitatus, antimicrobial, MIC

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF THE ESSENTIAL OIL EXTRACTED FROM WASTE OF JUNIPERUS COMMUNIS L. MEDICINAL AND AROMATIC PLANTS INDUSTRY IN ALBANIA

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ABSTRACT

The Medicinal and Aromatic Plants (MAPs) industry is relevant for Albania covering approximately 20% of agricultural exports. Mostly high quality dried parts of MAPs are traded, while products not fulfilling quality criteria and non-tradable plant parts are often regarded as waste products, even though they contain valuable bioactive substances. This study evaluates the composition and biological activity of the essential oil (EO) fraction of wastes generated form the MAPs industy of Juniperus communis L. in Albania. J. communis L. was collected from Korçë area, subsequently air-dried, screened for trade quality berries in an industrial plant for MAPs, and the waste parts underwent hidrodistilation. Chemical composition was performed using Gas Chromatography coupled with Mass Spectrometry and identified 50 compounds, where main components were α-Pinene (24.47%), Sabinene (12.4%), Germacrene D (3.2%) and β-Myrcene (1.6%). The antioxidant capacity of J. communis L. EO was determined by 2,2-diphenyl-1-picrylhydrazil (DPPH) and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and expressed as Inhibitory Concentration of 50% of the free radical (IC50) where values were IC50= 155.4 µg/mL and IC50= 163.2 µg/mL for DPPH and ABTS respectively. Antimicrobial activity of J. communis L. EO was determined against five bacteria, Escherichia coli ATCC 10535; Salmonella enteritidis, ATCC 49223; Pseudomonas aeruginosa, ATCC 9027; Micrococcus luteus, ATCC 10240; Stenotrophomonas maltophilia, ATCC 1363; and one yeast, Candida albicans, ATCC 10231 by microdilution method used to determine the minimum inhibitory concentration (MIC). The EO showed no antimicrobial activity against the first 3 bacterial strains, whereas it inhibited growth of Micrococcus luteus and Candida albicans at concentrations of 2.5 mg/mL and Stenotrophomonas maltophilia at the maximum tested concentration of 5 mg/mL.

Key words: Juniperus communis L., antioxidant, antimicrobial, MIC

EXAMINING THE EFFECT OF SUSTAINABILITY-FOCUSED CERTIFICATION IN PALM OIL PRODUCTION ON PRODUCER AND CONSUMER AWARENESS

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ABSTRACT

Palm oil is a vegetable oil used for many food and non-food applications. The global demand for palm oil will continue to rise, owing to the growing population and expanding economy. To meet increasing demand, the area of land dedicated to palm oil production in producer countries in Southeast Asia such as Malaysia and Indonesia has increased steadily. Palm oil establishment in these areas has resulted in widespread deforestation, deterioration of ecological balance, and increased greenhouse gas emissions. To avoid these problems and fulfill the growing global demand for palm oil, voluntary certification under the International Roundtable Palm Oil (RSPO) and Malaysian Sustainable Palm Oil (MSPO) emerges as an efficient solution. These certifications aim to ensure sustainability, optimization of productivity and efficiency while adhering to transparency, ethical, and legal principles, respecting communities, supporting smallholders, and protecting workers while conserving the ecosystem. A related study examines the impact of sustainability-focused certification on product quality characteristics and stakeholder awareness in palm oil production. An assessment was conducted with approximately 100 individuals involved in the palm oil supply chain, either as producers or users. The assessment covered recognition of sustainability concepts, awareness of health benefits associated with palm oil and brand perception about certification in the context of purchasing products containing palm oil. This study has the potential to serve as a model for studies that will contribute to the advancement of conscious consumption and circular production in palm oil sustainability certification parameters. Preliminary results revealed that producers and consumers are aware of sustainability. Moreover, sustainability certification might positively affect brand recognition and purchase tendency for palm oil products. Developing efficient marketing and informative advertising based on scientific facts is crucial to maintaining and expanding awareness of the sustainability concept of palm oil and its products.

Key words: Palm, Palm Oil, Sustainability, MSPO, RSPO

BIOPOLYMER-BASED BIODEGRADABLE PACKAGING MATERIALS FOR FOOD APPLICATIONS

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ABSTRACT

Biopolymer-based materials are considered an alternative to petroleum-based plastics, which are responsible for much of the environmental pollution in food packaging. Biopolymers can be produced by microorganisms or derived from biomass. Starch, cellulose, chitin, chitosan, polylactic acid (PLA), and polyhydroxylalkanoates (PHAs) are biopolymers that are produced according to origin and method of production. These materials are used to produce biodegradable packaging, and these are preferred for sustainability, waste reduction and non-toxicity properties. However, high price, lower mechanical, thermal, and barrier properties against oxygen, water vapor, microbes, light, and conditions of high humidity compared to petroleum-based polymers limit their use in the food industry. Studies on biodegradable polymers coupled with various materials are expected to play an increasingly crucial role to improve these properties that restrict their industrial use. Ultimately, continued advancements and innovations in biopolymer technology holds promise for overcoming these challenges and fostering wider adoption of sustainable packaging solutions in the food industry. Here we review the benefits, chemistry and trends in biopolymer-based packaging materials for food applications.

Key words: Biopolymer-based packaging materials, biodegradable packaging, biopolymers, sustainability

EFFECTS OF CHIA SEED INCORPORATION ON THE PHYSICOCHEMICAL PROPERTIES OF MORTADELLAS

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ABSTRACT

Chia seeds have become increasingly popular in various food items as a result of their considerable nutritional and functional advantages. Abundant in omega-3 fatty acids, fiber, and antioxidants, these seeds provide a variety of health benefits. The present research delved into the consequences of integrating chia seeds in mortadellas in two distinct formats (powder and whole seeds) to evaluate their influence on the physicochemical characteristics of the end product. We incorporated chia seeds at 2% in total, comprising 1.5% in powdered form and 0.5% as intact seeds, into mortadella specimens, subsequently assessing parameters such as pH, peroxide value, acidity index, fat content, ash content, and moisture. The aforementioned assessments were carried out utilizing established and verified methodologies. The results showed significant variations in physicochemical parameters due to the incorporation of chia seeds. The pH of the samples showed slight variation, while the peroxide value and acidity index indicated changes in the oxidative stability of chia-enriched products. The lipid content, mineral content, and moisture levels were similarly impacted by the inclusion of chia, unveiling adjustments in the structural and conservation characteristics of the mortadellas. The findings of this study indicate that incorporation of chia seeds, in both powder and whole seed forms, induces significant alterations in various physicochemical characteristics of the end product. Subsequent investigations may delve into the sensory impacts and consumer attitudes to enhance the existing results.

Key words: Chia seeds, Mortadellas, pH, Peroxide index, Acidity index, Physicochemical composition

INVESTIGATION OF THE EFFECTS OF RAINFALL RISK ON THE QUALITY OF SUN-DRIED GRAPES

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ABSTRACT

Türkiye is one of the world's largest producers and exporters of seedless raisins. It has the favourable ecological conditions for viticulture and a significant cultivar diversity. In Türkiye, grapes are dried on the ground under sun. In some years, the quality of the raisins can be seriously affected by sudden changes in the weather and by rain during the drying period. This can affect the quality of the product as well as the supply of the product to the market. In this study, the aim was to determine the risk of rainfall during the drying period and the effects of rainfall on drying yield and quality. For this purpose, six vineyards were identified near to the climate recording stations in Manisa, and their grape growing and drying processes were monitored and recorded. In another experiment, 10 mm of rainfall equivalent water was sprayed on the grapes on certain days (1st, 3rd, 5th and 7th) during the drying period and the drying behaviour and quality alterations were study. The average density of the grapes on the ground was 19.53 kg/m2. The drying time was found to be 20 days for the natural grapes and 11.6 days for the dipped dried grapes. Drying efficiency and dry matter content were determined as 23.42% and 88.49%, respectively. The drying time of the grapes that were rained during the drying process increased by 45.5%, while the raisin quality score decreased by 40%. The lowest quality score of the raisin for the rainfall equivalent water spraying treatments was found in the 5th day samples. In other words, the quality of the water sprayed grapes on the fifth day of drying was lower. As a result, it was found that the drying time increased with rainfall, the quality of the raisins decreased significantly, and the drying efficiency was affected.

Key words: Raisin, drying, rainfall, quality, viticulture

DETERMINATION OF SENSORY AND BIOCHEMICAL PROPERTIES OF GRAPE SEED BLENDED TURKISH COFFEE

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ABSTRACT

Coffee is one of the most consumed and widespread beverages in the world. For this reason many brewing methods were developed that gave the name to coffee, like "Turkish Coffee". This study is about to evaluate sensory and biochemical properties of Turkish Coffee (TC) with addition of grape seed powder (GSP). The trial design contains 6 different TC+GSP blends including % 0-5-10-30-50-100 GSP. Coffee was bought form local market and grape seeds were obtained from Manisa Viticulture Research Institute Pilot Grape Processing Unit as grape juice by-product. Seeds were roasted at 200 ◦C for 10 mins and grounded with grinder. After that coffee and grape seed powder vwere blenden with mentioned ratios and cooked according to Turkish Coffee cooking procedure. Sensory evaluation is realized by 7 uneducated coffee lover panelists. The results showed that GSP addition has a powerful effect on aroma, body, acidity and taste of coffee. Although unblended coffee is selected in first rank in aroma, body, taste and overall appreciation until %30 GPS addition into coffe is found acceptable for sensory evaluation and also found in same statistical groups ($p<0.05$). Biochemical analyses, such as total phenolic content, total flavonoid content and antioxidant capacity, are carried out and results showed that GSP addition has effect on biochemical properties of blended coffee. As a result is found that GSP can be used in coffee in limited addition.

Key words: Coffee, grape seed powder, biochemical properties, sensory analyses

DETERMINATION OF CHANGES IN THE ANTIOXIDANT POTENTIAL OF HARDALIYE POWDER DURING STORAGE USING DIFFERENT METHODS

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ABSTRACT

Combining centuries-old traditions with advanced technology allows us to preserve our national foods. Moreover, merging various technologies is essential for the production of modern products and increasing diversity, thereby enriching our national products. Hardaliye is a traditional product from the Thrace region, produced through lactic acid fermentation of dark-colored and aromatic grapes. However, the short shelf life of Hardaliye limits its commercial and industrial value, leading to an increase in preservative usage, which in turn minimizes the functional properties that make Hardaliye significant. In this vicious cycle, the production of Hardaliye in the region has not gained the value it deserves. Spray drying is a widely used method for drying fruit juices and extending shelf life. However, issues such as thermal damage caused by heat to nutrients can arise. Freeze-drying, on the other hand, is a technique used to produce high-quality powdered products, reducing thermal damage while preserving the product's nutrient composition, flavor, and color (Rishabh et al., 2021). The goal of this study is to determine the changes in polyphenolic compound content and antioxidant capacity during the storage of Hardaliye powder at 4°C using seven different methods (TEAC, CUPRAC, FRAP, DPPH). The methods used for determining the antioxidant capacity of the samples are compared. Various methods, such as in vitro, in vivo, or ex vivo, can be used to determine the antioxidant activities of substances. Although in vitro or ex vivo methods provide useful evidence of antioxidant activity, the applicability of the results to biological systems is not always possible. Moreover, there are various challenges in the in vivo measurement of antioxidants. In vitro methods for evaluating the antioxidant capacity of foods are categorized into two groups: electron transfer (ET) and hydrogen atom transfer (HAT) based methods.

In our research, the carrier agent formulation to be used during the freeze-drying process was optimized. In the experimental design table prepared for the mixture design, maltodextrin (MD), inulin (In), starch (St), and gum arabic (GA) were included as formulation components. While the maltodextrin ratio varied between 0.5 and 1.0, the other components were used within the mass fraction values of 0 – 0.5. As a response, yield (%), moisture content (%), water holding capacity (WHC, %), oil holding capacity (OHC, g g-1), and solubility (%) values were used after the formulation studies conducted according to the experimental design. The results indicated that the use of starch was not necessary in the formulation. The yield (%) value predicted by the model was estimated to be 44%. In the validation trial conducted with the optimal formulation obtained, the calculated yield was 44.62%, confirming the model's validity. For the subsequent storage studies of the research, the product obtained with the optimal formulation was used against the control group, and a comparison was made between the two. Accordingly, samples dried using only maltodextrin (M) and samples dried using maltodextrin-inulin-gum arabic (0.54:0.23:0.24) (MIAG) were stored at 4°C. During this storage period, the M and MIAG samples showed a total phenolic compound loss of 4% and 12%, respectively, within the first 15 days. Although the antioxidant potentials varied depending on the method evaluated, an average loss of 50% occurred in the first 15 days.

This study successfully optimized a carrier agent formulation for the freeze-drying of Hardaliye, demonstrating the importance of selecting appropriate formulation components to enhance product stability and antioxidant retention.

Key words: Antioxidant, Carrier Agents, Hardaliye, Lyophilization, Polyphenols, Storage.

EVALUATION OF SOME QUALITY ATTRIBUTES OF FREEZE-STORED 'MEJHOUL' AND 'BOUFEGGOUS' DATE FRUIT (PHOENIX DACTYLIFERA L.)

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ABSTRACT

Among thousands of date fruit cultivars around the world, 'Mejhoul' and 'Boufeggous' are known by their high nutritional quality but also with low storability index. In this investigation, both date cultivars were subjected to two freezing temperatures: -10 and -18°C and stored under these conditions for 4 months: M-FRZ10: "Mejhoul" cultivar stored at -10°C. M-FRZ18: "Mejhoul" cultivar stored at -18°C. B-FRZ10: "Boufeggous" cultivar stored at -10°C. B-FRZ18: "Boufeggous" cultivar stored at -18°C. The quality assessment was based on measuring weight loss (WL), skin color attributes (L*, a*, b*, Chroma, Browning Index, and delta E), hardness, total soluble solids (TSS), titratable acidity, pH, and water activity before storage and after 2 and 4 months. The results showed no significant changes ($p>0.05$) in all color attributes for both 'Mejhoul' and 'Boufeggous' during four months of freezing storage. For delta E, the obtained values for each cultivar at each freezing temperature were higher after 4 months comparatively to 2 months. For hardness, a significant decrease ($p<0.05$) was observed since the second month of storage with a more pronounced effect on 'Mejhoul' compared to 'Boufeggous'. In the case of a freezing at -18°C, the rate of decrease was from 8.86 to 6.08 N and from 3.70 to 2.66 N for 'Mejhoul' and 'Boufeggous' respectively. Moreover, water activity was statistically unchanged during freezing storage for all treatments and it was around 0.59 for 'Mejhoul' and 0.68 for 'Boufeggous'. This stability was confirmed by the slight moisture gain that was respectively 0.14%, 0.26%, 0.19% and 0.13% for M-FRZ10, M-FRZ18, B-FRZ10, and B-FRZ18. For TSS, a pronounced significant increase (from 77.7°B to 79.8°B) was observed for 'Mejhoul' stored at -18°C compared to M-FRZ10 'Mejhoul' which varied only from 77.7°B to 78.8°B after four months of storage. For the other cultivar, no significant changes were detected for B-BRZ18 while a slight decrease in TSS was reported after 4 months for freeze-stored B-FRZ10. Regarding acidity, a general significant decrease ($p<0.05$) of 0.4% was noted for both cultivars under the two freezing temperature with a starting point of titratable acidity of 1.985% and 1.440% for 'Mejhoul' and 'Boufeggous' respectively. Accordingly, pH presented an opposite behaviour since it started to significantly increase from the second month od freezing storage. In terms of conclusion, the two studied cultivars exhibited different behaviour that can be manifested in more significant changes for other biochemical quality characteristics under prolonged freezing storage.

Key words: Freezing; Temperature; Colour; Hardness; Water activity; Brix; Titratable acidity.

EFFECT OF BLENDING LOCAL WHEAT AND IMPORTED WHEAT ON COUSCOUS QUALITY

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ABSTRACT

An experimental study was carried out on El-Baraka brand couscous, to determine the extent of the effect of the blending technique (combination) between two types of wheat (local and imported) on the quality characteristics of the finished product. The results of physicochemical analyses of local and imported durum wheat (dockage, specific weight, thousand kernel weight, moisture content, etc.), as well as those of the semolina obtained from their millings (particle size, moisture content, ash content, color index, gluten, etc.), showed that they complied with Algerian standards, with a quality superiority in favor of imported wheat. Physicochemical analyses (particle size, color indices, water content, ash content, etc.), culinary analyses (swelling index, post-cooking weight, etc.) and sensory tests on the couscous produced from the blending proved that it complied with Algerian standards, with superiority over the control couscous made from local wheat, and that it largely retained the quality characteristics of the control couscous made from imported wheat.

Key words: couscous, blending, quality, physicochemical analysis, culinary analysis, sensory testing.

UTILIZATION OF POMEGRANATE JUICE PRODUCTION WASTE IN DIETARY SUPPLEMENT TABLET PRODUCTION: EFFECTS OF BINDER RATIO AND WASTE PARTICLE SIZE ON TABLET QUALITY

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ABSTRACT

Pomegranate (Punica granatum L.) is a perennial plant belonging to the Punica genus of the Lythraceae family, with a cultivation history dating back to 3000 BCE. It is native to Iran and is known to grow in the Middle East, the Caucasus, and northern India, encompassing tropical and subtropical climates, including the southern and southeastern regions of Turkey. The pomegranate is consumed fresh but can also be processed into products such as juice, juice concentrate, jam, wine, and liqueur, and used as a coloring and flavoring agent in various foods. After processing, approximately half of the fruit is discarded as waste, consisting of pulp, rind, and seeds. It is known that production wastes are rich in phenolic compounds and dietary fiber. This study determined some physical and chemical properties of dietary supplements pressed using a single-punch tablet press machine with pomegranate juice production waste powders of three different particle sizes (<500, <710, <1000 µm) and three different ratios of binder (20%, 30%, 40% Polyethylene Glycol (PEG) 4000). The bulk densities of the powder mixtures ranged from 0.67 to 0.72 g/cm³, the tapped densities ranged from 0.78 to 0.86 g/cm³, Carr Index values ranged from 10.71 to 17.24, Hausner ratios were between 1.12 and 1.21, angle of repose ranged from 32.23° to 35.74°, flow rates were between 0.90 and 1.97 mm/s, and water absorption varied from 70.99% to 122.29%. The hardness of the dietary supplements (429 - 4849 g force) increased with the PEG 4000 ratio, with the highest hardness observed at 40% PEG 4000 and particle size of <710 µm. The friability of the tablets ranged from 0.45% to 2.76%, with the lowest friability (0.45%) observed at 40% PEG 4000 and <710 µm particle size, as expected with the highest hardness. Notably, under conditions of reduced PEG 4000 ratio and particle size (<500 µm), the lowest hardness and highest friability were observed. Considering the significant quality indicators of high hardness and low friability, it was concluded that the highest quality tablets were obtained using 40% PEG 4000 with pomegranate juice production waste powder particle size of <710 µm.

Key words: pomegranate, waste, dietary supplement, tablet quality

COMBINED EFFECT OF DRYING AND CHILLING ON COLOR CHANGES OF DATE FRUIT DURING STORAGE: THE CASE OF 'MEJHOUL' AND 'BOUFEGGOUS' CULTIVARS

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ABSTRACT

In this study, the main changes in skin color of 'Mejhoul' and 'Boufeggous' date palm cultivars were investigated based on lightness (L*), redness (a*), yellowness (b*), chroma (C), and browning index (BI). Date fruit samples were subjected to convective (CD) and infrared (IRD) drying before storage and then were stored in cold containers at +4°C/55% and +4°C/65% of relative humidity (RH) for 4 months. The results showed a general increase in lightness for both cultivars at each storage treatment. However, it was found that a* value decreased while progressing in storage with a more pronounced decrease for convective-dried 'Mejhoul' date samples. For non-dried date fruit, a slight increase was noticed for this attribute. Regarding b*, a noticeable increase was revealed after the second month of storage for non-dried, convective, and infrared-dried 'Mejhoul' and 'Boufeggous' stored at +4°C/65% compared to fruit samples stored at 55% of RH. Similar tendency was observed for chroma attribute of non-dried and infrared-dried date fruit kept at the RH of 65%. Moreover, BI presented a general progressive increase during storage, especially for non-dried date fruit stored at 4°C/65%. Overall, this study suggested that the storage at high relative humidity resulted in pronounced changes in color attributes of non-dried and infrared-dried date fruit compared to fruit subjected to convective drying.

Keywords. Phoenix dactylifera L.; chilling; relative humidity; color attributes; convective drying; infrared drying; storage.

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THE SPECIFICITY OF THE HONEY MARKET IN POLAND.

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ABSTRACT

The study analyzes the honey market in Poland from 2014 to 2022, taking into account the dynamics of the climate environment. It focuses on aggregated data regarding honey production and consumption, interpreting production trends and changes in consumer preferences. The data are analyzed in the context of changing weather conditions and general trends in the food market. The aim of the research is to understand the basic characteristics of the honey market in Poland and to identify potential areas for further research or practical actions.

Key words: Honey market, climate dynamics, honey production, honey consumption, production trends, consumer preferences, weather conditions, food market trends

SURFACE ANALYSIS OF ULTRAFILTRATION MEMBRANES

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ABSTRACT

In ultrafiltration processes, membrane surface properties are one of the critical factors that directly affect filtration performance. Membrane fouling can be evaluated depending on the morphology, chemical composition and electrical charge of the membrane used. Furthermore, membrane modifications affect fouling tendencies and play a crucial role in membrane selection. Determination of membrane surface features contributes to the optimization of the ultrafiltration process. In this study, an investigation on membrane fouling characterization, membrane modifications and fouling trends was carried out focusing on surface analysis of ultrafiltration membranes. Various surface characterization techniques such as contact angle method, FTIR-ATR, SEM, AFM and surface load analysis are discussed and how these techniques determine membrane surface properties and their effects on fouling mechanisms are presented.

Key words: Ultrafiltration membranes, Surface analysis, Membrane fouling

FUNCTIONAL FOODS AND THEIR EFFECTS ON HEALTH

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ABSTRACT

In recent years, there has been a significant increase in interest in natural products as individuals have become more health-conscious and aware of disease prevention. People are turning to functional foods to protect and improve their health, rather than relying on chemically-based medications. These foods are preferred more frequently due to their nutritional properties and their role in preventing diseases. Functional foods can be defined as products that have positive effects on health thanks to certain biologically active components added to them. For example, adding ingredients such as omega-3 fatty acids, probiotics, fibers, and antioxidants to foods makes these products functional. These types of foods offer various benefits, such as strengthening the immune system, protecting heart health, ensuring proper digestive function, and generally enhancing quality of life by supporting specific metabolic processes in the body. Another important feature of functional foods is that they do not contain synthetic ingredients. These foods can be included in a daily diet, consumed directly, or found in the form of food and beverages. While they serve as a part of the daily diet due to their nutritional qualities, they also stand out for their functions in reducing the risk of diseases and improving overall health. For this reason, functional foods occupy an important place in modern nutritional approaches.
In conclusion, functional foods play a significant role in supporting individual health and are increasingly finding a place in today's dietary habits. In an era where lifestyle diseases are on the rise, the consumption of such foods has great potential to protect individual health and improve public health levels.

