



the 22nd INTERNATIONAL CONFERENCE
**LIFE SCIENCES FOR
SUSTAINABLE DEVELOPMENT**
28 - 30 September 2023, Cluj-Napoca, Romania

BOOK OF ABSTRACTS

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IMPRESSUM

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”LIFE SCIENCES FOR SUSTAINABLE DEVELOPMENT”

28th – 30th September, 2023

Cluj-Napoca, Romania

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WELCOME MESSAGE

We are pleased to welcome you to the 22nd International Conference "Life Sciences for Sustainable Development", Romania to share our scientific performance and progress during this special scientific event.

The University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, classified in the first category of "advanced research" universities of Romania, place also confirmed by the European University Association (EUA). The University becomes nowadays one of the most prestigious academic institutions from Romania.

The 22nd International Conference "Life Sciences for Sustainable Development" is a dynamic forum of exchanges for scientific experiences, innovative ideas and concepts, future prospects in agriculture, plant and animal science, food science and technology, biotechnology, veterinary medicine, as well in other interdisciplinary and transdisciplinary areas.

The 22nd International Conference "Life Sciences for Sustainable Development" includes invited conferences, presented by known international and national personalities, oral and poster presentations, where recent advanced scientific and technical results can be seen, especially now, in the context of the new European Research Program "Horizon 2020" and of the national Research – Technological Development and Innovation Program, related to Life Sciences.

The conference programme will consist of ten main sessions:

1. Agriculture
2. Environmental Protection
3. Food Science and Technology
4. Horticulture
5. Economics and Rural Development
6. Animal Science
7. Biotechnology
8. Veterinary Medicine - Fundamental and preclinical sciences
9. Veterinary Medicine - Clinical sciences
10. Geodesy, Forestry and Applied Exact Sciences

The participants registered to our conference have the opportunity not only to present their results, published as summary in the "Book of Abstracts" but also to publish in extenso their contributions. The oral presentations, after a previous peer review process, can be published in the journal Bulletin of UASVM-CN – Agriculture, Horticulture, Animal Science-Biotechnology, Veterinary Medicine and Food Science and Technology.

"Book of Abstracts" contain abstracts submitted by participants from different countries. We wish to thank all participants and organizers for making this meeting possible.

With best wishes,

Prof. Cornel CĂTOI, PhD
Rector

Prof. Dan C. VODNAR, PhD
Vice-rector for Research

ANNOTATION

**The abstracts and contact information are submitted by the main authors.