Key words: Functional foods, health benefits, nutraceuticals

NEW TECHNOLOGIES AND TRENDS IN THE FOOD PRODUCT DEVELOPMENT PROCESS

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ABSTRACT

Today, manufacturing enterprises face numerous challenges, such as technological innovations, shortened product lifespans, increasing competition, and rapidly changing customer expectations. These challenges compel businesses to closely follow market developments and innovations, requiring them to adapt swiftly to maintain their competitive advantage. Especially with globalization, consumers have become more conscious and demand that food products are produced, processed, stored, transported, and distributed under safe conditions, emphasizing food safety. Customers prioritize not only the taste and quality of the products they purchase but also that these products are manufactured in a safe, healthy, and sustainable manner. In this dynamic environment, businesses in the food industry are under pressure to prioritize food safety and nutritional quality while producing a diverse range of products that meet evolving customer needs. This pressure accelerates the new product development process in the industry and fosters the adoption of innovative approaches. In today's food sector, the principle of sustainability is gaining increasing importance. In this context, environmentally friendly production methods, waste management, energy savings, and efficient use of natural resources are becoming key priorities for companies. New technologies and trends used in the food industry focus on extending shelf life while preserving the nutritional value of products, improving sensory characteristics such as taste and texture, and enhancing health-promoting functional components. These technologies include non-thermal food processing methods such as high-pressure processing, cold plasma technology, pulsed electric fields (PEF), ultrasonic and microwave processing, and other innovative techniques. Compared to traditional thermal processes, these methods better preserve the nutritional value of products and ensure food safety while causing less environmental harm. Significant innovations are also observed in food packaging techniques. Solutions such as active and intelligent packaging, edible coatings, biodegradable packaging, and nanotechnology-enhanced packaging are being used to improve food quality and safety. These innovative packaging methods prevent food spoilage, reduce waste, and contribute to a more sustainable food system. In conclusion, the new product development process in the food sector is shaped by innovative and advanced technological solutions that consider customer expectations and sustainability principles. These developments create a competitive advantage in the industry while supporting the community's access to healthy and safe food. Through these new technologies and sustainable practices, food manufacturers can respond more quickly to consumer demands, securing a strong position in the market.

Key words: Food, new product, development, technology.

FUNCTIONAL VINEGAR-BASED BEVERAGES AND THEIR EFFECTS ON HEALTH

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ABSTRACT

The production of functional foods has become one of the focal points of advancements in the food industry. The functional beverage market is expected to reach $208.13 billion by 2024, with a projected Compound Annual Growth Rate (CAGR) of 7.5% from 2022 to 2027. Consumers increasingly recognize the importance of the relationship between diet and health in maintaining overall well-being. Additionally, factors such as fast-paced lifestyles, high consumption of convenience foods, inadequate exercise, and the rising trend of self-medication are considered critical drivers for the growing popularity of functional foods. Research generally supports the idea that certain food components, when consumed as part of a healthy diet, have protective potential against the development of many age-related diseases. These observations have led to an increase in studies aimed at identifying specific bioactive components in foods, such as antioxidants, that may be responsible for improving and maintaining human health. Vinegar, widely used around the world, can be produced using various methods and bases, including grains, wheat, and fruits. Vinegar has been reported to have various health-promoting effects, including immune modulation, suppression of cardiovascular diseases, prevention of appetite increase, and reductions in serum cholesterol levels, arterial stiffness, and blood pressure. With these effects, functional vinegar-based beverages are among the functional drinks of interest due to their potential health benefits, attributed to their rich bioactive components such as acetic acid, polyphenols, flavonoids, and organic acids. Consumption of vinegar-based beverages has been associated with positive effects on metabolic health, such as increasing insulin sensitivity and improving lipid profiles. Furthermore, the anti-inflammatory properties of vinegar can support the immune system and reduce the risk of infections. However, further research is needed to evaluate the long-term effects and potential risks of regular vinegar consumption. Overall, functional vinegar-based beverages offer a valuable contribution to a healthy diet, with the potential to support metabolic health, enhance immunity, and combat oxidative stress. This review discusses the multifaceted health effects of these beverages, focusing particularly on their antioxidant properties, which play a crucial role in mitigating diseases associated with oxidative stress.

Key words: Bioactive Compounds; Functional Beverages; Health; Vinegar

THE SITUATION OF FOOD E-COMMERCE IN POLAND IN 2018-2023

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ABSTRACT

Technological development, including the digital revolution, is causing major changes in the market, which are associated with the emergence of new needs and opportunities. Digital technologies and access to the Internet enable changes in the distribution of goods, which can currently take place both traditionally and online. The study focuses on issues related to the sale of goods conducted using virtual distribution channels. The aim of the work is to present the situation in the e-commerce industry in Poland, with particular emphasis on food products. The work uses secondary sources of information taken from reports prepared by research organizations dealing with the e-commerce market. The obtained research results were developed using the descriptive and comparative method. The time scope of the research covers the period 2018-2023. The study includes, among others, reports on the number of Internet users and the percentage of people buying goods via the Internet, factors motivating electronic purchases, the gross value of food goods purchased via e-commerce. Based on the information obtained, it can be seen that in Poland in the period under review, the tendency to shop online was growing. This applies to the sale of goods in general, as well as food products, which were a particular area of interest in this study.

Key words: e-commerce, e-grocery , trade, sale, food sector, food

INCORPORATION OF NATURAL MINERAL WATER IN NOODLE PRODUCTION: ENHANCING TEXTURAL QUALITY AND ELIMINATING THE NEED FOR LEAVENING AGENTS

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ABSTRACT

This study explores the innovative use of natural mineral water as a viable alternative to traditional chemical leavening agents and acidity regulators in noodle production. The primary objective was to enhance the textural quality of noodles while simultaneously eliminating the need for synthetic additives that are often associated with health concerns. In recent years, consumer demand for clean label products—those free from artificial additives—has surged, prompting the food industry to seek natural alternatives that not only meet these demands but also improve product quality. Mineral water, rich in naturally occurring carbonates and minerals, presents a promising option that aligns with these clean label trends. In this study, varying proportions of mineral water (0%, 10%, 20%, 30%, and 40%) were incorporated into the noodle formulation to assess their impact on various quality parameters. These parameters included texture, color, pH, fat content, oxidation levels, and sensory properties. The noodles were subjected to rigorous analytical methods, including texture analysis, Fourier Transform Infrared (FTIR) spectroscopy, and sensory evaluation, to determine the effectiveness of mineral water in replacing traditional additives. The results of the study were promising. Noodles made with 20% mineral water exhibited significantly enhanced textural properties, including increased hardness and elasticity. These improvements were attributed to the strengthening effect of the minerals in the water on the starch and protein matrix of the dough. FTIR analysis further supported these findings by revealing improved interactions between starches and proteins, leading to a more cohesive and stable dough structure. Sensory evaluation, conducted by a panel of trained experts, confirmed that noodles made with 20% mineral water were preferred in terms of taste, aroma, and overall acceptability compared to those made with conventional leavening agents and acidity regulators. In addition to textural enhancements, the study found that mineral water contributed to a lighter and more uniform color in the noodles, which is a desirable attribute in consumer products. The pH levels of noodles produced with mineral water remained neutral, indicating that mineral water does not significantly alter the chemical structure of the product, while still optimizing conditions for starch gelatinization—a key factor in noodle quality. Additionally, the use of mineral water did not have a negative impact on fat oxidation levels, indicating that the stability of the product's shelf life was maintained. The implications of this research extend beyond just improving noodle quality. The study highlights the untapped potential of Turkey's rich mineral water resources, which largely remain underutilized. By integrating these natural resources into food production, particularly in noodle manufacturing, there is a significant opportunity to create value-added products that are healthier, clean label, and sustainable. This approach not only meets the growing consumer demand for natural ingredients but also contributes to the economic and environmental sustainability of the food industry. In conclusion, the findings of this study suggest that natural mineral water is a viable and effective alternative to traditional chemical leavening agents and acidity regulators in noodle production. Its use not only enhances the textural and sensory

qualities of noodles but also aligns with the clean label movement, offering a more natural and healthier product to consumers. This innovative approach provides a pathway for the food industry to develop products that are both high in quality and sustainable, leveraging Turkey's abundant mineral water resources in the process.

Key words: Noodle production, mineral water, textural quality, clean label, sensory evaluation, sustainability, natural ingredients.

A DYNAMICAL EVALUATION OF THE EFFECTS OF FOREST PRODUCTS ON ECOLOGICAL FOOTPRINT: A NETWORK PERSPECTIVE

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ABSTRACT

Based on the increase of severe climate conditions in recent years, sustainability and sustainable development has become a very important topic of the global agenda. Within this scope, ecological footprint has started being used as a tool to evaluate the damage caused by economic and social activities of human beings. There are six areas that ecological footprint tracks such as cropland, grazing land, fishing grounds, built-up land, carbon demand on land, and forest area. The measurement on forest area, namely Forest Product Footprint (FPF), reveals the impact of consumption on worldwide forests. There are especially nine primary commodities such as palm oil, coffee, soybean, cocoa, timber, rubber, meat, paper, and cardboard that have high risk of deforestation. Based on the importance of the case, this study aims to examine the evolution of global trade of these commodities from 2000 to 2023. Complex network tools will be used to examine the global trade networks. Complex network analysis enables us to reveal some topological properties of the network such as connectedness, transitivity, core-periphery structure, power-law degree distribution etc. Network tools also provide some centrality measurements in order to evaluate the systemic importance of countries in the network. An analysis covering the period from 2000 to 2023 will help to gain a dynamical perspective and evaluation. We also aim to evaluate these centrality measurements by comparing the position of countries in global aggreements on environmental issues.

Key words: Complex network analysis, Forest products footprint, Global trade network

SPACEBORNE FOREST MONITORING

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ABSTRACT

A novel space-based approach was created to utilise high-resolution Sentinel-2 satellite imagery of the European Space Agency and Google Earth Engine platform (GEE). Sentinel-2 imagery was used for studying forest health change, species composition and biomass content. We developed a new method to create vegetation and water index (NDVI, Z NDVI, NDWI) maps and charts from satellite imagery for multiple purposes, including land-cover surveying, tree species classification, and forest disturbance detection in Hungary. The image processing steps such as query, filtering, masking, visualising, and analysing took place in the digital cloud for forest monitoring. Forest disturbances, encompassing biotic, abiotic, and anthropogenic damage types, were regularly surveyed in Hungary using the Google Earth Engine (GEE). In the GEE, Machine learning algorithms including Random Forest, Minimum Distance Estimation, Support Vector Machine, and Gradient Boost Regression were employed to facilitate classification tasks related to land cover, tree species, and forest damage. The objective centred on achieving precise mapping of forests and tree species, thereby enhancing the accuracy of forest monitoring endeavours and enabling analysis of tree species distribution. Our findings for sample areas and the whole country suggest that integrating satellite imagery with ground-based reports yielded a suitable dataset for conducting forest damage monitoring using Google Earth Engine. The method we employed demonstrated success in identifying various types of forest damage on spectral index maps during the surveyed period, achieving a Total Accuracy of 78% and accurately classifying tree species with an accuracy of 82% compared to the validation set, the Hungarian Forestry Database. These results are promising and indicate the usability of the approach.

Key words: forest monitoring, Sentinel-2, satellite, Machine Learning, Google Earth Engine, image classification

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DEVELOPMENT OF AN INNOVATIVE APPLICATION FOR THE PRESENCE OF CYDALIMA PERSPECTALIS IN BOXWOOD AREAS OF TURKIYE BY USING GOOGLE EARTH ENGINE

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ABSTRACT

Boxwood, which has two species in Turkiye, namely Anatolian boxwood (Buxus sempervirens) and Spanish boxwood (Buxus balearica), is used as a forest tree and ornamental plant. It is distributed all over the world with 105 different species except Antarctica and is evaluated as a raw material source in various areas. However, boxwood (Buxus spp.), which provides both ecological and economic contributions, is unfortunately under the threat of Cydalima perspectalis (boxwood moth). C. perspectalis, which was first encountered in parks and gardens in Sarıyer, Istanbul in 2011, has rapidly increased its presence in our country every year. The damage caused by the drying up of boxwoods by pests leads to serious economic and ecological losses. Therefore, developing methods to control this pest and taking early measures is of critical importance. In this study, it was aimed to implement a map application consisting of C. perspectalis information in boxwood locations in order to perform early detection of C. perspectalis in Turkiye and to take the necessary precautions. In this direction, field studies were carried out and coordinate information of boxwood locations in Turkiye was obtained. At the same time, the presence of C. perspectalis on boxwoods was confirmed with field studies. After the field studies, a data set was created with coordinate, date, altitude and C. perspectalis presence/absence information. The created data set was transferred to the Google Earth Engine (GEE) platform and visualized. In addition to the data set, an NDVI vegetation index graph was created using Sentinel-2A satellite images belonging to the date of the field studies. An application was developed with the codes written on the GEE platform and the date, altitude, C. perspectalis presence/absence and NDVI (Normalized Difference Vegetation Index) graph information of the clicked boxwood locations were shown on the panel. This study provides the first preliminary view of the presence of C. perspectalis in the same locations and dates in future periods.

Key words: Cydalima perspectalis, Google Earth Engine, Boxwood

EXAMINATION OF THE HEALTH SAFETY OF OAK SEEDS ORIGINATING FROM SEED SOURCES IN CENTRAL SERBIA

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ABSTRACT

The paper presents an examination of the presence of pathogenic fungi and insects on oak seeds collected from 13 areas in Central Serbia (Kucevo, Krusevac, Kraljevo, Boljevac, Beograd, Kragujevac, Uzice, Despotovac, Ivanjica, Nis, Kursumlija, Djerdap and Sabac). The presence of the following pathogenic fungi was identified in a low range – from 1.0 to 5.0%: Botrytis cinerea Pers., Alternaria tenuis Nees, Cladosporium herbarum (Pers.) Link, Mucor racemosus Bull., Rhizopus nigricans Ehrenb., Thamnidium elegans Link, Trichothecium roseum (Pers.) Link, Fusarium spp., Penicillium spp., Aspergillus spp., Ciboria batschiana (Zopf) N.F. Buchw, Pestalotiopsis funerea (Desm.) Steyaert, Pestalotia hartigii Tubeuf, Cytospora intermedia Sacc., Gnomonia quercina Kreb., Phomopsis quercina (Sacc.) Höhn. ex Died., Gloeosporium quercinum Westend., Ophiostoma spp. and sterile mycelium. Among the harmful insect species, the following were found on the examined seeds: Curculio glandium Marsham, 1802, Curculio elephas (Gyllenhal 1836), Cydia semplana (Hübner, 1799) and Andricus quercus salicis (Burgsdorf, 1783) in the range of only 1.0 do 4.0%. The species Quercus rubra showed the greatest resistance to the presence of the above-mentioned harmful agents, while the highest number of diseases and pests was found on the seeds of Quercus petraea, which may also be a consequence of the large number of samples. The results of these examinations indicate a satisfactory health condition of all the examined tree species, particularly regarding the presence of economically significant pathogenic fungi and harmful insects.

Key words: Oak seeds, pathogenic fungi, insects, diseases, pests

REMOTE SENSING TECHNOLOGIES IN URBAN FOREST MONITORING AND CLIMATE ADAPTATION

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ABSTRACT

Remote sensing techniques have emerged as powerful tools for urban forest monitoring, offering a comprehensive and efficient method for assessing and managing urban green spaces. Among others, this technology provides high-resolution satellite images that can be used to map the extent of urban forests and assess their distribution across the city which is crucial for understanding urban forest composition and its impact on local microclimates. As a first step, this study validates thresholds in multi-spectral imaging of Sentinel-2 satellites to identify green areas in Novi Sad municipality. Based on various vegetative activity thresholds proposed in earlier studies, an NDVI value of 0.3 was recognized as the most reliable threshold for mapping green areas in Novi Sad across different seasons. We experimented with different ranges of buffer zones (250 to 1000m) around urban network stations which highlighted the 500 m buffer as the most practical in urban areas for 2 reasons: 1) the buffer zones do not overlap thus justifying the analysis of greenery contribution to one particular area and 2) covering the uniform area where the local environment does not vary dramatically. These buffer zones can serve to differentiate tree types (deciduous and coniferous) within complex urban environments. These data are the basis for analysis of the impact of trees based on their type on local microclimates. Deciduous trees, with their seasonal leaf shedding, and conifers, with year-round foliage, contribute differently to air temperature regulation, air quality, urban heat island mitigation, and outdoor thermal comfort conditions. By leveraging remote sensing data (together with in situ or mobile climate monitoring), city planners and environmental scientists can better assess the distribution and health of urban forests, leading to more informed decisions on green infrastructure management. This research highlights the potential of remote sensing in enhancing our understanding of urban ecosystems and their role in creating resilient, climate-adaptive cities.

Key words: Remote Sensnign, Urban Forest, Climate Adaptation

CYTOTOXIC AND MUTAGENIC ACTIVITY OF PESTICIDE DIMETHYLAMMONIUM 2,4- DICHLOROPHENOXYACETATE IN ALLIUM CEPA CELLS

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ABSTRACT

Pesticides are substances which are foreign to organisms but can participate in their metabolic processes. A number of studies have shown that the disproportioned use of pesticides has a negative effect on bee health. Some of these pesticides are widely used and can reach high concentrations in wax, honey, pollen and bee individuals. The study of these pesticides expands our understanding of their harmful effects on bee colonies. In the present study, we analyzed the toxic potential of the systemic herbicide dimethylammonium 2,4-dichlorophenoxyacetate (2,4-D), which is based on phenoxycarboxylic acid. To screen the potential cytogenetic activity of the tested pesticide, we used the Allium-test. The results of the study show that the herbicide 2,4-D, applied in concentrations of 50 mg/l and 100 mg/l, has a cytostatic effect, lowering the rate of cell division. Lower mitotic index values were reported in all tested variants compared to the control. Maximum inhibition of mitotic activity was found at the higher pesticide concentration tested. 2,4-D also demonstrates genotoxic potential, which is manifested by increasing the frequency of aberrations in onion meristem cells. The established genotoxic effect of herbicide studies is related to the initiation of different chromosomal aberrations such as: lagging and wandering chromosomes, anaphase and telophase bridges, chromosome fragments, micronuclei, etc. The studied lower concentration of 2,4-D has a more pronounced aneugenic effect on onion meristem cells, while the analyzed higher concentration causes predominantly structural chromosomal disorders. Despite extensive research interest in the genotoxic effects of pesticides, many details remain unclear. The results of an in-situ experiments would clarify in more detail the mechanism of action of the study pesticide, which is the next stage of our research.

Key words: pesticides, chromosomal aberrations, cytotoxicity, Allium cepa

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DO THE COLORANTS TARTRAZINE (E102) AND SUNSET YELLOW (E110) HAVE GENOTOXIC EFFECT IN LABORATORY CONDITIONS?

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ABSTRACT

Colorants are a class of non-nutritive additives that are inserted to foods to provide color, thus making the product more attractive and increasing its consumer value. Intensive use of synthetic dyes, excessive consumption of products containing them (food, medicine, cosmetics, etc.) can lead to a number of negative consequences for human health. The aim of the present study was to analyze the general toxic and genotoxic effects of the food dyes tartrazine (E102) and sunset yellow (E110), by using the Allium cepa test system. By measuring the length of onion roots grown in solutions with different concentrations of tartrazine and sunset yellow, the inhibition potential of the colorants, was determined. The anaphase method and the micronucleus mutagenicity test are used to determine their genotoxicity, taking into account structural aberrations of chromosomes and other mitotic abnormalities in microscopic preparations prepared from the apical root meristem of the Allium cepa. Statistical analysis shows that the average root length reached in the control variant is significantly higher than the values of this indicator in the experimental variants treated with tartrazine and sunset yellow. Suppression of root growth was observed, which is evidence of the toxic effect of the dyes. Tartrazine at a concentration above 0.01% and sunset yellow at a concentration above 0.005% induced chromosomal aberrations, which frequency was significantly higher compared to the control variant. Disturbances are most often associated with changes in DNA spiralization and in the structure of the dividing spindle. They are visualized as different changes in the behavior of the chromosomes during the different stages of mitosis. Both substances cause chromosomal abnormalities such as C-mitoses, "wandering" and lagging chromosomes, chromosomal bridges and fragments, and asynchronous spiraling of chromosomes. The sunset yellow colorant also induces diagonal anaphases, as well as the appearance of cells with micronuclei. Such kind of results should be taken in mind when discuss the human health problems.

Key words: Allium cepa, tartrazine, sunset yellow, genotoxicity, chromosomal aberration

EFFECT of ASPROSIN HORMONE on SKMEL-30 CELLS

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ABSTRACT

Melanoma Cancer (SKMEL-30) is one of the deadliest forms. Altered energy metabolism and increased aerobic glycolysis in SKMEL-30 are features that require attention. The glucogenic hormone asprosin is often dysregulated in insulin resistance and metabolic disorders. Despite its association with metabolic disorders, its role in energy metabolism in the tumor microenvironment has not yet been investigated. Methods: MTT analysis, determination of expression of glycosyltransferases by qRT-PCR and sialic acid levels spectrophotometrically. Results: Following treatment with 50 nM asprosin, SKMEL-30 cell line showed a significant increase in the ST8SIA-2 gene ($p < 0.05$). Asprosin has been shown to alter pathways related to cell communication and cell proliferation, in addition to pathways related to energy metabolism and glucose. When sialic acid levels were analyzed at the control and 50 nm asprosin dose, it was determined that asprosin reduced the sialic acid level. Conclusions: Regarding SKMEL-30, asprosin appears to regulate the in-vitro signaling pathway of glycosyltransferases. Aerobic glycolysis, known as the Warburg effect, is a factor involved in the progression of many cancers, including SKMEL-30. Despite the presence of oxygen, preferential use of the glycolytic pathway, where glucose is used for rapid energy production and produces excess lactate, over aerobic respiration/oxidative phosphorylation, is often preferred over excess glucose. It is well known that respiration alone can maintain tumor viability. Aerobic glycolysis is a controllable factor, and abnormal regulation of growth factor signaling is an initiating event in oncogenesis. Asprosin, as a glucogenic hormone, is thought to have a role in this process and is a promising candidate for research in the tumor microenvironment.

Key words: SKMEL-30, Melanoma, Glycosyltrasnferases, Sialic Acid, Apoptosis

DYNAMIC EXPRESSION OF HEAT-SHOCK AND ACID-TOLERANCE RELATED GENES OF LACTOBACILLUS DELBRUECKII SSP. BULGARICUS LBB.B5 IN MILK

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ABSTRACT

The dynamic expression of heat-shock related genes (hsp60 and cspA) and genes putatively contributing to acid-tolerance (ornB, thrB and thrC) in Lactobacillus delbrueckii ssp. bulgaricus LBB.B5 in milk medium was monitored. Genes hsp60 and cspA encode a heat-shock and a cold-shock protein, respectively, ornB - one of two active ornithine decarboxylases, while thrB and thrC are involved in threonine synthesis, one of the very few amino-acids de-novo synthesized in this species. Expression levels were monitored by RT-qPCR and pH values and viable cell numbers were recorded at 3, 5 and 7 hours of fermentation at 42ºC, followed by cold storage at 4ºC until the 24th hour. Samples at 3h were used as control for calculating relative expression. The expression dynamics of the analysed genes followed two distinct patterns. The first pattern, that of cspA, ornB, thrB and thrC, showed maximal expression levels of 11.6, 6.8, 3.9 and 2.4 times the control, respectively, at 5h of the fermentation. At this point a transition from exponential to stationary phase was observed with acidification crossing the pH 5,0 threshold. The second pattern was characteristic for hsp60 where gradually increasing expression levels were measured, including during cold storage when expression of 6.4 times the control was reached. The upregulation of threonine biosynthesis and even more so, of a cold-shock protein, with the onset of the stationary phase suggests that threonine and CspA have a function different form just serving the amino-acid anabolism or managing cold stress. Rather, together with the activity of ornithine decarboxylase, they serve as factors facilitating the transition of the cells to stationary phase and/or adaptation to acidic conditions. On the other hand, the continuous upregulation of hsp60 may reflect the ongoing adaptation of stationary phase cells to further incubation at 42ºC and cold storage.

Key words: acid-tolerance, gene expression, heat-shock, Lactobacillus bulgaricus

ZOOMING IN INTO THE TAXONOMIC IDENTIFICATION OF A HUMAN BREAST-MILK DERIVED BIFIDOBACTERIUM SP. 2450

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ABSTRACT

Precise identification of a new isolate intended for the development of functional food is required in order to relate it to the safety- or health-beneficial record of a particular species. Exact taxonomic identification is complicated by the fast evolution of molecular methods and species delineation concepts. In this study a human breast milk isolate Bifidobacterium sp. 2450 was identified using a classical 16S-rDNA sequence analysis, multilocus sequence typing (MLST) and digital DNA: DNA hybridization (dDDH). Clustering the partial 16S-rDNA sequence of Bifidobacterium sp. 2450 with those of type strains of the Bifidobacterium genus grouped it within the B. longum cluster. Zooming in into this species, currently containing the longum, infantis, suis and suillum subspecies, showed that the Bifidobacterium sp. 2450 derived sequence was >99.5% (1490 bp) identical to B. longum ssp. infantis. MLST results, based on concatenated partial sequences of the clpC, dnaG, dnaJ1, hsp60, purF, rpoC and xfp genes, however, situated Bifidobacterium sp. 2450 closer to the B. longum ssp. longum cluster, separately from B. longum ssp. infantis. Next, after one- (16S-rDNA) and seven- gene (MLST) sequence analysis, dDDH permitted comparison of draft genome data of Bifidobacterium sp. 2450 to complete genomes of type strains. Hybridization values with the type strain of B. longum ssp. longum DSM 20219 were 75.8 against only 62.4 for B. longum ssp. infantis DSM 20088. Considering a species delineation threshold value for dDDH of 70, this method identified Bifidobacterium sp. 2450 as B. longum ssp. longum in contradiction with the classical 16S-rDNA analysis. In many cases identification to the species level is satisfactory for practical purposes. However, further developments in taxonomy and selection of the preferred molecular method for identification within the B. longum species will be necessary, while 16S-rDNA sequence analysis may not be reliable enough for identification of its closely related subspecies.

Key words: Bifidobacterium longum, digital DNA:DNA hybridization, multilocus sequence typing

INVESTIGATION OF RAP2B, CDK4 AND BAX GENE LEVELS IN RELATION TO CCAT1 AND GHET1 LEVELS FROM LONG NON-CODING RNAS IN NEWLY DIAGNOSED ADULT ACUTE MYELOID LEUKEMIA PATIENTS

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ABSTRACT

Long non-coding RNAs (lncRNA) are RNAs longer than 200 nucleotides with no protein-coding potential, functioning as regulators. They have been implicated in disease prognosis and suggested as biomarkers for various cancers, including acute myeloid leukemia (AML). AML, the most common adult leukemia, involves genetic abnormalities leading to the abnormal proliferation, differentiation, and survival of myeloid progenitor cells. The genetic background of AML is crucial, but its heterogeneity complicates the understanding of its molecular mechanism. This study investigates the expression levels of colon cancer-associated transcript-1 (CCAT1) and gastric carcinoma proliferation-enhancing transcript 1 (GHET1), and associated genes Ras-associated protein 2B (RAP2B), Bcl-2-associated X protein (BAX), and cyclin-dependent kinase 4 (CDK4) in AML. Blood and bone marrow (BM) samples were collected from 26 newly diagnosed adult AML patients before treatment and compared to blood samples from 32 healthy adult volunteers. The samples were analyzed using real-time polymerase chain reaction. The results demonstrated no statistically significant difference in the expression levels of CCAT1, GHET1, RAP2B, BAX, and CDK4 in AML blood and BM samples ($p > 0.05$). However, CDK4 expression was found to be significantly higher in AML patients compared to healthy controls ($p < 0.05$), while RAP2B expression was observed to be lower in AML patients ($p < 0.05$). No significant differences were observed in CCAT1, GHET1, and BAX expression between the groups ($p > 0.05$). A positive correlation was identified between GHET1 and CCAT1 expression levels and between RAP2B and CDK4 expressions. These results suggest that GHET1 and CCAT1 may influence leukemogenesis in AML by increasing CDK4 expression. Although the increase in GHET1 and CCAT1 expressions was not significant, there was a positive correlation with RAP2B. This study is the first to report GHET1 and RAP2B expression in AML patients, highlighting the need for further research with a larger population.

Key words: GHET1, CCAT1, RAP2B, CDK4, BAX, AML

AN ADVENTURE IN THE BIOINFORMATICS OCEAN: "MOLGEN63"

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ABSTRACT

Bioinformatics is a new branch of science that blends many branches of science, especially molecular biology, statistics and computer science. With bioinformatics, data obtained from many disciplines are processed with functions such as analysis, storage and graphing. Within the scope of this research, the "MOLGEN63" website was established in order to benefit from the depth of knowledge of bioinformatics. An online laboratory was designed to enable students to stay in touch with the world of science and improve themselves in the field of bioinformatics (https://molgen63.org.tr). The main purpose of this project is to bring together and promote the field of bioinformatics. The site contains many contents such as introducing databases and explaining their basic functions, showing basic coding, including package programs and their training on the site, statistical analysis and scientific-current announcements, sharing academic articles and videos. It is aimed to constantly renew and share all relevant scientific content, to all relevant people to this field and to everyone who want to explore this field. In the project, an open platform to everyone interested, especially the relevant departments, was created. For the first time, a comprehensive online platform has been created at both department and university undergraduate levels. In addition, all information and applications on this platform are offered to users free of charge. Since the platform was established with the support of Harran University' s Department of Molecular Biology and Genetics, it will serve as an important online laboratory that will be kept up to date and made available to students in the future.

Key words: Bioinformatics, database, statistics, molecular biology and genetics

EPIDEMIOLOGICAL STUDY OF OVARIAN CYSTS IN ALGERIAN WOMEN

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ABSTRACT

In the context of an increase in the number of women complaining of ovarian cysts, we conducted a study with 161 women, in the aim of finding out the frequency of ovarian cysts in Algeria, their effects and complications on women's health. The study was carried out using a questionnaire published on social networks. We found that this pathology was highly prevalent among women aged between 20 and 30, most of whom were single. The results show that functional cysts are the most common. Clinical symptoms included irregular menstrual cycles, abdomino-pelvic pain, fatigue and infertility for more than two years. Concerning complications, most of women had no complications, while intra-cystic or intra-peritoneal hemorrhage was one of the most common complications for the remainder. The results show that the majority of cases benefited from hormone therapy, while only 24.6% underwent surgery.

Key words: ovary, ovarian cysts, infertility, PCOS, letrozole

THE ROLE OF NANOPARTICLES IN VACCINE DEVELOPMENT

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ABSTRACT

The integration of nanoparticles (NP) in vaccine development has revolutionized the approach to immunization, offering substantial improvements in the efficacy, safety, and delivery of vaccines. NP, due to their unique physicochemical properties, provide a versatile platform for the design of more effective vaccines. This research explores the multiple roles of NP in vaccine development, focusing on their ability to enhance immune responses, ensure targeted delivery, facilitate controlled release, and stabilize vaccine formulations. NP can be engineered to mimic the size and shape of pathogens, which enhances the immune systems ability to recognize and react to the vaccines antigens. This bio mimicry is crucial for eliciting a robust immune response. The surface of NP can be modified with specific ligands to target them to particular cells or tissues, increasing the immunogenicity of the antigens and reducing off-target effects and systemic exposure. This targeted delivery is particularly beneficial in developing vaccines for diseases that affect specific tissues or organs. Additionally, NP can encapsulate antigens and adjuvants, providing a controlled release that maintains a steady stimulation of the immune system. This controlled release can reduce the number of doses required, which is vital in enhancing vaccination coverage and compliance. Moreover, NP offer the advantage of stabilizing vaccine components, protecting sensitive molecules like mRNA and proteins from degradation during storage and transport. This stabilization is critical for extending the shelf life and efficacy of vaccines, especially in regions lacking advanced storage facilities. The adaptability of NP allows for their use in various types of vaccines, including those based on proteins, peptides, and nucleic acids. For instance, lipid NP have been successfully utilized in mRNA vaccines against COVID-19, showcasing their potential in vaccine design and deployment during a global health crisis. This research discusses recent advancements in NP-based vaccine formulations and their clinical implications. It also examines the challenges in scaling up the production and ensuring the safety of NP vaccines. The continued exploration and optimization of NP technologies in vaccine development could pave the way for more personalized and effective immunization strategies, thereby transforming the landscape of public health and disease prevention. Overall, the role of NP in vaccine development signifies an important shift towards more sophisticated and targeted approaches to vaccination, promising improvements in global health security.

Key words: Nanoparticles, Vaccines, Development, Nanotechnology

DETERMINATION OF ANTIBIOTIC RESISTANCE PROFILES OF PSEUDOMONAS AERUGINOSA STRAINS ISOLATED FROM DIABETIC FOOT INFECTIONS

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ABSTRACT

One of the important complications of diabetes is diabetic foot infections accompanied by neuropathy and vascular problems. These infections, especially caused by resistant bacteria, are among the most important etiological causes of foot amputations. Pseudomonas aeruginosa is the most common cause of diabetic foot infections in our country. The widespread and multidrug resistance seen in this bacterium poses a global threat. In this study, the antibiotic resistance profile of 100 different Pseudomonas aeruginosa strains isolated from diabetic foot infections was determined with the help of E-test. **Materials and Methods:** In our study, 100 different Pseudomonas aeruginosa strains isolated from diabetic foot infections and from our collections were used. The susceptibilities of different antibiotics (piperacillin, piperacillin+tazobactam, ceftazidime, meropenem, ticarcillin+clavulanate, cefepime, cefpirome, aztreonam, imipinem, amikacin, ciprofloxacin and tigecycline) in Pseudomonas aeruginosa isolates were determined using the E-test method**. Results:** While two of the Pseudomonas aeruginosa strains isolated from diabetic foot infections were resistant to all the tested antibiotics, all the isolates except one were found to be intermediate or resistant to at least one antibiotic. The most common resistance rate among Pseudomonas aeruginosa strains evaluated within the scope of our study was Ticarcillin-Clavulanate (60%), followed by Ciprofloxacin (48%), Aztreonam (45%), Piperacillin (30%), Piperacillin-Tazobactam (28%), Ceftazidime. (22%), Imipenem and Meropenem (15%), Amikacin (13%). The least resistance was found against Cefepime (4%). Since there is no breakpoint value in the CLSI data of tigecycline and cefpirome, the resistance rate could not be determined. **Discussion and Conclusion:** Pseudomonas aeruginosa, which has multidrug resistance, is being isolated at increasing rates from diabetic foot infections in our country. According to previous studies, although the resistance situation was generally similar, it was observed that sensitivity to carbapenems was higher and the resistance to cefepime was very low. Monitoring sensitivity to antibiotics according to isolation locations is important in directing empirical treatments

Key words: Pseudomonas aeruginosa , antibiotic resistance, diabetic foot

INTERACTION OF CHRYSIN WITH MOLECULAR TARGETS OF PARKINSON'S DISEASE: AN IN-SILICO APPROACH

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ABSTRACT

Parkinson's disease (PD) is a neurodegenerative disease characterized by dopaminergic neuron loss in the substantia nigra. The incidence of the disease, which has symptoms such as bradykinesia, rigidity, and tremor, increases with age. Although the mechanism of the disease, which affects millions of people, is not fully understood, it is reported that protein aggregation due to α-synuclein misfolding, neuroinflammation, and many gene mutations, including LRRK2, contribute to the development of PD. Chrysin is a flavone compound found in high amounts in honey, propolis, and various plants, and its anti-inflammatory and neuroprotective effects have been shown in various studies. In the in silico study, the binding scores of neuroprotective chrysin with Parkinson's disease-specific (α-synuclein, LRRK2, MAO-B) and neuroinflammation-related (mTOR, JNK3, iNOS, nNOS, MAPK) proteins were recorded and the interaction levels were evaluated. The 3D models of the target proteins selected for molecular docking studies were obtained from RCSB Protein Data Bank with the ID numbers α-synuclein (1XQ8), LRRK2 (5OPB), MAO-B (1GOS), mTOR (2FAP), JNK3 (2O0U), iNOS (3HR4), nNOS (5VV0) and MAPK (5UOJ). The 3D structures of the ligand tests were obtained from DrugBank and NCBI PubChem databases and their structural minimizations were performed with USCF Chimera ver. 1.17.1. After the receptors and ligands were prepared with AutoDockTools 1.5.7, binding scores were recorded. In the obtained findings, it was shown in silico that chrysin interacts with α-synuclein, LRRK2, MAO-B, mTOR, JNK3, iNOS, nNOS and MAPK receptor proteins. The in silico findings obtained for chrysin, which targets protein aggregation through the interaction with α-synuclein and LRRK2, neuroinflammation through the interaction with mTOR, JNK3, iNOS, nNOS and MAPK, and the dopaminergic system through the interaction with MAO-B, demonstrate the potential effect of the target compound in Parkinson's disease and shed light on new studies to be conducted for the treatment of the disease.

Key words: Chrysin, Molecular docking, Neuroinflammation, Parkinson's Disease

CURRENT LITERATURE REVIEW ON MENSTRUATION-RELATED MIGRAINE

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ABSTRACT

Migraine is the second leading cause of disability globally, affecting women 2 to 3 times more than men. Migraine stands out as the single largest factor leading to the loss of years of healthy life, especially in women of childbearing age. Menstrual cycle-related migraine (MM) constitutes an important subgroup in this context, occurring in approximately 18% to 25% of women. MM is an important component of migraine that affects women's quality of life. This literature review will address current issues encountered in the diagnosis and management of MM and innovations in the literature. The ICHD-3 diagnostic criteria have some limitations in defining menstrual-related migraine. For example, the criteria do not appear to adequately address migraine frequency and timing. First, the criteria required by ICHD-3 require migraine to occur in two out of three consecutive menstrual cycles. However, this may lead to misdiagnosis in women with high frequency of migraine attacks, i.e., those with chronic migraine (CM) or high frequency episodic migraine (HFEM). This may affect the diagnostic criteria, as women with 8 or more migraine days per month must have a migraine attack within the perimenstrual window, simply by chance. Cases defined as rare pure MM refer to rare migraine attacks that occur only during the menstrual period. These cases may be difficult to accurately identify and manage because they do not have migraine attacks frequently enough to be diagnosed according to current criteria. In addition, there is a lack of clarity regarding the timing of migraine attacks. The term “occurring” in current criteria does not clarify whether they begin or end on days 1 ± 2 of the menstrual cycle. This uncertainty is a significant barrier to accurate diagnosis and treatment. In recent years, some innovations have emerged in the treatment and management of MM. Hormonal therapies play an important role, especially in the management of menstrual cycle-related migraine. Methods such as oral contraceptives and hormone replacement therapies can reduce migraine attacks in some women. In addition, various drug therapies, antidepressants and antiepileptic drugs are used to reduce the association of migraine with the perimenstrual period. These approaches may be especially effective in managing menstrual cycle-related migraine. Current research is conducting various studies to improve current diagnostic criteria and to make more accurate diagnoses. For example, large population-based studies and cohort studies are important to improve the definition and management of menstrual-related migraine. In addition, research on the role of biomarkers and genetic factors supports a better understanding of migraine and the development of personalized treatment approaches. Migraine, and especially menstrual-related migraine, causes significant disability and loss of quality of life in women. The current ICHD-3 criteria present some difficulties and uncertainties in the diagnosis of this type of migraine. However, hormonal treatments and other medical approaches offer important steps in migraine management. Future research and updating of diagnostic criteria are critical for a better understanding of migraine and the development of effective treatment methods.

Key words: menstrual-related migraine, women's health, migraine attacks, perimenstrual window, women's quality of life

RELATIONSHIP BETWEEN FEMALE SEXUAL DYSFUNCTION (FSD) AND RESTLESS LEGS SYNDROME (RLS): A CURRENT LITERATURE REVIEW

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ABSTRACT

Female sexual dysfunction (FSD) is a broad spectrum that includes various problems such as sexual arousal, orgasm and discomfort during sexual intercourse. Restless legs syndrome (RLS) is a neurological disorder characterized by discomfort and a need to move the legs, usually while lying down or at rest at night. The relationship between these two conditions may be of interest in terms of both physiological and psychological factors. Definition and Symptoms: RLS is characterized by discomfort and a feeling of restlessness in the legs. These symptoms usually occur in the evening or at night and are relieved by the need to move. RLS is generally more common in women and can significantly affect sleep quality. Epidemiology: The prevalence of RLS varies between 5-10% in the general population, but this rate may be higher in women. RLS is thought to be caused by genetic, biochemical and environmental factors. Definition and Types: FSD includes problems such as sexual arousal, orgasm, and discomfort during sexual intercourse. Types of SD include sexual desire disorder, sexual arousal disorder, orgasmic disorder, and sexual pain disorder. Epidemiology: SD is common among women and is seen in various age groups. The prevalence of SD may vary depending on the age of the women and their physical and psychological health status. Relationship Between RLS and FSD Physiological Factors: RLS is known to be associated with sleeplessness and constant restlessness at night. This condition can affect the general quality of life and lead to sexual dysfunction. Insomnia can cause symptoms such as lack of sexual desire and fatigue. Psychological Factors: There may be a psychological link between RLS and SD. Constant discomfort and insomnia may increase the risk of anxiety and depression. These psychological conditions may contribute to sexual dysfunction. Research and Findings: Current literature offers a limited but growing number of studies on the relationship between RLS and FSD. One study found that RLS may have negative effects on sexual function. However, the mechanisms explaining this relationship are not yet fully understood and further research is needed. The relationship between RLS and SD in women requires a multidisciplinary approach. Treatment strategies should be developed considering the effects of both physiological and psychological factors. Understanding the effects of RLS on sexual function is important in terms of coping with this condition and developing treatment strategies. The literature on this subject is still developing and more comprehensive studies are needed. In particular, longitudinal and control group studies may be useful to understand the mechanisms of the relationship between RLS and FSD. Research on this subject is very important in terms of its effects on women's sexual health.

Key words: Female Sexual Dysfunction (FSD), Restless Leg Syndrome (RLS), Sexual Dysfunction, Hormones and Sexual Function, Women's Health

URINARY INCONTINENCE ISSUES IN WOMEN AFTER COVID-19

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ABSTRACT

Introduction
The Covid-19 pandemic has had extensive effects on health and social life, and women's health has also been affected by these effects. The increase in urinary incontinence problems in women after the pandemic requires investigation of the causes and management strategies of this situation. The Covid-19 pandemic has affected the health status of millions of people worldwide, as well as causing significant changes in women's health problems. Urinary incontinence is a common health problem among women and has become more pronounced with the impact of the pandemic process. General Effects of Covid-19 on Women's Health The effects of the pandemic on women's health are multidimensional: Physical Health: In addition to the direct effects of Covid-19, inactivity, weight gain and other health problems have also been experienced during the pandemic. This has affected women's physical health and paved the way for conditions such as urinary incontinence. Psychological Health: The pandemic has caused an increase in stress, anxiety and depression levels. Psychological health problems can affect bladder control and increase the risk of urinary incontinence. Access to Healthcare: Access to healthcare has become difficult during the pandemic, causing disruptions in the management of chronic health problems such as urinary incontinence. What is Urinary Incontinence? Urinary incontinence is defined as the involuntary leakage of urine. There are three main types in women: Stress Type Urinary Incontinence, Urgent Urinary Incontinence, Mixed Urinary Incontinence. Increase in Urinary Incontinence After Covid-19 There are some obvious reasons why urinary incontinence problems have increased in women during and after the pandemic period: Reduction in Physical Activity: The obligation to stay at home and social isolation have caused a decrease in physical activity. Inactivity can lead to a weakening of the pelvic floor muscles and therefore an increase in the risk of urinary incontinence. Weight Gain: Weight gain was observed during the pandemic period due to changes in eating habits and physical activity. Obesity is an important factor that increases the risk of urinary incontinence. Psychological Stress and Anxiety: The pandemic process has caused an increase in stress and anxiety levels. This situation can have negative effects on bladder control and trigger urinary incontinence. Access to Healthcare: Access to healthcare has become difficult due to the pandemic, which has led to a delay in the timely diagnosis and treatment of health problems such as urinary incontinence. Hormonal Changes: Hormonal changes after menopause and childbirth can increase the risk of urinary incontinence. During the pandemic, women may have difficulty accessing the necessary healthcare services during these periods. Urinary Incontinence Management and Treatment Strategies Managing urinary incontinence problems usually requires a multidisciplinary approach. Treatment strategies may include: Physical Therapy, Pelvic Floor Exercises, Biofeedback, Psychological Support, Stress Management, Cognitive Behavioral Therapy. Medical Intervention: Drug Therapies: Medications that relax the bladder muscles and control urinary incontinence may be used. Surgery: In severe cases, surgical options may be considered. These methods may include bladder or urethral support procedures.

Lifestyle Changes: Exercise and Weight Management: Regular exercise and weight control can reduce the risk of urinary incontinence. Dietary Adjustments: Regulating water intake and avoiding foods that can irritate the bladder, such as caffeine, may be helpful. 6. Monitoring and Support After Covid-19 Healthcare services should provide better support for women with issues such as urinary incontinence after the pandemic. Long-term monitoring and treatment plans are critical in managing these issues. It is also important for health professionals to inform women about these issues and provide the necessary support services.

Key words: Covid-19, Lifestyle changes, Women's health, Urinary incontinence, Post-Pandemic, Access to health care

THE PATH OF ADVANCEMENT FOR FEMALE PHYSICIANS: FIGHTING AGAINST GENDER INEQUALITY

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ABSTRACT

Gender inequality is one of the most important problems faced by female physicians in the healthcare sector. Female physicians face various obstacles in their medical education and professional careers, and this can also affect the quality of healthcare services. In this article, we will discuss the current status of gender inequality for female physicians and the approaches developed to reduce this inequality. Reflections of Gender Inequality in the Health Sector 1. Gender Discrimination in Education Female physicians may generally face more discrimination than their male colleagues in medical education. Female students are often subjected to prejudiced evaluations such as "weak" or "insufficient" in medical schools, which can negatively affect their self-confidence and academic success. In addition, female medical students and young physicians receive less mentoring support than their male colleagues. 2. Career Advancement and Leadership Positions The career advancement of female physicians often involves a more challenging process than that of male physicians. Women have more difficulty than men in advancing to leadership positions, and their competence is often questioned. In addition, women's social role and the difficulties in establishing a work-life balance can hinder their career advancement. 3. Wages and Working Conditions Female physicians generally receive lower salaries and are exposed to more difficult working conditions than their male colleagues. Wage inequality can negatively affect women's motivation and commitment to their profession. In addition, female physicians' job security and promotion opportunities are often more limited than men's. 4. Balance of Work and Family Life Female physicians have difficulty balancing work and family life. Childcare, housework and other family responsibilities in particular can directly affect female physicians' job performance and career advancement. This can cause female physicians to advance their careers more slowly than their male colleagues. Current Approaches and Solution Proposals 1. Education and Awareness Programs In order to eliminate gender inequality, awareness should be raised on gender equality issues in medical education. Educational institutions should organize seminars and workshops for students on gender equality and combating discrimination. In addition, mentoring programs should be established for female medical students. 2. Policies and Legal Regulations In order to provide equal wages and working conditions for female physicians, gender equality policies should be developed in the health sector. Legal regulations and policies combating gender inequality should be implemented in workplaces. In addition, incentives should be provided to support female physicians to advance to leadership positions. 3. Child Care and Flexible Working Hours Supportive measures such as child care services and flexible working hours should be taken for female physicians to balance their work and family life. Such arrangements can enable female physicians to be more successful in their careers and have a more satisfying experience in their work life. 4. Gender Equality Trainings and Awareness
Gender equality trainings and awareness-raising activities should be carried out for all individuals working in the health sector. These trainings can help both women and men become informed about gender inequality issues and combat these issues more effectively.

Conclusion: Women physicians play an important role in the healthcare sector, but they face various challenges due to gender inequality. Comprehensive approaches and solutions should be developed to eliminate inequalities in areas such as education, career advancement, wage inequality, and work-family balance. Gender equality will improve the quality of not only women physicians but the entire healthcare system and create a more equitable working environment. The healthcare sector should take important steps to achieve gender equality and be a part of this process.

Key words: Education and Awareness, Gender Awareness, Women Physicians, Gender Inequality, Gender Inequality in the Health Sector, Medical Education and Gender, Career Advancement and Gender, Gender Equality Policies

A STUDY OF THE EFFECT OF DISC GEOMETRY AND FLOW RATE ON THE SPREAD UNIFORMITY OF ORGANIC GRANULAR FERTILISER

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ABSTRACT

The aim of this study was to investigate the influence of disk vane angles on the uniformity of distribution of granulated cylindrical-shaped organic fertiliser granules using a centrifugal spread-er. The impact of fertiliser flow position on disc quality and uniformity of fertiliser distribution on soil was also studied. The investigative simulations were performed using a commercial discrete element method (DEM) software package, specifically Altair Edem 2023. The low material density of the pellets, the shape of the pellets and the high dispersion of the size of the pellets render experimental studies of this kind quite complicated. Simulation studies have demonstrated that the position and geometry of the spreader disc blades have the most significant effect on the uniformity of the pellet distribution quantity and spreading uniformity. The results indicated that modifying the position of the pellet flow on the disc had a relatively minor impact on the quantity and uniformity of pellets spreading.

Key words: granulated organic fertiliser, centrifugal spreader, spreading disc, DEM simulation

THE FUTURE OF NATURAL REMEDIES: EFFICACY OF SALVIA ESSENTIAL OIL IN LIPOSOMAL FORMULATIONS

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ABSTRACT

The integration of nanotechnology with traditional herbal medicine heralds a transformative era in natural remedies, offering novel methodologies to enhance their therapeutic efficacy. This study centers on the encapsulation of Salvia essential oil within liposomal formulations, utilizing Lipoid S100, Phospolipon 85 G, and Phospolipon 90H as the lipid matrix. Our primary objective was to explore the physicochemical attributes of these nanoformulations. Aimed at understanding the interaction between Salvia essential oil and the lipid carriers, we carefully evaluated their particle size, zeta potential, and polydispersity index (PDI). These parameters are essential in governing the stability, bioactivity, and ultimately the success of liposomal systems in delivering therapeutic agents. Our findings reveal that all three liposomal formulations exhibit optimal particle sizes, conducive to enhanced cellular uptake and biodistribution. The zeta potential measurements indicate a high degree of colloidal stability, which reduces the likelihood of aggregation and precipitate formation, thereby prolonging the shelf life of the nanoformulations. Furthermore, the narrow range of PDI values underscores the uniformity in size distribution, a important factor in ensuring consistency in dosage and therapeutic response. These physicochemical characteristics are indicative of a high-quality encapsulation process, laying a solid foundation for further in vivo and clinical evaluations. By harnessing the synergistic effects of Salvia essential oil and advanced liposomal delivery systems, this study not only underscores the potential for improved therapeutic outcomes but also paves the way for the future development of natural remedies in the pharmaceutical and medical landscape.

Key words: Liposomal Encapsulation, Nanotechnology, Salvia Essential Oil

CONTRIBUTION TO THE CHEMICAL AND BIOLOGICAL STUDY OF SAGE "SALVIA OFFICINALIS L."

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ABSTRACT

Medicinal plants represent an inexhaustible source of natural bioactive compounds qualified as secondary metabolites. In recent years, there has been growing interest in the use of antioxidants, antimicrobials. Our study aims to evaluate the antibacterial activity and the antioxidant activity of extracts of Salvia officinalis from the region of Nechmaya (Wilaya of Guelma). The analysis of this study made it possible to know the organoleptic characteristics of essential oils and to obtain different yields according to the harvest periods, the content of polyphenols and flavonoids contained in the extract of the plant. The results obtained for the antiradical activity by the DPPH method reveal that the methanolic extract has a strong antioxidant activity compared to the essential oil. The antibacterial activity was studied against three bacterial strains: (Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa), by the aromatogram method, the essential oil was active against two microorganisms tested, namely : Staphylococcus aureus, Escherichia coli.

Key words: essential oil, Salvia officinalis, antibacterial activity, antioxidant activity, methanolic extract

CHARACTERIZATION AND STABILITY EVALUATION OF ROSEMARY ESSENTIAL OIL-ENCAPSULATED LIPOSOMES

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ABSTRACT

This study investigated the encapsulation of rosemary essential oil within liposomes formulated with different phospholipids: Lipoid S100, Phospholipon 85G, and Phospholipon 90H. The objective is to assess how lipid composition influences various parameters, including particle size, polydispersity index (PDI), rheological properties, zeta potential, and stability over a six-month period. Dynamic Light Scattering (DLS) is employed to measure particle size and PDI, providing insights into the uniformity of liposomal dispersion. Zeta potential measurements offer information on surface charge and potential stability, while rheological analysis using a rheometer sheds light on the flow properties of the liposomal formulations. Stability studies conducted at monthly intervals focus on evaluating the integrity and release behavior of the encapsulated essential oil over time. The findings reveal that lipid composition significantly impacts the physicochemical properties and stability of the liposomes. Liposomes formulated with Phospholipon 90H exhibit the most favorable stability profile, maintaining essential oil integrity throughout the study period. These results underscore the critical role of phospholipid selection in developing stable and effective liposomal formulations for rosemary essential oil, with potential implications for pharmaceutical and cosmetic applications.

Key words: Essential oils, Rosemary essential oil, Nanoformulation, liposomes, stability

EVALUATION OF THE ANTIMICROBIAL EFFECT OF SODIUM BICARBONATE

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ABSTRACT

Sodium bicarbonate, commonly used for its cleaning and deodorizing properties, is also suggested to have antimicrobial effects. However, scientific evidence regarding its antibacterial efficacy is not yet sufficiently established. The aim of this study was to evaluate the effect of sodium bicarbonate on the growth of various pathogenic bacteria, and to determine its potential as an antimicrobial agent. We tested Gram-negative and Gram-positive bacterial strains, as well as Saccharomyces sp yeast, and the bacteria were exposed to different concentrations of sodium bicarbonate. The antimicrobial activity of sodium bicarbonate was determined by two methods: the agar incorporation method and the agar diffusion method, which measures the minimum inhibitory concentration (MIC). The results showed a variable inhibitory effect on different strains, confirming the antibacterial activity of sodium bicarbonate. Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella pneumoniae carb - and Acinetobacter baumannii OXA-23 showed notable sensitivity, but Escherichia coli, Acinetobacter baumannii NDM-1 and Bacillus cereus were totally resistant, as was Saccharomyces sp. These promising results support the idea that sodium bicarbonate can be used more extensively in the prevention and treatment of infections, and pave the way for its use in personal care products, cleaning agents, and medical applications for the control of infections to complement traditional approaches.

Key words: Sodium bicarbonate, antimicrobial activity, minimum inhibitory concentration (MIC), , infection control

DEVELOPMENT OF A NEW HPLC-FL METHOD FOR THE SIMULTANEOUS ANALYSIS OF AFLATOXIN B1 AND B2 IN COMMERCIALLY AVAILABLE CHILI PEPPERS

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ABSTRACT

A simple, fast and selective analytical method has been developed for the simultaneous determination of aflatoxin B1 and B2 in commercially available chili peppers. The proposed method depends on reversed-phase liquid chromatography with isocratic flow profile of the mobile phase composed of methanol-water (40:60, v/v), with a C18 (150 mm × 4.6 mm × 5 µm) column at 30 ºC. The method was based on the measurement of the derivative using fluorescence detection (λex=365 nm, λem=435 nm). The injection volume was 30 µL. This currently developed method was validated according to ICH criteria by evaluating the specificity, linearity, precision, accuracy and robustness. The method was determined to be linear in a concentration range of 0.01-50 µg/kg with the correlation coefficient of 0.9998. LOD and LOQ were found to be 0.003 and 0.01 µg/kg, respectively. Intraday and interday RSD values were less than 4.38%. No interference was observed from concomitants. The developed method was applied to the analysis of 10 different chili pepper products. It is envisaged that the method can be used for rutine analysis, quality control and standardization of chili pepper products containing aflatoxin B1 and B2.

Key words: Aflatoxin B1 and B2, HPLC-FL, Chili Pepper, Method Valitadion

DEVELOPMENT AND VALIDATION OF A NEW UHPLC-DAD APPROACH FOR ATOMOXETINE DETECTION IN SEVERAL MEDICINAL PLANTS

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ABSTRACT

Atomoxetine (ATX) is a medication that is extensively used to treat attention deficit hyperactivity disorder in children, adolescents, and adults. The goal of this work was to create a speedy, easy, and sensitive ultra high performance liquid chromatographic method (UHPLC) for the measurement of atomoxetine in various medicinal plants. (Salvia officinalis L., Rosmarinus officinalis L., Melissa officinalis L., Ginkgo biloba L.). Prior to chromatographic separation, liquid-liquid extraction was applied, which is currently the preferred extraction technique due to its simple, fast and efficient procedure for sample preparation. The chromatographic separation was achieved by reversed phase C18 (5 µm × 4.6 mm × 150 mm) analytical column and a mobile phase consisting of monobasic potassium dihydrogen orthophosphate (pH=6.8) and acetonitrile (50:50 v/v) at flow rate of 0.8 ml/min and diode array detector (DAD) detecting at 215±2 nm. The envisioned method's linear behavior was tested in the 0.5-20 µg/ml range (r2=0.09990). In compliance with International Conference on Harmonisation (ICH) criteria, the method received validation by means of accuracy, precision, repeatability, specificity, robustness, and detection and quantification boundaries. LOD and LOQ values were determined as 0.16 and 0.5 µg/ml. RSD values for hourly and daily measurements are found to be below 2.5% for both assays. The proposed method can be used effectively for quantification of atomoxetine in medicinal and aromatic plants. The proposed analytical procedure represents an efficient method for the quantification and routinee analysis of atomoxetine in medicinal and aromatic plants.

Key words: Atomoxetine, UHPLC-DAD, Attention Deficit Hyperactivity Disorder, Medicinal Plants

CHEMICAL COMPOSITION AND EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS OF SATUREJA BABORENSIS (BATT.) BRIQ.

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ABSTRACT

Essential oils of Satureja are used as a food ingredient in the Mediterranean region and as an aromatic and flavoring agent in Algeria. The leaves of Satureja are used to purify water and increase the time of conservation of dried figs and sun-dried tomatoes. The aim of this work is to evaluate the antibacterial activity of essential oils from fresh and dried aerial parts of the algerian species Satureja baborensis which is locally used to perfume potatoes, soups, tea and to treat gastric troubles. Hydrodistilled essential oils of dry and fresh parts were analyzed by GC and GC-MS. The antibacterial activity of the essential oils was evaluated against nine microorganisms, using disc diffusion and MIC methods.The hydrodistillation of fresh and dried aerial part (100 g each) of S. baborensis afforded 2.05% and 2.15% (v/w) respectively of strong pleasant smelling yellow essential oils. GC and GC-MS analyses allowed the identification of compounds representing (95.68–96.34%) of the oils. The main constituents of the essential oils of the fresh (FA) and dried (DA) aerial parts were pulegone, menthone, piperitenone oxide, cis-piperitone oxide and limonene, constituting 75-86% respectively, of the oils. The most active antibacterial essential oil was that of the dried part (DA), it showed particularly a most potent inhibition of strains growth of Escherichia coli ATCC 25922 and Streptococcus □-hemolitic with 80 µg/mL MIC values. We can conclude that the essential oils of dry and fresh parts of Satureja baborensis inhibited the growth of all bacterial strains because of their bioactive component content like pulegone and menthone. Regarding the inhibition zones and MIC's, the essential oil from dried part seemed to be a little higher antibacterial than the fresh part. Thus, we conclude that it's better to use the essential oil of dried parts for antimicrobial purpose.

Key words: Satureja baborensis; Essential oi; GC-MS; Antibacterial

POLYPHENOLIC PROFILE AND EVALUATION OF THE ANTIMICROBIAL, ANTI-BUTYRYLCHOLINESTERASE, ANTI-ALPHA-AMYLASE AND LARVISCIDAL ACTIVITIES OF LINUM TRIGYNUM L.

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ABSTRACT

In this study, we investigated the polyphenolic composition of the n-butanol fraction of Linum trigynum L. (BELTr), a medicinal plant from the Linaceae family that grows in Algeria, using RP–UHPLC–ESI–QTOF–MS technique and evaluated of its antimicrobial, larviscidal and inhibition of □-amylase and butyrylcholinestrase (BChE) potentials. Fifty six polyphenols were identified in the BELTr with isomers of vicenin-2 and orientin, and isovitexin as the major compounds. The extract showed a significant inhibition of BChE (IC50: 112.45±3.93 µg/mL) and a good inhibition of α-amylase (IC50: 2.25±4.05 mg/mL). In addition, the BFLTr exhibited antimicrobial activity against Escherichia coli ATCC 25922, Staphylococcus aureus ATCC 25923, Staphylococcus aureus ATCC 6538P, Salmonella enterica ATCC 13076, Bacillus subtilis ATCC 6633, Klebsiella pneumoniae ATCC 13883, Enterococcus faecalis ATCC 19433, and Pseudomonas aeruginosa ATCC 27853, as well as a yeast strain, Candida albicans ATCC 1031, with MICs values ranging between 250 and 500 µg/mL and a weak larviscidal effect. The extract's activities may be attributed to its richness in flavonoids and phenolic acids, either through a direct mechanism or in a synergistic one.

Key words: Linum trigynum L.; RP–UHPLC–ESI–QTOF–MS; Butyrylcholinesterase; α-Amylase; Antimicrobial.

THE NATURAL HORMONE OF THE HUMAN BODY, IRISIN, INDUCES APOPTOSIS IN HELA CERVİCAL CANCER CELLS BY SUPPRESSING GLUCOSE METABOLISM

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ABSTRACT

Irisin is a natural body hormone that can also be produced synthetically. Although the first research on irisin was on energy metabolism, recently its proliferative and anti-proliferative effects have been investigated in various types of cancer, depending on the type of cancer. In this study, the 48-h proliferation suppressive dose of irisin on the HeLa cervical cancer cell line was determined to be 50 nM. Additionally, when the same dose was applied to mouse healthy liver cell line AML12, 105.37 ± 5.87% viability was detected compared to the control group. As a result of qRT-PCR analyses performed upon application of this dose of irisin to the HeLa cell line, significant decreases in PI3K, Akt, mTOR, HIF-1α, Mn-SOD, CAT, and GSR gene expression levels were detected, whereas significant increases were detected in GLUT1 and p53 gene expression levels. As a result of flow cytometry analyses performed based on the same application, 71.84 ± 2.49% of ROS-affected and 51.23 ± 3.14% of total apoptotic and necrotic cell amounts were detected in the HeLa cell line compared to the control group. At the same time, depending on this application, apoptotic symptoms in the nuclear structures of HeLa cells were demonstrated by fluorescence microscope imaging. These data have shown that irisin can play an effective role in the fight against many types of cervical cancer, especially HeLa.

Key words: Apoptosis, GLUT1, HeLa, HIF-1α, Irisin, ROS

THERAPEUTIC BENEFITS OF MEDICINAL PLANTS FOR TREATING COLIC DISEASES USED BY THE POPULATION OF RELIZANE

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ABSTRACT

As colonic disorders represent a major public health issue, herbal medicine is frequently used in Africa, especially in Algeria. This study aims to identify the medicinal plants used in the traditional treatment of various diseases, such as colonic disorders and diabetes, in Relizane. To achieve this, an ethnobotanical survey was conducted in the most popular districts of the city over a period of 3 months (March 2021 to May 2021). The inventory of medicinal plants is summarized in a table that includes their botanical family, scientific names, vernacular names, as well as their names in French and English. The in-depth investigation identified twenty-five (25) plant species belonging to twelve (12) botanical families, with the most represented being Lamiaceae, Fabaceae, Asteraceae, and Apiaceae. Prominent plant species include Rosmarinus officinalis, Trigonella foenum-graecum, Salvia officinalis, Lavandula, Aloysia citriodora, Curcuma longa, Nigella sativa, Mentha, Melissa officinalis, and Chamaemelum nobile. The most commonly used plant parts are seeds, leaves, stems, flowers, and fruits. Recipes are primarily prepared by decoction and administered exclusively orally. No adverse effects associated with the use of these recipes were reported by herbalists in this study. This work highlights the widespread use of traditional medicine and suggests that the conventional use of these plants can be rationalized due to their richness in active components.

Key words: Medicinal Plants , Colic Diseases , Relizane

EVALUATION OF PHYTOCHEMICAL COMPONENTS OF ACHILLEA MILLEFOLIUM IN DIFFERENT AREAS OF ALBANIA USING SUPERCRITICAL CO2 EXTRACTION

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ABSTRACT

Achillea millefolium, commonly known as yarrow, is a perennial herb that belongs to the Asteraceae family. Achillea millefolium continues to be valued in moderrn herbal medicine for its broad spectrum of therapeutic applications, rooted in centuries-old traditional knowledge and validated by contemporary scientific research. The medicinal properties of Achillea millefolium are attributed to its complex phytochemical composition, which includes various classes of bioactive compounds. Essential oil of Achillea millefolium contains various compounds such as mono- and sesquiterpenoids, including pinenes, sabinene, phellandrene, terpinen-4-ol, alpha-terpineol, β-caryophyllene, bornyl acetate, azulene. These components contribute to the diverse pharmacological activities exhibited by Achillea millefolium. The objective of this study is to evaluate and identify the chemical components present in Achillea millefolium using supercritical CO2 extraction. The plant material was collected in May-July 2023from 4 various regions in Albania (Elbasan,Librazhd,Pogradec,Korce) and then subjected to supercritical CO2 extraction.The extracted compounds were analyzed using flame ionization gas chromatograph. The most abundant chemical components were 1.8-Cineole(6.2%-8.08%), b-Caryophyllene (19.8%- 24%), Germancene(11%-12.4%), Bornyl acetate(4.8%-6%), b-Pinene(6.2%-7.1%) Achillea millefolium, commonly known as yarrow, is a perennial herb that belongs to the Asteraceae family.Achillea millefolium continues to be valued in moderrn herbal medicine for its broad spectrum of therapeutic applications, rooted in centuries-old traditional knowledge and validated by contemporary scientific research. The medicinal properties of Achillea millefolium are attributed to its complex phytochemical composition, which includes various classes of bioactive compounds. Essential oil of Achillea millefolium contains various compounds such as mono- and sesquiterpenoids, including pinenes, sabinene, phellandrene, terpinen-4-ol, alpha-terpineol, β-caryophyllene, bornyl acetate, azulene. These components contribute to the diverse pharmacological activities exhibited by Achillea millefolium. The objective of this study is to evaluate and identify the chemical components present in Achillea millefolium using supercritical CO2 extraction. The plant material was collected in May-July 2023from 4 various regions in Albania (Elbasan,Librazhd,Pogradec,Korce) and then subjected to supercritical CO2 extraction.The extracted compounds were analyzed using flame ionization gas chromatograph. The most abundant chemical components were 1.8-Cineole (6.2%-8.08%), b-Caryophyllene (19.8%- 24%), Germancene(11%-12.4%), Bornyl acetate(4.8%-6%), b-Pinene(6.2%-7.1%)

Key words: Achillea millefolium, supercritical CO2 extraction, phytochemical components

EFFECTS OF EDIBLE MUSHROOM Hohenbuehelia petaloides (Bull.) Schulzer on APOPTOSIS and CELL CYCLE IN HT-29 CANCER CELL LINE

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ABSTRACT

In addition to being low in calories, mushrooms are important natural sources of essential fatty acids, protein, vitamins and minerals, which, taken together, make them an important part of a healthy diet. Used as a nutritious food, many mushroom species are specially collected and used in cooking in many parts of the world. Hohenbuehelia petaloides (Bull.) Schulzer (Pleuroteceae) is an edible tree mushroom that is naturally distributed in Türkiye. While apoptosis is a programmed cell death, necrosis and autophagy occur when cells are under stress. One of the effective measures for tumor suppression is to reconstruct the signal transduction system of tumor cell apoptosis and induce cancer cell apoptosis. This study aimed to determine whether H. petaloides hexane extract (IC50= 135.45±0.06 µg/mL) induces apoptotic cell death in HT-29 and to determine the amount of cells in the division phase. 300 g dried mushrooms were extracted with hexane then apoptosis and cell cycle analysis were investigated in HT-29 by flow cytometry using ModFit LT according to Yilmazer 2011 method. According to the flow cytometry analysis performed to determine the amount of cells in the division phase, it was determined that the hexane extract of H. petaloides induced apoptosis in HT-29 in 24 hours (2xIC50 = 42.5%) in parallel with the increase in concentration. Cell cycle analysis, it was found that the number of cells in the G1 phase (IC50 concentration 4.42% and 2x IC50 concentration 16.76%) increased and the number of cells in the S and G2 phases (IC50 concentration 5.41%, and 2x IC50 concentration 16.85%) decreased in HT-29 cells at 24 hours as the doses of hexane extract increased compared to the control. In conclusion, H. petaloides hexane extract at 2x IC50 concentration induces Q2 stage apoptosis in HT-29, leading to the arrest of HT-29 at G1 stage of the cell cycle

Key words: Hohenbuehelia petaloides, colon cancer cell line, HT-29, apoptosis, cell cycle

CYTOTOXIC ACTIVITY and WOUND HEALING EFFECT of EDIBLE MUSHROOM Hohenbuehelia petaloides (Bull.) Schulzer in HEALTHY 3T3 FIBROBLAST CELL LINE

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ABSTRACT

In recent years, new therapeutic approaches that are non-toxic, lower cost and accelerate wound healing are needed. Considering the different medicinal benefits of mushrooms, mushroom extracts are gaining attention as wound healing agents. Fungi help in the wound healing process by stimulating the immune system, producing reactive oxygen species (ROS) and regulating various inflammatory intermediates. In this study, it was aimed to determine the cytotoxic activity of the edible wood fungus Hohenbuehelia petaloides (Bull.) Schulzer. in healthy 3T3 fibroblast cell line and its wound healing effect at a non-toxic concentration. The collected mushroom material from Datça in Türkiye was identified and was turned into fungarium material at Muğla Sıtkı Koçman University, "Organic Chemistry and Natural Products Laboratory". H. petalodies was extracted (considering going from apolar to polar in the solvent system) with hot water (at about 85 °C by brewing) and the solvent of the extract was removed using a lyophilizer, respectively. It was determined that H. petaloides water extract did not show toxic effect on healthy 3T3 fibroblast cell line treated for 24 and 48 hours (IC50>1000 µg/mL). After 24 and 48 hours of application of H. petaloides water extract on healthy 3T3 fibroblast cell line, the wound area in the dose group decreased due to the increasing time compared to the control. It was determined that the wound area of 3T3 fibroblast cells treated with H. petaloides water extract closed at 66% and 95% in 24 and 48 hours, respectively, compared to the control group. In conclusion, in healthy 3T3 fibroblast cell line, the non-toxic dose of H. petaloides water extract caused 2-fold more cell migration in the wound area compared to the control at 24 and 48 hours.

Key words: Hohenbuehelia petaloides, healthy 3T3 fibroblast, wound healing, cytotoxic activity

PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF CENTAUREA SPECIES

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ABSTRACT

This study aimed to investigate the phytochemical composition and antioxidant potential of plant extracts from the Centaurea genus. A comprehensive qualitative and quantitative analysis was conducted to determine the levels of total flavonoids (using the AlCl3 method), total polyphenols (using the Folin-Ciocalteu method), and total tannins in the extracts. Additionally, the antioxidant capacity was evaluated using the DPPH and ABTS assays. Results indicated that the hydroalcoholic extract exhibited significantly higher levels of total flavonoids, total polyphenols, and total tannins compared to other extracts tested. Furthermore, the hydroalcoholic extract demonstrated superior antioxidant activity in both DPPH and ABTS assays. These findings suggest that Centaurea species possess promising antioxidant properties, warranting further investigation into their bioactive compounds and potential therapeutic applications.

Key words: TPC, TFC, TTC, DPPH, ABTD

EVALUATING THE ANTIOXIDANT AND ANTIDIABETIC POTENTIALS OF ASTERACEAE PLANTS FROM THE MEDITERRANEAN REGION

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ABSTRACT

Introduction & Objectives: The present work concerns the phytochemical and biological studies of the flowers of an Algerian plant belonging to the Asteraceae family. Methodology (Material and methods): Polyphenols were estimated by the Folin-Ciocalteu method. Flavonoids were estimated by the aluminum trichloride method (AlCl3). The antioxidant activity of our extracts was evaluated using DPPH and ABTS test. The evaluation of the ant-diabetic activity using □-amylase test is carried out by this enzyme according to theiodine / potassium iodine (IKI) method with few modifications. Results and Discussion:Firstly, the flowers of this species were submitted to a phytochemical study, which revealed the presence of severalsecondary metabolites, such as alkaloids, flavonoids, tannins and others.Then Soxhlet extraction in three solvents of increasing polarity made it possible to obtain three extracts: CHCl3, EtOAcand n-BuOH .The results of the quantitative analysis reveal that the n-BuOH extract is the richest in total polyphenolsand flavonoids, with values of 82.7±1.086 mgGAE/g of extract and 35.25±0.0784 mgQE/g of extract, respectively.The DPPH and ABTS methods used to assess the antioxidant activity reveal that the n-BuOH extract has the highestantioxidant activity.In addition, the α-amylase test shows that all extracts possess dose-dependent antidiabetic activity; based on the IC50 values, the EtOAc extract has the best inhibitory activity with a value of 51.58±9.95 µg/ml. Conclusion:The studied plant, which belongs to Asteraceae family, is characterized by a large reservoir of secondary metabolitessuch as alkaloids and flavonoids, which are known by their specific therapeutic and pharmacological properties, theflower of this plant, possess large antioxidant ant antidiabetic activit

Key words: medicinal plants, phytochemical screening, polyphenols, flavonoids, antioxidant activity, α-amylase.

STRAIN EFFECT ON HOLE-CONFINED PHONON SCATTEING RATES IN AL0.25GA0.75AS/GAAS/ AL0.25GA0.75AS QUANTUM WELLS

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ABSTRACT

This study presents a theoretical investigation of hole-confined polar optical phonon scattering rates in symmetric Al0.25Ga0.75As/GaAs/Al0.25Ga0.75As quantum wells. We calculate the valence band structure using the empirical band structure method, employing Bloch states as basis functions for the Schrödinger equation. The 6x6 Luttinger-Kohn Hamiltonian is implemented via the k·p method, incorporating heavy holes, light holes, and split-off subbands while accounting for spin-orbit interaction. Our analysis reveals that the heavy-hole band structure exhibits pronounced anisotropy and substantial coupling with the light-hole subbands. We compute intrasubband heavy-hole confined phonon scattering rates in the quantum well using Fermi's Golden Rule in conjunction with the dielectric continuum model. Numerical results demonstrate that these scattering rates are significantly influenced by hole wave functions and the density of final states available for hole scattering, displaying a high degree of anisotropy. Furthermore, our research indicates that compressive hydrostatic and biaxial strains can reduce scattering rates at low hole energies, thereby decreasing hole mobilities. We also examine the anisotropic effect on hole-confined phonon scattering rates, finding it to be considerable. Lastly, we compare scattering rates for quantum wells grown along the [001] and [011] directions. Our findings show increased scattering rates for the [011] growth direction compared to the [001] orientation.

Key words: Quantum Well, Confined Phonon, Semiconductor, strain

EVALUATION OF THE HEMOLYTIC EFFECT OF RHAMNUS ALATERNUS

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ABSTRACT

Our work focused on the phytochemical and biological study of three extracts and essential oil from the aerial parts of an Algerian medicinal plant, Rhamnus alaternus. The phytochemical study, carried out on the three extracts using solvents of different polarities (aqueous, ethanolic, and hydroalcoholic) prepared under reflux, highlighted the richness of this plant in secondary metabolites, particularly tannins, flavonoids, saponins, alkaloids, and heterosides. Based on these findings, we were interested in the biological study and evaluation of two biological activities of this plant. Firstly, we studied the antioxidant activity of Rhamnus alaternus, using two methods, namely the DPPH free radical scavenging assay and the FRAP iron-reducing capacity assay, which showed that all the plant extracts and its essential oil have antioxidant activity and iron-reducing capacity. Secondly, we studied the cytotoxicity of this plant by evaluating the hemolytic activity of the extracts in vitro against human red blood cells. The results showed that this plant has low toxic effects on human erythrocytes. The maximum hemolytic effect was obtained with the aqueous extract (6.38%) and the essential oil (10.52%).

Key words: Rhamnus alaternus, antioxidant activity, DPPH, FRAP, secondary metabolites, hemolytic activity

STUDY OF THE HEMOLYTIC EFFECT OF SOME NATURALS EXTRACTS

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ABSTRACT

This study was carried out in the Laboratory of Natural and Bioactive Substances (LASNABIO-TLEMCEN - Algeria) in order to analyze the extracts of the aerial part of the plant Sonchus oleraceus L., an annual plant belonging to the Asteraceae family and widely used in traditional medicine. The main objective of this study is to evaluate the cytotoxicity of extracts on human red blood cells. The aqueous, ethanolic and hydroethanolic extracts were prepared from hot extraction, and the polyphenolic extract is obtained using a polyphenol extraction protocol. Precipitation and color change reactions were used to determine secondary metabolites, such as tannins, saponosides, heterosides, alkaloids, and flavonoids. The antioxidant activity was performed using the DPPH and FRAP tests, and showed that the aqueous extract has a relatively low antioxidant activity compared to the baseline (vitamin C), although it is better according to both tests. The hemolytic power of the extracts on the human red blood cells was determined, and the results showed a very low toxic effect of the aerial part of the plant, even at high doses.

Key words: sonchus oleraceus L., DPPH, FRAP, red blood cells.

ECOPHYSIOLOGICAL STUDY OF SOME COASTAL DUNE SPECIES OF ZEMMOURI EL BAHRI (ALGERIA)

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ABSTRACT

Species of coastal dunes are subjected to several environmental stress factors such as drought, high temperature,light intensity as well as salinity, which led to development of specific morphological, physiological and biochemicaladaptation mechanisms. Studying these strategies allows explaining the survival of these species in such hostile and stressful conditions. In this study we compared some parameters (morphological, physiological and biochemical) of two Brassicaceae species Matthiola tricuspidata (L.) W.T.Aiton, Cakile maritima Scop., and two Fabaceae species Lotus creticus L. and Ononis variegata L., harvested from their natural environment in coastal dunes of Zemmouri El Bahri (Algeria), with the aim to understand their mechanisms of adaptation. The results revealed that C. maritime showed the highest relative water content, leaf area, leaf mass area, and succulence index. Based on the highest levels of total phenols, flavonoids and anthocyanins as well as high contents of photosynthetic pigments, M. tricuspidata can be classified as “homoiochlorophyllous” plant. The dry mass content varied considerably among species, with the highest values observed in L. creticus and the lowest in C. maritima. As both Fabaceae species L. creticus and O. variegata showed high chlorophylls, carotenoids, total phenols and flavonoids could also be classified as “homoiochlorophyllous” species. The relatively high levels of total phenols, total flavonoids, anthocyanins and carotenoids implies a biochemical adaptation that allows these plants to maintain necessary photosynthetic activity under a water deficiency condition.

Key words: adaptation, anthocyanins, flavonoids, photosynthetic pigments, relative water content, total phenols

STUDY OF THE VARIABILITY OF PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF SOME LINES AND VARIETIES OF DURUM WHEAT (TRITICUMDURUMDESF) UNDER WATER STRESS

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ABSTRACT

This study was conducted at the level of the Institute of Agronomic Research (INRAA), Baraki-Alger, with the objective of analysing the behaviour and variability of the response in the variety (Boussalem) (Triticum durum Desf):and nine durum wheat lines V3, V7, V10, V16, V17, V15, V18, V19 and V23 under water stress. This comparative study affects the different morphological parameters (plant height and leaf surface), physiological parameters (relative water content and chlorophyll content) and biochemical parameters (protein content and Malonyl dialdehyde content) under complete irrigation shutdown for 20 days, in a randomized block device with three repeats. Results show that water stress resulted in reduced leaf area, plant height, relative moisture content, total chlorophyll content, soluble leaf protein levels, and increased Malonyl dialdehyde (MDA) content. which represents the final product of membrane lipid oxidation. The results showed that water stress causes the same mechanisms of response in all ten varieties but different degrees.

Keywords: Water stress, tolerance, durum wheat, morphology, physiology, biochemistry, irrigation.

SOIL FERTILIZATION WITH MINERAL NITROGEN IMPROVES GROWTH, BIOMASS PRODUCTION AND LEAVES BIOCHEMICAL VALUES IN MORINGA OLEIFERA KNOWN AS MIRACILLOUS TREE

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ABSTRACT

This study aims to prove that growth also than biochemical quality of Moringa the miraculous tree able to grow under different culture conditions, were optimized by nitrogen fertilization of soil. In our case, three-aged seedlings were grown under control condition (without fertiliser) or in presence of NH4NO3. The several growth parameters (leaves and flowers numbers, stem diameter and height, relative growth rate (RGR), net assimilation rate, (NAR), relative leaf area expansion rate (RGRA) and relative growth rate of the principal stem in height (RGRh) were enhanced by nitrogen fertilizer (NH4NO3) presence. The high growth level seemed to be the result of increase of chlorophyll a fluorescence parameter like the minimal and maximal fluorescence emission and the maximum quantum efficiency of PSII photochemistry (Fv/Fm). More that, when Moringa reached the most pronounced degree of growth (August, 2023), biochemical measures were realized. At that time of phenological cycle and the environmental conditions in which they were generated, a rise in the contents of total phenolic compounds, total flavonoids, condensed tannins, soluble sugars, proline and proteins was observed. Compared to in trees grown under control condition, dramatic tenor's augmentation of all secondary metabolites, osmolytes and proteins was shown in plants fertilized with ammonia nitrate. Recording to our goals, these data demonstrated the importance of soil fertilization in Moringa improvement of bioactive compounds richness improving healthy benefits, and in resoltuion of different problems at agronomic and economic levels.

Key words: Bioactive compounds, Nitrogen fertilizer, Fluorescence, Moringa oleifera

RNA-SEQ ANALYSIS REVEALS MOLECULAR MECHANISMS OF BIOSTIMULANT-MEDIATED DROUGHT TOLERANCE IN BARLEY

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ABSTRACT

Drought stress is a major abiotic factor limiting crop productivity worldwide. Biostimulants, particularly algae-based products, have shown a great potential to ameliorate the negative effects of drought and improve plant stress tolerance. However, the underlying molecular mechanisms by which biostimulants confer drought tolerance remain largely unknown (Jagtap and Meena, 2021; Kapoore et al., 2021). Transcriptomic analysis using RNA-Seq can provide valuable insights into the global gene expression changes and regulatory networks involved in biostimulant-mediated drought stress response. In the present study, RNA-Seq analysis was performed on drough-stressed barley plants supplied with an algae-based biostimulant. The results revealed that the application of biostimulant had a much larger effect on the barley transcriptome under drought condition compared to well-watered control plants. Furthermore, functional enrichment analysis of the DEGs identified several key biological pathways that were modulated by the biostimulant application under drought stress. Particularly, the pathways associated with enhanced growth included those involved in ion transport, membrane function, cell wall remodeling, and auxin signaling cascades.

Key words: Stress tolerance, Nutrient signaling, sustainable agriculture and stress responsive genes

EVALUATION ON THE IMPACT OF GLOBAL WARMING ON ENTOMOPATHOGENIC NEMATODES

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ABSTRACT

For many years, pesticides have been used in agricultural production areas to control pests. However, restrictions on pesticide use have been increasingly imposed due to the understanding of their toxic effects on non-target organisms in recent years. This has highlighted other methods of pest control. In this context, Entomopathogenic nematodes (EPNs), widely used in biological control, have come to the forefront. Effective utilization of EPNs in agricultural fields depends significantly on environmental factors. Recently, global warming has been notably affecting agricultural areas, particularly causing concerns about drought and high temperatures, which are anticipated to negatively impact EPNs already in use or planned for use. Therefore, developing EPN isolates adapted to our country's conditions, resilient to high temperatures and drought, becomes crucial for future biological pest control strategies in agricultural areas.

Key words: Biological control, Entomopathogenic Nematodes, Drought, Global warming

INVESTIGATION OF ETHNOBOTANICAL CHARACTERISTICS OF SOME HALOPHYTE SPECIES COLLECTED FROM KEŞAN REGION OF SAROS GULF

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ABSTRACT

This research was carried out between 2023-2024 in order to discover the taxa and ethnobotanical characteristics used in the regions of Saros Gulf, Keşan Region (Danişment village, Erikli village, Tuzla Lake, Gökçetepe village, Sazlıdere village and Mecidiye village). As a result of the interviews with the local people, within taxa with ethnobotanical uses it was shown that 15 families and 30 genera were used for various purposes (food, medicine, household goods, industrial, ornamental, religious). We learned that none of the endemic and rare plants were in danger. The use of Leucophyta brownii (silvery plant) as an ornamental plant was recorded for the first time in Turkey with this study. In addition to the data obtained from this study contributing to the recording of naturally occurring halophytes in Saros Gulf and the determination of the ethnobotanical characteristics of the relevant plants; it is aimed to draw attention to the protection of the habitats of these valuable plant species adapted to these extreme conditions.

Key words: Saros Gulf, Keşan, halophyte, ethnobotany, medicinal plants.

IN VITRO GERMINATION METHODS FOR CORYLUS AVELLANA CV. 'TOMBUL'

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ABSTRACT

Hazelnut (Corylus avellana) seeds have a prolonged germination period due to their requirement for extended stratification treatments, complicating breeding studies. This present study investigated the surface sterilization and in vitro germination of C. avellana cv. 'Tombul' seeds. The shells were cracked and the kernels were sterilized with 70% ethanol, NaOCl (1%, 2%, and 3%), and H2O2 (3%, 6%, and 9%). The most visually contamination-free cultures were achieved with a 10-minute treatment using 3% NaOCl, while the highest germination rate was observed with a 10-minute treatment using 3% H2O2. Hazelnut seeds were cultured in Murashige and Skoog (MS) medium with varying combinations of benzyl amino purine (BAP) and gibberellic acid (GA3). The highest germination rate (85%) was obtained with 0.5 mgL-1 BAP and 3 mgL-1 GA3. This study demonstrated that hazelnut seeds can germinate in vitro within 3 weeks without any cold pre-treatments.

Key words: Hazelnut, Corylus, in vitro, germination

MICROPROPAGATION OF TURKISH HAZELNUT (CORYLUS COLURNA)

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ABSTRACT

Corylus colurna L. (Turkish hazel) is a tree widely grown in the Balkans and the Caucasus. Propagation of this species, which is very difficult to propagate vegetatively since it does not produce suckers, by tissue culture has many advantages. The objective of this study was to determine the effectiveness of different basal culture mediums in the micropropagation of Corylus colurna. Axillary buds were cultured in different media with varying doses of plant growth regulators after sterilization with 70% ethanol for 30 seconds and 1% NaOCl for 10 minutes. Shoots were subcultured twice in Driver and Kuniyuki (DKW), Murashige and Skoog (MS), Woody Plant Medium (WPM), and Nas and Reed (NRM) media, each containing Benzylaminopurine (BAP; 1, 2 mgL-1) or meta topolin (mT; 1, 2 mgL-1). Among all treatments, NRM medium containing 2 mgL-1 mT showed the best culture success with the highest shoot length and low hyperhydricity.

Key words: Corylus colurna, Turkish hazel, micropropagation

ALLEVIATING EFFECTS OF MELATONIN AND JASMONIC ACID IN RICE EXPOSED TO 5-FLUOROURACIL

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ABSTRACT

Increasing cancer cases in recent years have cause to the use of antineoplastic (anticancer) drugs in high doses and in more combinations. Due to the inadequacy of traditional treatment facilities, antineoplastics can reach the environment from different sources and contaminate different parts of the environment such as soil, groundwater or surface water. 5-Fluorouracil (5-Flu) is a cytotoxic chemotherapy agent widely used in the treatment of various cancers. In this research, some morphological, biochemical and physiological changes in rice plants exposed to 5 Flu were investigated. In addition, the effects of melatonin and jasmonic acid applied to the plants on these changes were determined.

Key words: 5-Fluorouracil, melatonin, jasmonic acid

DETERMINATION OF TOTAL PHENOLIC AND TOTAL FLAVONOID CONTENTS OF VERBASCUM MYRIANTHUM AND ASTRAGALUS TOKATENSIS PLANTS

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ABSTRACT

In this study, total phenolic and total flavonoid amounts of 2 different endemic species (Astragalus tokatensis Fischer. and Verbascum myrianthum Boiss.) were investigated. In literature searches, there are no studies on bioactive compounds related to these two plants. Therefore, methanol and hexane extracts of the flower and leaf parts of these two plants were obtained. Flavonoid and phenolic amounts of extracts obtained in different solvents were determined and compared among themselves. Flavonoid and phenolic amounts of extracts obtained in different solvents were determined and compared among themselves. In conclusion, Astragalus tokatensis Fischer. and Verbascum myrianthum Boiss. It was revealed that both plants have flavonoid and phenolic active compounds. According to the results obtained, more total phenolic substance measurements were obtained in methanolic extracts of Verbascum myrianthum and Astragalus tokatensis plants than in ethanolic extracts. Total flavonoid content in Astragalustokatensis plant was determined to be close to each other in both methanolic and ethanolic extracts.

Key words: Astragalus tokatensis Fischer., Verbascum myrianthum Boiss., Flavonoid, Phenolic

HEAVY METALS REMOVAL FROM ARTIFICIALLY CONTAMINATED SUBSTRATES USING FRENCH MARIGOLD (TAGETES PATULA L.)

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ABSTRACT

Phytoextraction is a phytoremediation technique that uses different plant species to remove heavy metals or other pollutants from a contaminated area by accumulating them in harvestable plant parts. It is an efficient, sustainable, environmentally friendly and cost-effective technology with good public acceptance, and therefore promising for reducing soil pollution and increasing soil fertility. The use of ornamental plants for phytoextraction has received considerable attention in recent years, primarily due to their high biomass and aesthetic features. In addition, since ornamental plants are usually not edible, the heavy metals accumulated in them do not enter the human food chain, thus reducing the health risks associated with heavy metals. French marigold (Tagetes patula L., Asteraceae) is a compact, bushy, annual ornamental plant that can potentially be used for phytoextraction, especially in urban areas where people have higher demands on environmental quality. This study aimed to assess the phytoextraction potential of the French marigold cultivated in commercial substrate contaminated with elevated Cd, Cr, and Pb concentrations. The French marigolds were grown for two months in pots having 1.5 kg of growing substrate mixed with various Cr (0, 100, 250, and 500 mg kg-1), Pb (0, 100, 250, and 500 mg kg-1), and Cd (0, 20, 50, and 100 mg kg-1) concentrations. Cr, Pb, and Cd were applied as K2Cr2O7, Pb(NO3)2, and CdCl2, respectively. The plant growth was not noticeably influenced by substrate contamination with Cr, Cd, and Pb during the investigation. The determination of Cr, Pb, and Cd in plant and substrate samples was performed by the flame atomic absorption spectrometry using the Shimadzu AA7000 device. The bioaccumulation factor (BCF) and translocation factor (TF) were calculated to identify the performance of the French marigold plants as accumulators for Cr, Pb, and Cd. In this study, Pb and Cr were accumulated mainly in roots, while Cd was accumulated more in the leaves. French marigold showed considerable Cd bioaccumulation, as indicated by BCF values higher than 2 in all Cd treatments. These results strongly suggest that French marigold could be identified as suitable for phytoextraction of Cd. However, further studies are needed to confirm this assessment.

Key words: cadmium, chrome, lead, phytoextraction, phytoremediation

RESEDA LUTEA L. ENJOYS IN THE UNREHABILITATED SURFACE OF IRON ABANDONED MINE

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ABSTRACT

The above-ground surfaces of abandoned iron mines represent natural laboratories for the studying plant survival mechanisms in harsh ecological conditions. Among distinctly present species is Reseda lutea L. (Resedaceae), a widespread honey-bearing plant with proven pharmacological activities. This plant prefers moderately moist, calcareous, fertile and uncultivated soils, but also can be found along roads. One of the most noticeable characteristics of the wild mignonette is its ability to adapt to extreme environmental conditions. The pH and some soil quality parameters of the rhizosphere of R. lutea collected on the surface of the abandoned iron mine (Vareš, Bosnia and Herzegovina) were measured. The photosynthetic pigments and proline content, polyphenolic profile, and antioxidant activity (DPPH) were spectrophotometrically estimated in the aerial parts. The rhizosphere is characterized by moderately alkaline soil reaction (pHH2O=8.40 and pHKCl=8.06), a small amount of humus (1.11%), and 0.16 and 4.00 mg 100 g-1 of P2O5 and K2O, respectively. The content of photosynthetic pigments of dry leaves in the pure acetone extract were 10.95, 3.55, 14.50 and 4.00 μg mL-1 for chlorophyll a, chlorophyll b, total chlorophylls and carotenoids, respectively. Ethanol (80%) extracts of aerial parts contain a high level of total phenols (184.76 mg Gallic Acid equivalent g-1 DW) and proline (11.98 mg g-1 DW), and a relatively small amount of total flavonoids (0.68 mg Rutin equivalent g-1 DW) and phenolic acids (2.23 mg Caffeic Acid equivalent g-1 DW). The same extract showed antioxidative activity of 116.48 μmol Trolox equivalent g-1 of DW. Although R. lutea lives in very harsh conditions (combination of drought, excessive light and temperature stresses, and deficiency in most biogenic elements, except calcium and magnesium), obtained results suggest that this plant has effective survival mechanisms and is stress tolerant. This study indicates the necessity of more complex research on the response mechanism of R. lutea to extreme stress conditions.

Key words: environmental stress, open-pit mine, wild mignonette

INCREASING GRANULARITY OF ADAPTATIONAL LANDSCAPES FOR NUE IN MAIZE WITH HIGH THROUGHPUT PHENOTYPING AND REMOTE SENSING

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ABSTRACT

Considerable breeding variance in maize can be attributed to the complex genotype by environment by management interaction (GEMI). Nitrogen (N) availability plays a pivotal role alongside water in this interaction. While state-of-the-art breeding methods incorporate both genotyping and phenotyping, phenotyping often lags behind genotyping in scale, despite being rich in information. High throughput phenotyping (HTP) aims to bridge this gap by utilizing secondary or related traits to enhance information density. One promising HTP approach involves multispectral reflectance monitoring via remote sensing technologies, including satellite and unmanned aerial vehicle (UAV) data, particularly for nitrogen use efficiency (NUE). We have conducted several experiments to address GEMI, combining dense genotyping data with 50k to 600k SNP markers and multispectral HTP. Our methodology involves using ensemble machine learning to model yield formation across various environmental and management scenarios. By increasing data size and informational density in phenotyping, we aim to enhance the granularity of adaptational landscapes for quantitative traits. Our approach promises to integrate multiple levels of information through advanced machine learning algorithms, addressing potential pitfalls in yield improvement. This research highlights the potential of HTP and remote sensing to advance maize breeding by providing more detailed insights into GEMI dynamics.

Key words: adaptation; maize; genotyping; phenotyping; nitrogen

HEAVY METAL RELATED GENE EXPRESSION COMPARISON BETWEEN HYPERACCUMULATOR AND NON-HYPERACCUMULATOR PLANTS

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ABSTRACT

Heavy metal pollution is becoming more widespread due to the rising industrialization of both developed and newly industrialised countries, also the excessive use of fertilisation in agriculture, it is arguable that unprecedented imbalances in the natural ecosystem. Heavy metal contamination seriously threatens plant development and growth therefore human health. Heavy metal contaminated soils and streams pose a severe problem due to their persistence in the environment and carcinogenicity to humans. Plants have an amazing adaptation known as metal hyperaccumulation, allowing some species to accumulate high concentrations of heavy metals in their tissues with little or no vital effect on their metabolism. Hyperaccumulators have evolved specialised defences against elevated heavy metal concentrations, including antioxidant systems, chelation, and compartmentalization. Specialised transporters, such as Heavy Metal ATPases (HMAs) and Natural Resistance-Associated Macrophage Proteins (NRAMPs), facilitate metal uptake and translocation across cellular membranes. Chelation by phytochelatins and metallothioneins, along with the binding of metals by organic acids, is crucial for reducing metal toxicity and enabling vacuolar sequestration. Hyperaccumulator plants also exhibit robust antioxidant defence systems, including enzymes like superoxide dismutase (SOD) and glutathione-S-transferase (GST), which mitigate oxidative stress caused by metal exposure. Gene expression plays a key role in the complex strategies that plants have evolved to deal with these harmful substances. Plants exposed to heavy metals trigger a series of transcriptional reactions that result in altered gene expression. Transcription factors further refine the plant's response by regulating gene activity, enabling adaptation to diverse metal levels and stress conditions. Understanding these molecular processes and mechanisms between hyperaccumulators and other plants through gene expression analysis is essential for developing strategies to enhance crop yield and tolerance against heavy metal stress.

Keywords: Plant, Heavy metal, Gene expression, Hyperaccumulators, Tolerance

PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF AERIAL PARTS OF PALLENIS SP. DURING THE FRUCTIFICATION PERIOD IN ALGERIA

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ABSTRACT

This study investigates the phytochemical composition and biological activities of the aerial parts (AE) of Pallenis sp., harvested during the fructification period in the Betita region of Tebessa province, Algeria. The phytochemical analysis identified a diverse range of bioactive compounds, including flavonoids, leucoanthocyanins, coumarins, catechol tannins, gallic tannins, saponins, terpenes, sterols, and quinones. The antioxidant potential of the extracts was assessed using DPPH, ABTS, and CUPRAC assays. The findings reveal significant variability in phytochemical profiles and bioactivities across different parts of Pallenis sp. The presence of flavonoids, terpenes, triterpenes, sterols, and tannins was confirmed through phytochemical screening. The aerial parts exhibited total phenolic and flavonoid contents of 47.65 ± 0.72 mg/g and 12.38 ± 0.72 mg/g, respectively. Antioxidant assays demonstrated that the aerial parts have a notable antioxidant capacity, with DPPH, ABTS, and CUPRAC values of 65.98±0.72 mg/mL, 34.16±0.76 mg/mL, and 42.26±2.16 mg/mL, respectively. These results underscore the rich phytochemical composition and significant antioxidant properties of Pallenis sp. extracts, indicating their potential for development into natural therapeutic and cosmetic applications.

Key words: Pallenis sp., Phytochemical screening, Fructification, Antioxidant activity.

EFFICACY OF SOME FUNGICIDES IN CONTROLLING WHEAT POWDERY MILDEW (BLUMERIA GRAMINIS) IN THE FERIZAJ REGION, KOSOVO

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ABSTRACT

The powdery mildew of wheat, caused by the pathogen Erysiphe graminis, is one of the most dangerous diseases that attacks germinating wheat and appears every year where cereals are cultivated, particularly in the cultivation of wheat and barley. The presence of this disease is mainly sporadic but can lead to a significant reduction in productivity. The intensity of the disease depends on climatic conditions. In our research experiment on wheat cultivation, we identified powdery mildew (Erysiphe graminis) in trials of three different wheat cultivars. The experiment was conducted on a 7-hectare parcel of land in the region of Ferizaj, known in Kosovo for the cultivation of white cereals. The focus of the experiment was to measure the intensity of infection in the three different cultivars of wheat to assess their sensitivity under the same climate and agricultural conditions. Another objective of this study was to test various fungicides to combat this pathogen by comparing the results of untreated plots with those treated with fungicides. By using different fungicides, we aimed to determine the most efficient fungicide for fighting this disease. Considering the biology of the pathogen, we introduced systemic fungicides with curative action, including Tebuconazole + Triadimenol (Folikur), Propiconazole + Carbendazim (Tilt), and Piroxamin + Tebuconazole + Triadimenol (Falcone). After applying these fungicides, we conducted sampling to determine the remaining infection levels. By comparing the test plots, we were able to identify the most effective fungicide for our specific climate conditions.

Key words: Experiment,Powdery Mildew,Pathogen,Fungicides,Parcel

PHYTOCHEMICAL COMPOSITION AND PHOTOPROTECTIVE PROPERTIES OF PALLENIS SP. EXTRACTS FROM BIR EL ATER, ALGERIA

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ABSTRACT

This study investigates the phytochemical composition and biological activities of the aerial parts (AE) and roots (R) of Pallenis sp., collected during the fructification period in the Bir El Ater region, Tebessa province, Algeria. Comprehensive phytochemical screening revealed the presence of flavonoids, leucoanthocyanins, coumarins, catechol tannins, gallic tannins, saponins, terpenes, sterols, and quinones. The sun protection factor (SPF) was also determined to evaluate the photoprotective properties of the extracts. The findings demonstrated notable variations in the phytochemical profiles and bioactivities between different parts of Pallenis sp. Specifically, the analysis identified significant quantities of flavonoids, terpenes, triterpenes, sterols, and tannins. The total phenolic and flavonoid contents (mg/g) were measured as follows: the aerial parts (AE) exhibited 47.65 ± 0.72 and 12.38 ± 0.72, respectively, while the roots (R) showed 86.34 ± 1.11 and 10.10 ± 1.11, respectively. The SPF values for the aerial parts and roots were determined to be 31.47±0.31 and 31.45±0.06, respectively, indicating substantial UV protection. These results underscore the rich phytochemical profile and significant photoprotective activities of Pallenis sp. extracts, highlighting their potential application in the development of natural therapeutic and cosmetic products.

Key words: Pallenis sp., phytochemical screening, fructification, Sun protection factor.

TRANSCRIPTIONAL PROFILING IN NLA MUTANT ARABIDOPSIS THALIANA EXPOSED TO TOXIC BORON

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ABSTRACT

Boron (B) toxicity reduces quality and yield of the cereals worldwide. Understanding molecular responses against B stress is one of the goals to improve the management of B. Our previous study demonstrated the differential regulation of protein degradation genes under B toxicity. In the following study, a remarkable induction was observed in NLA gene encoding a "nitrogen limitation adaptation" protein in response to B stress. To reveal the interaction between B responsive regulations and NLA, a ubiquitin ligase, RNA sequencing was performed in NLA mutant Arabidopsis thaliana under toxic-B. Accordingly, Principial Component Analysis (PCA) showed an obvious separation of wild type group from nla mutant groups, suggesting that mutation of nla gene significantly disturbed the transcriptome of Arabidopsis leaves. 710, 818, 1558 genes were differentially upregulated and 1648, 1351, 2472 were downregulated in nla mutants under control, 1B and 2B conditions, respectively. 374 genes were commonly upregulated, and 980 were commonly downregulated in nla mutants exposed to toxic-B. 153, 155 and 832 genes were specifically upregulated whereas 182, 89 and 836 genes were specifically downregulated under control, 1B and 2B conditions, respectively. According to Gene Ontology (GO) analysis, pectate lysase and histone methyltransferase were overrepresented for upregulated genes in nla mutants under control condition. Ribosome was overrepresented for upregulated genes in nla mutant Arabidopsis under 1B and 2B conditions. Linoleic acid and plant pathogen interaction were overrepresented for downregulated genes in nla mutant under control, 1B and 2B. Glucosinolate biosynthesis and MAPK signaling were overrepresented for downregulated genes in nla mutant Arabidopsis under 1B and 2B. Most significantly regulated genes were VQ motif-containing protein, TRAF-like family protein and low-molecular-weight cysteine-rich 30 protein under control, 1B and 2B conditions, respectively. Eventually, our data might benefit the determination of candidate genes for molecular breeding, and genetic manipulation of plants for B toxicity.

Key words: Arabidopsis thaliana, Boron toxicity, nitrogen limitation adaptation, NLA gene, RNA sequencing

BIOCHEMICAL QUALITY OF SOME MALE POLLINATORS OF DATE PALM

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ABSTRACT

The aim of our study focused on the morphological, chemical, biochemical, and phytochemical characterization of two varieties of date palm from the El Outaya region, Biskra (Hamraya and Bouhles), as well as the influence of conservation methods on the quality of the pollens. The results obtained show that the Hamraya variety has superior quality in terms of fat content (9.85%), calcium (Ca^{2+}= 72 mg/L), and K+ (64.55 mg/L), while the Bouhles variety stands out for its higher magnesium content (Mg^{2+} = 40 mg/L). The phytochemical composition reveals slightly higher concentrations of polyphenols (58.71 mg GAE/g DM) and flavonoids (1.85 µg QE/g DM) for the Hamraya variety, whereas BH has the most effective IC50% with 33.84 mg/ml. Additionally, Hamraya demonstrates better morphological characteristics, with a spathe weight of 1603 g, number of flowers (92), spike length (27 cm) and flower-bearing part (24 cm), and a germination percentage of 70.51%. The study also revealed that fresh pollens from both varieties are more viable than those stored in the freezer. We conclude that the Hamraya variety is the best pollinator and the bioactive compounds in the pollen can be used for the development of medicines and in the agro-food industry.

Key words: pollen, chemical properties, biochemical properties, phytochemical properties, pollinator, conservation, morphological characteristics.

DETERMINATION OF NUCLEAR DNA CONTENT IN SOME LINUM USITATISSIMUM GENOTYPES BY USING FLOW CYTOMETER

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ABSTRACT

Flax (Linum usitatissimum L.) is a species within Linum genus belongs to Linaceae family. The genus Linum includes about 200 annual and perennial species which characterized by a complex and questionable taxonomy needed to clarify. Linum usitatissimum is one of the most economically important species owing to fiber and oilseed attiributes in the genus. Various significant products (e.g.; home textile, dresses, high quality papers etc.) made by flax fibers. Antioxidant compound, protein and rich α-linolenic acid (ALA, omega-3 fatty acid) and lignans make it valuable nutrient. There is limited number of studies about nuclear DNA content analyses in L. usitatissiumum genotypes and comparing the nuclear DNA content among its different genotypes which is crucial data for the genome analysis, ploidy analysis, taxonomy and breeding studies. The primary objective of this research was to determine nuclear DNA content of 10 different L. usitatissiumum genotypes by flow cytometer (Partec, CyFlow® Space Münster, Germany). Partec commercial kit (Cystain PI absolute P) was used for the preparation of the samples. Five different plants analysed for each genotype. V. sativa (3.65 pg/2C) was used as an internal standart. A simple statistical analyses using confidence intervals was used to compare mean DNA content of the analysed genotypes. According to the flow cytometric analysis, mean nuclear DNA content of the samples ranged from 1.20 pg/2C to 1.32 pg/2C pg. Differences among analysed L. usitatissimum genotypes were not significant statistically. In addition, flow cytometry was used successfully to detect the mean nuclear DNA content of L. usitatissimum genotypes owing to its ease, speed and accuracy. The study was supported by The Scientific and Technological Research Council of Türkiye (Project No. 123O692)

Key words: Linum usitatissimum, Nuclear DNA content, Flow cytometry

LIPIDOMIC ANALYSIS REVEALS COELOMIC FLUID BACTERIA'S IMPLICATION IN PLANT RESILIENCE

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ABSTRACT

Coelomic fluid (CF) from earthworms has been shown to improve plant growth. Our team's recent research has shown that there are microorganisms that are ideal for promoting plant growth. In the current study, we used gas chromatography-mass spectrometry (GC-MS) lipidomic analysis to investigate how CF bacteria support plant growth when exposed to abiotic stress at the metabolic level. The plants treated with CFB exhibit the flexibility of abiotic stress defense mechanisms, according to the results. Numerous biochemical pathways appear to be involved in the way the plants respond to these biostimulants based on the diverse metabolic profiles that have been discovered. Bacterial treatments result in a deeper metabolic reprogramming than control. Based on the Pearson correlation between the growth parameters and the metabolites of the leaves of CFB-treated plants, a statistical analysis was conducted. The results showed that certain metabolites involving fatty acids and their derivatives, carboxylic acids and their derivatives, benzene derivatives, and alkanes had a positive correlation with the length of the aerial part, surface of the leaves, and biomass (fresh and dry weight of the aerial part). Positive signals regulating the plant's development and stress tolerance are likely responsible for the finding, as indicated by the positively associated metabolites. When compared to the control treatment, the concentrations of the common metabolic components of all treatments were much greater during the bacterial treatment, indicating that the bacteria had promoted the overexpression of these metabolic components.

Key words: Plant, resilience, bacteria, lipidomic, stress

THE EFFECT OF SEWAGE SLUDGE USE ON SOIL AND SOME EROSION PARAMETERS IN ERODED PASTURE AREAS IN KARAPINAR

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ABSTRACT

Konya Domestic Wastewater Treatment Plant produces approximately 150 tons/day of stabilized domestic treatment sludge. Disposal of the existing treatment sludge is a problem. In this study, the effect of sewage sludge in terms of soil organic matter, pH, salinity, aggregate formation, erosion prevention and soil improvement on eroded, weak and degraded pasture soils in Karapınar was investigated. For this purpose, sewage sludge containing 80% dry matter was applied to the plots at 0 (Control), 1, 2, 4 and 8 tons/ha (DM) by two different methods as raking into the 0-5 cm layer of the soil and sprinkling on the soil surface. Then, soil samples were taken from the treatment plots for 3 years. According to the data obtained at the end of the experiment, it was determined that the treatments increased the soil organic matter especially in the 0-5 cm soil depth and this increase became more effective as time passed. The effect of the treatments on soil salinity partially increased over time. The average value of 0.23 mmhos/cm before the application in the first year was 0.34 mmhos/cm at the end of the fourth year. The average values of water saturation, stability index and mechanical stability index showed significant increases compared to the first sampling year. It was observed that sewage sludge applications increased soil organic matter, increased structural stability, may be effective in preventing sediment transport and consequently increased erosion resistance and resistance of soils to erosion. In the study, it was concluded that 1 ton/da can be applied in eroded weak pasture soils with a rainfall of at least 250 mm, in accordance with the regulation on the use of sewage sludge in soil, once every three years for the ecological conditions in this region, by mixing it into the soil to a depth of 0-5 cm.

Key words: Erosion, Sewage Sludge (Biosolids), Aggregate, Karapinar, Degraded Pasture Lands

THE EFFECT OF BIOGAS WASTE COMPOST ON SOIL PROPERTIES AND GROWTH OF SPINACH (Spinacia oleracea L.) PLANTS

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ABSTRACT

In recent years, recycling of plant and animal wastes is very important in terms of environment and sustainable agriculture. In this study, it was aimed to determine the effects of different doses of biogas waste compost application on some soil properties and spinach plant growth. In the greenhouse experiment, 2 kg of soil was used on oven dry weight basis and control, 1%, 2%, 4% and 8% doses of biogas waste compost were applied, and spinach plants were grown. Biogas waste compost application increased aggregate stability, EC and organic matter content of the soil. The treatments increased the water holding capacity values and pH, but the effects were limited. The values of the leaf length, leaf width, leaf thickness, stalk length, fresh weight and dry weight of spinach plants grown under greenhouse conditions increased with the application of biogas waste compost. The use of organic-based materials such as biogas waste is very important as a soil amendment for sustainable agriculture and a healthy environment.

Key words: Biogas waste, compost, soil properties, spinach

EXAMINATION OF SOIL FERTILITY STATUS FOR FIELD CROP PRODUCTION AT BURSA ULUDAG UNIVERSITY AGRICULTURAL PRACTICE AND RESEARCH CENTER

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ABSTRACT

In enhancing yield and quality in plant production, fertilization holds a significant place among cultural practices. It is crucial that fertilization applications are conducted consciously, based on the scientific evaluation of data obtained from soil and plant analyses. This ensures not only abundant and healthy production but also economical production by preventing excessive use of fertilizers and pesticides, thus protecting both the environment and human health. This study involves the physical and chemical analysis of soil samples taken from the 0-30 cm depth of soils used for field crop production at the Agricultural Practice and Research Center located on the Uludag University campus in Bursa. The results were compared with reference values to determine the fertility status of the soils and identify potential nutritional problems for the plants. According to the findings, the soils used for field crop production were generally identified as clay and clay loam, with pH values (1:2.5 w/v) ranging from 6.07 to 7.97, electrical conductivity (EC) values between 275.0 and 838.00 µS cm-1, CaCO3 contents varying from 0.40 % to 7.81 %, and organic matter contents ranging from 0.51 % to 3.18 %. It was found that nutrient elements in the soils ranged between deficient and excessive limits. Total nitrogen in the soil samples was determined to be between 0.060 % and 0.151 %, available phosphorus between 0.780 and 33.92 mg kg-1, extractable potassium between 60.00 and 1178.0 mg kg-1, calcium between 4378.00 and 8635.00 mg kg-1, and magnesium between 177.00 and 1374.00 mg kg-1. Other microelements were determined as follows: Na between 90.00 and 211.00 mg kg-1, Fe between 2.22 and 15.32 mg kg-1, Cu between 0.95 and 22.85 mg kg-1, Zn between 0.53 and 2.14 mg kg-1, Mn between 1.99 and 42.97 mg kg-1, and B between 0.29 and 0.61 mg kg-1. From the results of the study, it was determined that the soils do not have a homogeneous structure, the amounts of plant nutrients show a wide distribution due to application differences, and this situation triggers antagonistic relationships between the elements, causing macro and micro plant nutrient deficiencies to be observed in the field. The results of the study also revealed that an unscientific fertilization program not based on soil analysis results was being followed in the fields, and insufficient attention was given to the use of organic fertilizers. There is a need to carry out studies to ensure homogeneity in the soil and to bring all nutritional elements to the optimum level, and then to implement product-based fertilization programs. It has been concluded that it is necessary to program chemical or organic fertilizer types and doses, application methods and times according to soil analysis results, to prevent unnecessary fertilizer use and to show sensitivity to this issue by producers in order to increase the quality and yield in production.

Key words: Nutrient elements, Interaction, Quality production, Yield

APPROACHES TO OBTAINING OPTIMUM BENEFIT FROM MICROBIAL PRODUCTS USED IN PLANT PRODUCTION

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ABSTRACT

It is clear that in order to achieve higher and better-quality yields per unit area, it is not enough to only focus on plant breeding; effective plant nutrition through adequate watering and proper fertilization (based on the plant's phenological stage and in appropriate amounts) is crucial for obtaining the desired results. Growing healthy, high-yielding, and high-quality crops primarily involves proper soil management. In this context, a plant grown in soil with low organic matter levels (below 2%) and consequently reduced microbial diversity will struggle to cope with disease agents (especially soil-borne ones), have low vegetative and generative organ development, and ultimately may not benefit significantly from the minerals present in the soil or added through fertilizers. In addressing this common issue, commercial products containing microorganisms with functional benefits for soil and plants (such as bacteria, fungi, algae, etc.) which can aid in plant nutrition, plant protection, and plant growth regulation represent a significant alternative to chemical inputs (such as chemical fertilizers, pesticides, and synthetic growth regulators). However, to maximize the benefits of these products, it is essential to determine not only their capabilities under laboratory conditions (such as nitrogen fixation, phosphorus solubilization, siderophore production, auxin production, etc.) but also their abilities to colonize plant roots, proliferate in the rhizosphere, and compete in various plant and soil types under greenhouse or field conditions. Moreover, factors such as the type of plant production area (field, garden, greenhouse), production model (conventional, organic, ecological, etc.), plant type (cereal, vegetable, fruit), irrigation method (surface irrigation, pressurized irrigation), and especially soil characteristics (texture, organic matter, lime, pH, etc.) must be considered when selecting the appropriate product(s).

Key words: Biofertilizer, Biological agent, Biostimulant

THE ROLE OF ORGANIC FERTILIZER ON CROP PRODUCTION IN AFGOI-SOMALIA

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ABSTRACT

The study used a descriptive approach and had 400 participants from Afgoi District Lower-Shebelle, Somalia. A non-simple random selection was used to acquire information from farmers, educators, and workers. To clarify the effect of naturally occurring fertilizer on crop productivity, the data were evaluated using correlation analysis. The majority of responders (56%) indicated significant agreement with the study's findings that green manure improves crop productivity by directly adding nitrogen to the soil, increasing soil fertility. The majority of responders (47.5%), however, were in agreement that plants grown in green manure receive nutrients from deeper levels of soil and release them in the topsoil. On the other hand, the majority of respondents (54%) firmly concur that green manure improves nutrient availability, both macro and micro. The majority of respondents (51%) firmly concur that green manures are environmentally benign under other circumstances. In addition, the majority of responders (57.5%) highly concur that green manure raises the caliber of products and crops. The majority of respondents (51.5%) indicated high agreement with the finding that adding manure to cropland can help keep or raise the level of soil organic matter. However, the majority of respondents (38%) agreed that animal manure includes both macro- and micronutrients—in both organic and inorganic forms—that are essential for crop production. On the other hand, the majority of responders (45.5%) strongly concur that animal dung from a locally accessible source is cheaper than inorganic fertilizer when needed. Similar to this, the majority of respondents (41%) firmly concur that poultry manure is the best animal manure. However, the majority of respondents (51%) strongly concur that adding animal manure to the soil improves its quality. The majority of respondents (55%) said firmly that crop farming is the primary means of subsistence for Afgoi communities. However, the majority of respondents (37.5%) agreed that improvements have been made to the production system over the past two years. On the other hand, the majority of respondents (49.5%) agreed that using organic fertilizer increases crop output per unit of surface area. Similar to this, the majority of respondents (52.5%) strongly concur that fertilizer quality affects crop production.

Key words: Animal Manure, Crop Production, Green Manure, Organic Fertilizer

DETERMINATION OF SOLUBILITY OF ROCK PHOSPHATE AT DIFFERENT pH RANGES CAUSED BY PHOSPHATE SOLUBILIZING BACTERIA

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ABSTRACT

After nitrogen, phosphorus is the second element required by plants. Despite being widely distributed in the soil, phosphorus is inaccessible to plants due to its complexation with calcium in alkaline soils. By secreting organic acids that lower pH levels, phosphate-solubilizing bacteria liberate bound phosphorus from the soil.. This study was carried out to determine the relationship between the phosphate solubilizing bacteria and pH. In the study, the phosphate solubilizing potential of 72 bacteria was determined using National Botanical Research Institute phosphate (NBRIP) medium using rock phosphate as a phosphorus source. The bacteria were incubated in NBRIP medium at 150 rpm and 28.5 oC for 72 hours and at the end of the incubation, the pH value of the supernatant and the amount of phosphorus (P), Calcium (Ca), Zinc (Zn), Iron (Fe), Copper (Cu) and Manganase (Mn) were determined by centrifuging at 6000 rpm. According to Pearson correlation analysis, a strong negative correlation was found between pH and P, Ca, Fe, Cu, Mn and Zn ($r > 0.50$) , while no relationship was found between pH and K and Mg. In the study, it was determined that the Ca, P, Fe, Cu, Zn and Mn ions in the NBRIP medium increased due to the decrease in pH. However, it was determined in the study that different bacterial species released ions at different rates in similar pH ranges. The reason for this difference may be that they secrete different organic acids.

Key words: PSB, agriculture, rock phosphate, phosphorus

PREDICTING SOIL ELECTRICAL CONDUCTIVITY USING SOME SOIL PROPERTIES

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ABSTRACT

In this study, the relationships between soil electrical conductivity (EC) and some soil physicochemical properties were determined in 207 surface soil samples (0-20 cm) taken from cropland fields around Samsun, Türkiye. After analyzing clay, silt, sand, soil reaction (pH), electrical conductivity (EC), organic matter (OM), exchangeable Ca, Mg, K and Na contents of soil samples, regression models using stepwise analyses in SPSS program were done between soil EC values and soil properties. The EC values varied between 110 and 2949 µS/cm with a mean of 660 µS/cm. While exchangeable cations (Ca, Mg, K, Na), pH and clay content had significant correlations with EC, Si and sand contents showed negative correlation with EC. Soil EC values did not show a significant relationship with soil organic matter content. To predict soil EC value, the multiple linear regressions were produced by stepwise analyses using the soil properties. Producing linear regressions with using only clay, silt, sand, OM and soil pH as variables had lower linear regressions to predict EC. When including exchangeable cations in linear regression models, precision of the estimation increased. According to stepwise analyses, three linear regression models were produced using only clay, exch. Na and Ca contents. While the first model including just exch. Na as a variable had 0.641** R2, the second model including exch. Na and clay content as variables had 0.706** R2. The highest R2 value (0.722**) and the lowest RMSE (223.82 µS/cm) were estimated with a linear regression including clay and exch. Na and Ca contents. It was determined that clay and exch. Na and Ca contents are the most effective soil properties on predicting of soil EC values.

Key words: Salt, EC, exchangeable cations, soil texture

ESTIMATING FIELD CAPACITY BY USING LINEAR MULTIPLE REGRESSONS

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ABSTRACT

The objective of this study was to determine the relationships between field capacity moisture content (FC) and some soil physicochemical properties in 80 surface soil samples (0-20 cm) taken from arable fields around Samsun, Türkiye. After analyzing clay (C), silt (Si), sand (S), organic matter (OM) contents, electrical conductivity (EC), field capacity (FC) and bulk density (BD) of soil samples, FC values were estimated using the other soil properties by linear regression models using stepwise analyses in SPSS program. The FC values varied between 13.80% and 46.00% with a mean of 31.00%. While EC, C, Si, OM contents had significant positive correlations with FC, BD and sand content had negative correlations with FC. To estimate FC value, the multiple linear regressions were produced by stepwise analyses using the soil properties. Producing linear regressions with using only soil textural fractions had lower linear regressions to predict FC. When BD and OM was added into the linear regression models, precision for the estimation of FC increased. According to stepwise analyses, three linear multiple regression models were produced using BD, C, Si and OM contents. While the first model including C and Si contents as variables had 0.876** R2 and 3.052% RMSE, the second model including BD, C and Si contents had 0.898** R2 and 2.796 RMSE. The highest R2 value (0.916**) and the lowest RMSE (2.498%) were estimated with a linear multiple regression model including BD, C, Si and OM contents. It was determined that BD, C, Si and OM contents are most effective soil properties on FC. The FC values of arable fields can be estimated precisely using these soil properties as variables in linear multiple regression models.

Key words: Soil moisture, multiple regressions, soil texture, bulk density, organic matter

STUDY OF WATER TRANSFER IN SOIL. EFFECTS OF TEXTURE AND SALINITY

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ABSTRACT

Soil is a key component of the planet and plays a crucial role in achieving the United Nations Sustainable Development Goals and addressing the challenge of land degradation neutrality. Salinity and sodicity are among the most significant challenges faced by irrigated agriculture worldwide Due to the scarcity of fresh water, highly saline groundwater has become the primary source of irrigation. Saline water is used to irrigate cultivated lands in various parts of the world, especially in arid and semi-arid regions that cover 41% of the Earth's surface (UNDP 1997), despite the poor quantity and quality of this resource. Salts are naturally present in soil and groundwater. However, when the levels of soluble salts in the soil or water exceed natural concentrations, it can lead to salinity, posing significant risks to health and reducing plant productivity. Globally, approximately 0.9 × 10^9 hectares are affected by varying levels of salinity and sodicity, and this soil degradation is progressively worsening over time. The widespread presence of saline soils and waters, along with their current and future intensive use in agriculture, necessitates immediate attention and concerted efforts to improve their productivity, which is generally very low under routine management conditions. To address this issue, gaining a deeper understanding of how salinity and sodicity affect the hydraulic properties of soils, along with their interactions with other soil characteristics, is essential. An energy-based approach to monitoring salinity and sodicity is crucial for comprehending water movement through the soil. This method considers soil texture and the gradients of salinity and sodicity within the soil profile. It serves as a vital tool for understanding how varying levels of salinity and sodicity impact soil hydraulic properties. Consequently, soil hydraulic conductivity is a key factor for the restoration of desert lands and the planning of irrigation projects. This understanding is crucial for assessing soil degradation, restoring affected soils, and effectively planning their conservation and optimal use of land resources. The goal of this study is to establish a diagnostic protocol for analyzing water transfer in soil, focusing on soil texture and gradients of salinity and sodicity in irrigation water. To achieve this, experiments will be performed using soil samples in Plexiglas columns under controlled conditions, where different salinity and sodicity gradients will be applied to various soil textures to simulate water movement. Control columns will receive irrigation with distilled water. Preliminary results indicate that soil salinity and sodicity levels can be managed by adjusting irrigation water quality and considering soil texture, provided there is effective drainage. This strategy helps prevent physical soil degradation caused by sodicity. Therefore, it is important to select salt-tolerant crops for clayey soils with high sodicity and to implement early diagnostic measures to address the effects of salinity and sodicity, in order to maintain soil physical quality.

Key words: water transfer, Salinity, Sodicity, Soil Texture, Irrigation, Soil Column.

EFFECTS OF CATION AND ANION BALANCE ON THE ZOOTECHNICAL PERFORMANCE OF DAIRY COWS

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ABSTRACT

The ionic balance of the rations and its impact on the zootechnical health status and performances was the object of many studies. To take account in rationing of it, its preliminary evaluation is necessary. The objective of this work was to quantify the acido-basic balance of food and the modes distributed to the dairy cows in various dairy breedings of the Algerian North-East. The range used is made up of coarse food: the Egyptian clover (bersim), sorghum for the green and the ensilage, barley in green, the tare-oats mixture for the hay and the ensilage, straws of cereals and barley in grain for the concentrate. The estimate of the average quantities of food at summer realized 1 time per week by weightings. The proportioning of minerals at summer carried out by the classical methods of analysis. The dietary electrolytic balance (DEB) is estimated starting from equation (DEB)=Na + K - Cl, expressed in dry matter mEq / kg-1 of the total ration. The contents of strongions of studied food are relatively high, 1,9±0,42 vs 3,37±0,67 % and 0.2±0,01 vs 1±0,04 %; respectively for K+ and Na+. The FE of fodder varied with the form of use +114±13 for the straw at +776±151 mEq/kg-1 of DM for ensilage of sorghum. Balances of the current rations of the cows dried up containing cereal straws (+400±110 mEq / kg-1 of DM) and containing hay (+504±65 mEq / kg-1 of DM), without the contribution of concentrate. The balances of the current rations distributed to the cows in lactation are spread out between +481±71 and +688±168 mEq / kg-1 of DM. The dietary electrolytic balance is strongly influenced by the highly content of K+, out most grounds in the north of Algerian are rich in this element. The dairy breeding being concentrated in the north of the country, it will be necessary to plan to produce fodder in the grounds of interiors regions.

Key words: Electrolyte balance, fodder, Na+, K+, Cl+, Dairy cows

COMPARATIVE PHYSIOCOCHEMICAL STUDY BETWEEN COW'S MILK AND GOAT'S MILK IN THE WILAYA OF ANNABA.

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ABSTRACT

Milk is some edible biological liquid rich in lactose which is the main source of nutrients for young mammals. We use the milk produced by certain domestic mammals, mainly that of the cow. During this work, we carried out a comparative physico-chemical study between cow's milk and goat's milk in the Annaba region. This study was carried out on three different breeds of cows (La Prem-Holstein, La Montbéliard and the local breed) and three different breeds of goats (La Saanen, the Arabia type and the Makatea type). This study was the subject of physico-chemical analyzes in particular: acidity, pH, density, fat and finally dry extract at the Edough d'Annaba dairy. The density value is the same for all samples of goat's milk and cow's milk, it depends on the dry matter content, fat content, the increase in temperature and food availability. The pH and acidity values of the goat's milk samples reflect a slightly marked acidity which is conditioned by the content of casein, mineral salts and ions, as well as the hygienic conditions during milking, the microbial flora total, metabolic activity of the animal and milk handling. The fat content values reflect a higher fat content for goat's milk and the latter depends on certain factors such as climatic conditions, stage of lactation and diet. The dry extract content values reflect a greater dry extract richness for goat's milk, the latter depending on climatic and dietary factors.

Key words: Milk ,Cow ,Goat ,Physico ,Chemical Parameters ,Edough Dairy

PHYSICOCHEMICAL QUALITY OF MILK FROM PRIM'HOLSTEINS AND MONTBELIARDS COWS IN EASTERN ALGERIA

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ABSTRACT

Heifers of the Prim'Holstein (PH) and Montbéliarde (MB) dairy breeds were imported during gestation (between the 5th and 6th months of gestation). They were prepared for their careers as future dairy cows under different rearing conditions, and in particular feeding and breeding conditions. Once landed in Algeria, these pregnant heifers were confronted with variable rearing and feeding conditions. Their adaptation to the new rearing conditions, which were often restrictive, particularly in terms of feed, had short-term repercussions on their performance in first lactation and long-term repercussions on their dairy careers.

The performances achieved were below the milk production and reproductive potential of both breeds. The MB breed performed better: 4,211 ± 340 (MB) and 3,965 ± 328 kg (PH) in 1st lactation, 5,024 ± 360 (MB) and 4,660 ± 420 kg (PH) in 2nd lactation, 5,700 ± 530 (MB) and 5,180 ± 400 kg (PH) in 3rd lactation. Body condition profiles were inadequate at the start of lactation, particularly in 2nd and 3rd lactation (≤2), and at this stage protein levels (TP) are between 25.4 and 29.4 g/kg of milk. Overall, in addition to the energy deficit, the trend in TB and TP values indicates a suspected acidosis situation. The TB/TP ratio during the 1st week of lactation was close to 1.5, which may be indicative of suspected ketosis with an energy deficit. The aim of this study is to evaluate, compare and correct the zootechnical responses and, more specifically, the quantity and quality of the milk produced by these cows in relation to their adaptability.

Key words: MB, MB, Lactation, TP, TB, BCS reproduction, calving

ASSESSMENT OF THE GENETIC DIVERSITY OF THE MONOGENEAN GILL PARASITE LAMELLODISCUS ECHENEIS (MONOGENEA) INFECTING WILD AND CAGE-REARED POPULATIONS OF SPARUS AURATA (TELEOSTEI) FROM THE MEDITERRANEAN SEA USING NUCLEAR ITS AND MITOCHONDRIAL COI MARKERS

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ABSTRACT

The diplectanid monogenean Lamellodiscus echeneis (Wagener, 1857) is a specific and common gill parasite of wild and cultured gilthead seabream Sparus aurata Linnaeus, 1758 in the Mediterranean Sea. Only a few isolated molecular studies of this monogenean have been conducted and its population structure and genetic diversity are poorly understood. This study represents the first analysis of the population genetics of L. echeneis (n=97), isolated from wild and cage-reared gilthead seabream from sixteen localities in both the Southern (Tunisia) and Northern (Italy and Spain) regions of the Mediterranean Sea, using nuclear ITS rDNA markers and the partial mitochondrial cytochrome oxidase I (COI). The comparison of the newly obtained dataset with previously published sequences of L. echeneis, and the phylogenetic trees based on the analysis of ITS rDNA, corroborated the spread of only one species in the Mediterranean Sea. The star-like haplotypes network inferred by COI sequences suggested a recent population expansion of L. echeneis. This is supported by the observed high haplotype diversity (Hd=0.918) and low nucleotide diversity (Pi=0.01595). Population structure-based AMOVA for two groups (the Adriatic Sea and the rest of the Mediterranean Sea) attributed 35.39% of the total variation to differences within populations, 16.63% to differences among populations within groups and 47.99% to differences among groups. Fixation indices were significant with a high FST value (0.64612), likely related to the divergence of the parasite populations from the Adriatic Sea and other Mediterranean regions. Phylogenetic analyses grouped all samples into the main clade corresponding to L. echeneis from several localities. This study provides insight into the genetic variation between L. echeneis populations and did not show a clear genetic structure between populations of L. echeneis throughout Tunisian, Italian and Spanish localities, which can be attributed to the important gene flow between the populations favoured by the host dispersion potential within the Mediterranean Sea. Finally, haplotypes shared between wild and cage-reared hosts provided evidence for the potential for cross-infection between wild and farmed hosts in the Mediterranean Sea.

Key words: Lamellodiscus echeneis, Sparus aurata, population genetics, gene flow, population expansion, cross-infection.

CHARACTERIZATION OF VIRULENCE-ASSOCIATED FNBA GENE IN STAPHYLOCOCCUS AUREUS ISOLATED FROM BOVINE MASTITIS IN PAKISTAN

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ABSTRACT

Bovine mastitis has become one of the important threats to the dairy industry globally with considerable economic consequences, most frequently associated with Staphylococcus as a leading cause. To elucidate the virulence-associated fnbA gene of S. aureus isolates (224) were recovered from buffaloes suffering from clinical or sub-clinical mastitis and characterized using Polymerase chain reaction amplification. Out of 400 milk samples, 55% (224/400) were found positive from dairy buffaloes affected with clinical or sub-clinical mastitis. The fnbA gene sequencing and phylogenetic analysis revealed a high homology with Indian and Japanese strains, while strains from USA and Thailand were placed distantly. This study was the first report of the genotypic characterization of the fnbA gene of S. aureus from dairy buffaloes in Lahore and Bhimber Azad Kashmir, Pakistan. The knowledge of the occurrence of this virulent gene highlighted the role in the pathogenesis of mastitis and its importance for the development and implementation of prevention and control strategies against clinical and sub-clinical bovine mastitis. **Statement of novelty:** It is the study of virulence associated fnbA gene of Staphylococcus aureus isolated from the dairy buffaloes affected from clinical and sub-clinical mastitis in the Lahore and Bhimber Azad Kashmir, Pakistan for the first time. Furthermore, phylogenetic analyses based on the fnbA gene sequence encoded by strains currently prevailing in Pakistan with representative strains from other geographical locations, are presented.

Key words: Bovine Mastitis, fnbA gene, S. aureus, PCR, Phylogenetic analysis

A COMPREHENSIVE ANALYSIS OF DAIRY PRODUCTION AND HERD MANAGEMENT METRICS IN M'SILA REGION, ALGERIA

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ABSTRACT

The aim of this study was to analyze milk production data and herd management parameters from January to December 2023 at a private farm located in the wilaya of Msila, Central Algeria. Throughout the year, the farm achieved a total milk volume of 4,285,384 liters, with an average daily production of 11,775 liters. The study focused on productive cows (VT) averaging 620±24.34 and lactating cows (VL) averaging 524.54±59.13 per month. Lactation technical values varied from 24.3 to 28.9 liters per cow per day, averaging 24.92±2.17 liters, while economic lactation values ranged from 16.3 to 23.3 liters per cow per day, averaging 20.20±2.26. Significant variations in fertility indices were also observed, with an inter-visit interval (IV-IF) of 5.95±0.96 months and an inter-calving interval (IVV) of 14.81±0.22 months. In terms of herd health and management, the study reported an 8.70% incidence of abortion and a 1.90% mortality rate among calves during rearing. Calf and heifer sales accounted for 65.90% of total young stock management. This study offers insights into the operational dynamics and performance benchmarks crucial for optimizing productivity and sustainability in dairy farming.

Key words: Dairy cattle, herd management, milk , Algeria.

CONTRIBUTION TO THE STUDY OF THE PREVALENCE OF POSTPARTUM PATHOLOGIES IN A DAIRY CATTLE FARM IN MILA, ALGERIA

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ABSTRACT

The aim of this study was to assess the prevalence of postpartum pathologies in dairy cows in Msila, Algeria. A total of 219 dairy cows were monitored over a period of 15 months after calving. Data were collected through regular veterinary examinations and farmer reports. Overall prevalence rates for each pathology were calculated. Pathologies examined included: retained placenta, milk fever, acute metritis, delayed uterine involution, chronic endometritis, ovarian cyst and mastitis with rates of 20.09%, 0.51%, 25.70%, 6.07%, 7.00%, 14.95% and 28.03% respectively. Understanding these prevalence rates is crucial for implementing effective management and preventive strategies to improve dairy herd health and productivity.

Key words: Postpartum, pathologies, dairy cattle, Algeria

ACARICIDAL EFFECT OF FOUR ESSENTIAL OILS ON OTODECTES CYNOTIS

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ABSTRACT

Otodectic mange is a parasitosis responsible for otitis externa. The aim of this preliminary study is to assess the in vitro acaricidal effect of four essential oils (EOs) on Otodectes cynotis, the mite responsible for ear mange in cats. The biological material is represented by earwax collected from 40 cats aged 2 months to 3 years and infested with Otodectes cynotis. The mite colony includes 20 specimens of different developmental stages observed under a light microscope at X40 magnification. The results confirm the acaricidal effect of clove and peppermint EOs on Otodectes cynotis at concentrations of 10% and 5%, with a highly significant lethal effect on adults, nymphs and larvae ($p < 0.001$). While the EO of clove at 1% did not eliminate adults, that of peppermint had no effect on adults, as well as on larvae and nymphs during the 180-minute viewing period at the same concentration. Although lavender aspic and rosemary cineole EOs showed no acaricidal effect on Otodectes cynotis at the concentrations tested, their beneficial anti-inflammatory and antibacterial adjuvant properties may contribute to the symptomatic treatment of otodectic mange. The EOs tested may lead to the development of natural acaricides to eliminate the mite on the one hand, and relieve the symptoms associated with this parasitosis on the other hand.

Key words: Otodectes cynotis, Essential Oils, Mange, Cat

OTODECTIC MANGE IN DOGS AND CATS ACCORDING TO VETERINARY PRACTITIONERS

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ABSTRACT

Ear mange caused by Otodectes cynotis is a parasitosis affecting the external auditory canals of cats and dogs. The aim of this study was to collect information on the frequency, diagnosis and management of this parasitosis by veterinary practitioners via an anonymous online questionnaire. The study showed that, according to the veterinarians questioned, ear mange is much more common in cats than in dogs, and that young age seems to be a factor of vulnerability to this infestation. In the majority of cases, pet owners only consult the veterinarian when symptoms worsen. The diagnosis is mainly based on the presence of dry, brownish earwax in the auditory canal, itching and otitis, which are the main clinical signs, and on direct observation of mites under a light microscope. The most commonly used treatment, based on Permethrin, Neomycin, Nystatin and Triamcinolone, is often combined with other products. The cost of treatment is estimated to be relatively high, and although 58% of practitioners consider it satisfactory, recurrences remain possible. Nearly 86% of them recommend cleaning and disinfecting the animal's environment, and 91.1% recommend separating healthy animals from sick ones to reduce the spread of parasitosis, which is often detected late during other consultations, such as vaccination or deworming. A thorough examination of the ears should be systematically carried out by the veterinarian, even if otodectic mange is not the main reason for the visit.

Key words: Otodectic mange, Cat, Dog, Diagnosis, Treatment, Prevention

THE EFFECT OF PROBIOTIC SUPPLEMENTATION ON PERIPARTUM KETOSIS AND THE RESUMPTION OF POSTPARTUM OVARIAN ACTIVITY IN GOATS DURING THE OFF-SEASON

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ABSTRACT

Our study focuses on establishing, initially, the effect of probiotic supplementation on the resumption of sexual activity and the duration of lactation anoestrus; thus study, secondly, its effect on peripartum ketosis (gestational toxemia and postpartum ketosis). The study was carried out on a farm located in the willaya of Tizi-Ouzou. Twenty-eight goats of the Murciano breed aged one year, divided into two groups (control group (T) and experimental group (E)), were the subject of this study. The goats were subjected to the same environmental conditions and received the same diet, except that the experimental batch was supplemented with a food additive. The first dose was administered orally, three weeks before the expected date of parturition with a monthly booster, at a rate of 20 ml per goat. Monitoring the resumption of sexual activity after childbirth is based on cytological changes (by visualizing the different cells present on smears from the vaginal mucosa during postpartum) and hormonal changes (progesteronemia and estradiolemia). Screening and diagnosis of ketoses was done by measuring energy balance metabolites, namely glucose, BHB and NEFA. We recorded excessively exaggerated increases in average BHB values, and we also noted hypoglycemia (blood sugar < 0.4g/l) which argues in favor of a negative energy balance. Furthermore, we noted a total absence of correlation between the average values of NEFA (< 0.7mmol/l) and those of BHB (> 1mmol/l). The results of vaginal cytology (parabasal and small intermediate cells) and hormonal dosages of progesterone (P4<0.2ng/ml) and estrogens (< to 10 pg/ml) argue in favor of a state of anoestrus. In conclusion, we limit ourselves to saying that probiotic supplementation, in our experimental conditions, has demonstrated no effect on the prevention of ketosis, nor an effect on the sexual activity of goats in the off-season.

Key words: goat, probiotic, sexual activity, hormones, vaginal cytology, ketosis

ASSESSMENT OF COLOSTRUM QUALITY AND PASSIVE TRANSFER OF IMMUNITY IN GOATS

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ABSTRACT

Colostrum, the first milk produced by mammals after birth, is crucial for the health and development of newborns. In this study, we focused particularly on goat colostrum, known for its beneficial properties. This biological fluid is rich in nutrients, immunoglobulins, and other bioactive substances, playing an essential role in immune protection and optimal nutrition for kids from their earliest days. Our research took place from February 2024 to June 2024 at a goat farm located in Tizi-Rached, Wilaya of Tizi-Ouzou. We studied a total of sixteen goats and nineteen newborn kids, divided into five experimental groups: a control group (E1), a group supplemented with propylene glycol (E2), a group with vitamins AD3E (E3), a group with probiotics (E4), and a group with vitamins AD3E and propylene glycol (E5). The first phase of our study involved detailed monitoring of the goats before calving, with particular attention to their nutrition and nutrient supplementation. The second part of our research focused on evaluating colostrum quality and the transfer of passive immunity. We used several analytical methods, including colostrum weighing, Col IgG test, Calf IgG test, and comprehensive laboratory analyses. The results revealed significant variations between groups, with higher levels of immunoglobulins and nutrients observed in goats supplemented with propylene glycol + vitamins and probiotics. In conclusion, this study confirmed the crucial importance of high-quality colostrum in passive immunity transfer among goat kids. The use of specific tests like Col IgG and Calf IgG was essential for accurately assessing colostrum quality. Additionally, supplementation with propylene glycol associated to vitamins and probiotics during the peri-partum period significantly improved colostrum quality, ensuring better immune protection for newborn goats

Key words: colostrum, goat, Col IgG test, Calf IgG test, immunoglobulins, passive immunity

PLATELETS RICH PLASMA LOADED HYDROGEL MITIGATES WOUND HEALING BY ENHANCING THE EXPRESSION OF TRANSFORMING GROWTH FACTOR-β IN EXPERIMENTALLY INDUCED WOUND MODEL

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ABSTRACT

Wound healing is a complex physiological process involving various cellular and molecular events. Impaired wound healing presents significant clinical challenges, necessitating the development of new therapeutic approaches. In this experimental study, a total of eight native breed rabbits, regardless of color and sex, with body weights between 2-3 kg and ages ranging from 8-12 months, were used to create full-thickness excisional wounds on their dorsal surfaces. The animals were divided into two groups: a control group and a treatment group. The treatment group received an application of PRP-loaded hydrogel, while the control group received a placebo. Wound healing parameters, including wound closure rate, histological analysis, and TGF-β expression, were assessed at various time points during the healing process. The healing curves demonstrated the progression of wound closure over time. Notably, wounds treated with PRP-loaded hydrogel showed a significant acceleration in healing on days 3, 6, 9, 12, and 15 post-injury ($p < 0.05$). PRP-loaded hydrogel treatment enhanced cutaneous wound closure and promoted granulation tissue formation and maturation from day 3 to day 15 post-injury. Representative micrographs of H&E-stained wound sections revealed the presence of red blood cells, inflammatory cells, fibroblasts, and new blood vessels (Scale bar = 50 μm). The increased expression of TGF-β in PRP-loaded hydrogel-treated wounds suggests its critical role in the wound healing process. PRP-loaded hydrogel treatment significantly increased the expression of transforming growth factor β (TGF-β), as shown by representative western blotting and semi-quantitative analysis ($p < 0.05$ vs. control). The findings of this study highlight the therapeutic potential of PRP-loaded hydrogel in wound healing. The controlled release of growth factors from the hydrogel, particularly TGF-β, provides a sustained and localized stimulus to the wound site, creating a favorable microenvironment for tissue repair. The ability of PRP-loaded hydrogel to modulate the expression of key growth factors involved in wound healing offers a novel therapeutic approach for promoting efficient wound closure and tissue regeneration. In conclusion, this study demonstrates that PRP-loaded hydrogel accelerates wound healing by enhancing the expression of TGF-β in an experimentally induced wound model.

Key words: PRP; Hydrogel; TGF; Wound healing; Rabbits

CONGENITAL LUXATION OF THE HIPS AND SHOULDERS IN A TOY BREED DOG: CASE REPORT.

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ABSTRACT

This case report presents a rare condition in dogs involving congenital bilateral shoulder luxation and bilateral hip luxation, primarily affecting toy breeds. It is characterized by a malformed glenoid cavity, congenital dislocation of hips, leading to persistent discomfort and lameness. Hip dislocation, usually craniodorsal, is more common, typically resulting from trauma or hip dysplasia. Observing both congenital bilateral shoulder and hip dislocations at the same time is rare. This case report refers to a 4-year-old male, toy breed dog presented with severe right shoulder pain and reduced range of motion, moderate back limbs lameness. Radiographic examinations shows bilateral congenital luxation in the shoulder joints with ipoplastic glenoid cavity and humeral head deformity and congenital luxation of both hip joints with bilateral flattening of the acetabular cavities and severe modification of femoral heads. The dog was diagnosed with bilateral hip and shoulder congenital luxation. The right shoulder showing more instability and severe pain and lame. There is no definitive evidence directly linking hip and shoulder luxation, genetic predispositions and environmental factors contributing to overall joint health can influence the occurrence of both conditions in dogs. Surgical intervention was required to correct the dislocations by using the Vaughan technique for extracapsular stabilization of the shoulder, Femoral Head Excision (FHO) technique was performed for the stabilization of hip luxation, followed by a strict rehabilitation plan. This report discusses the clinical presentation, diagnostic process to evaluate this condition, surgical approaches, and post-operative outcomes, emphasizing the challenges posed by managing such cases in small toy breeds. The simultaneous congenital dislocation of the hip and shoulder joints in this case is important since it is a case of a condition not before reported in the literature, highlighting the importance of an adequate orthopedic assessment in toy breeds.

Key words: Congenital, Hip luxation, Shoulders luxation, Extracapsular stabilization

DEVELOPMENT OF AN INNOVATIVE APPLICATION FOR NOSEMOSIS AND VARROOSIS RATES IN BOLU BEEKEEPING LOCATIONS BY USING GOOGLE EARTH ENGINE

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ABSTRACT

Beekeeping is one of Turkiye's important sources of income. Our country's rich geography and various climatic conditions are quite suitable for beekeeping, which is directly related to geography, climate and topography. There has been an increasing interest in beekeeping, which provides higher income with less maintenance and cost compared to other agricultural activities. This increase has also brought to the agenda the need to take various measures to increase the efficiency obtained from beekeeping activities. The first issue to be considered is bee diseases. Nosema spp. and Varroa spp. are two important diseases frequently encountered in beekeeping. Both cause serious health problems in bee colonies and threaten the health of bees. In this study, it is aimed to implement a map application consisting of bee disease rates in beekeeping locations in Bolu province in order to perform early detection of bee diseases and to take the necessary measures. In this direction, field studies were carried out and coordinate information of beekeeping locations in Bolu province was obtained. At the same time, bee samples were collected from these locations and examined in a laboratory environment. After field and laboratory studies, a data set was created with coordinate, district name, nosemosis and varroosis disease rate information. The created data set was transferred to the Google Earth Engine (GEE) platform and visualized. An application was developed with the codes written on the GEE platform and the coordinate, district name, nosemosis and varroosis disease rate information of the clicked district beekeeping locations were shown on the panel. This study provided a preliminary view for the first time on the nosemosis and varroosis disease rates in the same locations for the future periods and created a database for the future periods.

Key words: Google Earth Engine, Beekeeping, Nosemosis, Varroosis

DETERMINATION OF FACTORS AFFECTING UNIVERSITY STUDENTS' CORN CONSUMPTION PREFERENCES

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ABSTRACT

In this survey conducted by Trakya University İpsala Vocational School Laboratory Technology Program students with 199 university students, 7 survey questions were asked and the participants were asked about their corn consumption preferences. Among the corn consumption types presented, the participants preferred popcorn the most with a rate of 35.2%, followed by corn chips with 22.6%. 42.7% of the participants stated that they consume corn monthly, while 35.2% stated that they consume it weekly. In the question asked about the value of corn in terms of human nutrition, 50.3% stated that they did not have any information, and the closest rate to this was 39.7%, which indicated that it was a healthy food as far as they followed from the media. When purchasing any corn product, 40.2% of the participants stated that they cared about the information about the production method or processing of the product, and the closest to this was their brand preference with 25.1%. 72.4% of the participants wanted the corn product they consumed to contain no additives. In the question about the future situation of corn, 49.2% of the participants stated that they preferred that the interest in corn would increase, while 19.1% of the participants thought that production would decrease due to the risk of drought. Again, in the question about the consumption rate of corn oil in the future, 43.6% of the participants stated that consumption would increase if its price was lower than sunflower oil.

Key words: Corn, Consumption Preference, University Students

ASSESSMENT OF PESTICIDE RESIDUES IN APPLE FRUITS AS AN INDICATOR OF FOOD SAFETY

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ABSTRACT

Pesticides are widely used in agriculture sector to control pests and plant diseases, increasing the overall production of crops and their quality. As the other crops, apple trees are treated with pesticides in order to maintain healthy plant and to improve the quality of fruits. However, the excessive use of pesticides in apple trees leads to the presence of pesticide residues in fruit, which can have adverse effects for the consumers. Since the apples are preferred to be consumed fresh, the adverse effects of the pesticide residues are so obvious therefore. The main objective of current study was to assess the pesticide residues in apple fruits as indicator of food safety. For this purpose, fruit samples of Starking and Fuji cultivars were collected and analyzed for pesticide residues. The analyses of the pesticide residues were performed using QuEChERS method and chromatography techniques (LC-MS/MS and GC-MS/MS). Furthermore, Dietary Risk Assessment (IESTI in % ARfDI) for children's category was estimated using EFSA PRIMo Model v3.1. The obtained results showed that pesticide residues were detected in both apple cultivars, but their levels were below MRLs. In the fruit samples of Starking cultivar were detected only 2 fungicides tebuconazole and trifoxystrobin in amounts of 0.030mg/kg and 0.018mg/kg, respectively. Whereas, in the fruit samples of Fuji cultivar were detected 2 insecticides phosmate and thiacloprid (0.087mg/kg and 0.058mg/kg, respectively) and 5 fungicides dodine, floupiram, pyrimethanin, tebuconazol and tebufenozid in amount of 0.021 mg/kg; 0.01 mg/kg; 0.032 mg/kg; 0.029 mg/kg, and 0.095 mg/kg, respectively. The fungicide tebuconazole was detected in all fruit samples. MRL of insecticides expressed as %MRL was above 15%. The total %MRL of pesticides in Starking cultivar samples was 12.57%, while the total %MRL of Fuji cultivar samples was 60.11%. Furthermore, the acquired data based on Dietary Risk Assessment (IESTI in % ARfDI) for children's category showed that exposure to these pesticides had no potential health risk. Based on found concentrations of pesticide residues and calculation of dietary risk for children's category can be concluded that the assessed apple fruits were safe for the consummators.

Key words: Apple fruit, Pesticide residue, Health risk, Short-term intake

SYNTHESIS, CHARACTERIZATION, AND INVESTIGATION OF DYE ADSORPTION OF CALCIUM CARBONATE NANOPARTICLES FROM AÇAI PALM (EUTERPE OLERACEA)

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ABSTRACT

Research shows that nanotechnology is a constantly evolving sector. In addition to advancements in this field, a new approach that allows the use of biological materials in nanoparticle production has come to the forefront. Nanoparticles can easily be synthesized through various chemical, physical, and biological methods. However, the biological approach, known as green synthesis, is advantageous compared to other methods due to its non-toxic nature, being an alternative, and being fast, simple, cost-effective, reliable, and environmentally friendly. Green synthesis does not require the use of hazardous chemicals, and with these features, it is considered one of the methods that could continue for many years. Calcium carbonate nanoparticles were synthesized using the green method with extracts from the Açai Palm (Euterpe Oleracea) as the reducing agent. The nanoparticles were characterized using UV-VIS (Ultraviolet-Visible Spectroscopy) and FT-IR (Fourier Transform Infrared Spectroscopy). The antibacterial activities of the obtained calcium carbonate nanoparticles were determined. After the calcium carbonate nanoparticles were synthesized, their dye removal properties were evaluated through adsorption studies using Coomassie Brilliant Blue R-250 (CBBR-250) and Congo Red dyes.

Keywords: Green Synthesis, Calcium Carbonate Nanoparticles, Açai Palm (Euterpe Oleracea)

EVALUATION OF WHEAT IN TURKEY IN TERMS OF PRICE AND AGRICULTURAL SUPPORT AMOUNTS

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ABSTRACT

Agriculture is of strategic importance in Turkey as in the whole world. Besides its strategic importance, agriculture involves risks and uncertainties due to its dependence on natural conditions. In this respect, the adequacy and sustainability of wheat, which constitutes the basic food raw material of humanity, has gained great importance for countries in recent years. Due to this feature of wheat, pricing and support of wheat is an important issue. In this study, wheat and support prices were analysed and evaluated in terms of current prices, real prices and dollar. It is seen that wheat prices have shown a significant increase in current prices but not in real and dollar prices. In terms of agricultural supports, it is seen that the support amounts of wheat, which has a share in area and premium-based supports, remained constant between 2001 and 2024 with 18.95 TL/da in real terms. In 2022-2023, it is seen that there has been a significant increase of 1000% in wheat premium support from 10krş/kg to 1 TL/kg. This study aims to contribute to the literature and stakeholders with panel data analysis of wheat agriculture, which is of great importance for our country, in terms of unit price and subsidies.

Keywords: Agriculture, wheat, wheat prices, wheat subsidies, Turkey.

PLANT GROWTH – PROMOTING EFFECT OF AZOTOBACTER VINELANDII 1619 ON HELIANTUS ANNUUS DEVELOPMENT

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ABSTRACT

Genus Azotobacter is a group of gram negative bacteria belonging to the group of plant growth promoting microorganisms. They actively participate in improving plant health and nutrition by synthesizing phytohormones, fixing nitrogen, participating in the degradation of pesticides and heavy metals metabolization. For the purposes of this experiment, several variants of Azotobacter vinelandii 1619 were used - a dry form, that underwent a spray drying process, a 24-h culture and only biomass without exometabolites. The results have shown that the best effect on stem development is observed with 24-hour culture of Azotobacter vinelandii 1619, where the length of the stem was with 3,89% higher, while the greatest difference in the helianthus disk diameter (8.07%) was found in the variants treated only with biomass. Azotobacter biomass also had a positive effect on dried biomass of helianthus stem, roots and disk.

Keywords: Azotobacter sp., Helianthus annuus

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IDENTIFICATION AND QUANTIFICATION OF NARINGENIN IN DIFFERENT TYPES OF HONEY FROM THE MOSTAR REGION USING HPLC

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ABSTRACT

Honey has been used as a natural sweetener for thousands of years, produced by bees (*Apis mellifera*) from either nectar or honeydew. Its chemical composition is influenced by factors such as processing methods, botanical origin, environmental conditions, and seasonal changes. Among the many valuable components of honey are phenolic compounds, such as naringenin, a flavonoid with several health-promoting properties, including nephroprotective, anti-inflammatory, antioxidant, and anticancer effects. This study aimed to quantify the naringenin content in nine honey samples from three honey types—sage, heather, and meadow—collected from three distinct locations in the Mostar region: Rujiste, Bijelo Polje, and Podvelezje. High-performance liquid chromatography (HPLC) was employed for the quantification. The results revealed the presence of naringenin in most samples from Rujište and Podvelezje, with no naringenin detected in meadow honey from Bijelo Polje.

Keywords: honey, naringenin, HPLC, functional food, Mostar

N-ACETYLCYSTEINE SUPPRESSES SODIUM FLUORIDE-INDUCED GENOTOXICITY IN MOUSE LEYDIG CELLS

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ABSTRACT

Fluoride is an essential element for living organisms, found in water, air, and food. Fluoride-containing dental products and fluoridated water are the primary sources of fluoride in the human body. Overexposure to fluoride can harm different organs and tissues, including the skeletal, neurological, digestive, respiratory, and urogenital systems. Reviewing the literature uncovers multiple studies that utilize antioxidant molecules to mitigate the detrimental impacts of fluoride. N-acetylcysteine (Nac), a chemical possessing antioxidant characteristic, directly interacts with oxidative substances to decrease the levels of reactive oxygen species (ROS) upon cellular entry, functioning as a scavenger of reactive oxygen molecules. Nac, which has high antioxidant and anti-inflammatory capacity, is used to treat various diseases related to oxidative damage. With the increasing evidence of fluoride toxicity on the male reproductive system, interest in studies in this direction has increased. However, there is a limited amount of study on the therapeutic properties of Nac in counteracting the harmful impacts of sodium fluoride (NaF) on TM3 Leydig cells. The TM3 Leydig cell line, which is involved in the production of testosterone in the male reproductive system, was exposed to different concentrations of NaF (50 ppm) and Nac (1 mM) for 24 h in this research. The study assessed cell viability and micronucleus formation at specific concentrations of NaF and Nac, focusing on the genotoxic effects of fluoride in the Leydig cell line. Based on the collected results, it was determined that NaF reduced cell viability in Leydig cells and caused genotoxic damage. Furthermore, it was found that the administration of Nac enhanced the survival rate of cells and mitigated the extent of genotoxic damage in Leydig cells that were affected by NaF exposure. Consequently, our study discovered that Nac may possess a therapeutic effect on TM3 Leydig cells in mitigating the harmful effects of NaF toxicity.

Keywords: Fluoride, Leydig cells, n-acetylcysteine, cell viability, genotoxicity.

SCREENING OF SELECTED WHEAT CULTIVARS FOR LEAF RUST RESISTANCE GENES LR9, LR19 AND LR24

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ABSTRACT

Leaf rust caused by *Puccinia triticina* is a common disease of wheat in the coastal regions, Southeastern Anatolia, Middle Black Sea, Trakya and Southern Marmara regions of Türkiye. Leaf rust is one of the most important biotic factor affecting grain yield and quality in wheat. Yield losses in wheat from *P. triticina* infections are usually the result of decreased numbers of grain per spike and lower grain weights. Genetic resistance is the preferred method to decrease losses from leaf rust. Leaf rust resistant genes (Lr) have been identified and used to control disease. Most Lr genes confer race-specific resistance in a gene-for-gene manner. The objective of present work was to screen some leaf rust resistant genes. In this purpose, in order to determine the presence of the leaf rust resistance genes, *Lr9*, *Lr19* and *Lr24*, which provide vertical resistance to leaf rust in wheat plants, was investigated using specific molecular markers in eighteen commercial bread wheat varieties. In the study, eighteen bread wheat cultivars and three genotypes of Thatcher near isogenic lines containing *Lr9*, *Lr19* and *Lr24* genes were used as positive control and Morocco cultivar was used as negative control. DNA obtained from the seeds of the wheat cultivars were screened for leaf rust resistance genes using PCR. As a result of PCR using the $SCS73_{719}$ marker, it was determined in the gel image that the Yüksel variety had the *Lr24* gene. Bread wheat cultivar Yüksel was found to be resistant to all leaf rust pathotypes both seedling and adult resistance tests in the Trakya region

Keywords: Wheat, *Puccinia triticina*, Leaf rust resistance genes (Lr),

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THE EFFECT OF CHANGES IN RICE PRODUCING ON WEEDS IN PADDY IN CURRENT ERA

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ABSTRACT

The evolution of rice cropping systems has brought about profound changes in weed management practices, necessitating a more sophisticated approach to controlling weed populations. Historically, before the year 2000, water-seeded rice systems depended heavily on traditional methods like manual weeding, which, while labor-intensive, often fell short of effectively controlling the diverse weed species prevalent in these environments. Continuous flooding, a key strategy in these systems, played a crucial role in suppressing weeds, but its use has diminished with the advent of water-saving technologies. The introduction of Clearfield technology was a significant breakthrough, allowing for the selective control of weedy rice and other persistent species using imidazolinone herbicides. However, the widespread adoption of this technology has inadvertently led to the rise of herbicide-resistant weed populations, particularly those resistant to imidazolinones. In response, Provisia technology emerged as an alternative, offering a new mode of action, though concerns about its long-term sustainability and the potential for resistance development persist. The adoption of hybrid rice varieties has further complicated weed management, as these vigorous rice plants, while competitive against weeds, require more precise management strategies to optimize yields and minimize weed pressure. The shift to drip irrigation, while advantageous for water conservation, presents additional challenges, particularly in the absence of continuous flooding, which naturally suppresses many weed species. This shift necessitates more integrated approaches, combining herbicides with cultural practices for effective weed control. Direct-seeded rice systems, which are increasingly popular, pose further challenges, as they are highly susceptible to infestations from competitive weeds that emerge concurrently with the rice, demanding intensive management during a critical, shorter window. The need for integrated weed management strategies has thus become more apparent, requiring a combination of cultural, mechanical, and chemical methods to maintain weed populations at manageable levels. As modern rice production continues to evolve, it is evident that a one-size-fits-all approach to weed management is no longer effective. Instead, the integration of advanced herbicide technologies like Clearfield and Provisia with both traditional and innovative cultural practices is crucial for maintaining long-term, sustainable weed control, mitigating the risk of further resistance development, and ensuring the continued productivity of rice cropping systems.

Keywords: Rice production, Weed control, Herbicides, Clearfield, Provisia

PREPARATION and CHARACTERIZATION of PARAFFIN LOADED POLY(LACTIC ACID) BASED NANOFIBER USING THE SOLUTION BLOW SPINNING METHOD

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ABSTRACT

In the food industry, cold chain temperature fluctuations accelerate the development of microorganisms and cause food waste. Phase Change Materials (PCMs) can store latent heat energy and maintain the storage temperature by releasing the stored heat to the environment when the ambient temperature decreases or increases. PCMs can prevent temperature fluctuations when used for food preservation purposes. n-Tetradecane is a paraffin that can store latent heat and poly (lactic acid)(PLA) is a biodegradable, environmentally friendly polymer. Solution Blow Spinning Method (SBS) is a safe nanofiber spinning method without high voltage. In this study, PLA based paraffin loaded nanofiber was prepared using the SBS method. PLA/n-tetradecane nanofiber was characterized by Scanning Electron Microscopy (SEM) and Differential Scanning Calorimetry (DSC). In SEM results, nanofibers are clearly visible and n-tetradecane is loaded on PLA fibers. DSC results showed that n-tetradecane had latent heat of 219 J/g at 6.99ºC and PLA/n-tetradecane nanofiber had latent heat of 30.79 J/g at 6.34ºC. PLA-based paraffin-loaded nanofibers can be used as packaging material to prevent cold chain fluctuations in food, pharmaceutical and chemical product storage.

Keywords: Phase change material, nanofiber, poly (lactic acid), n-tetradecane, SBS method

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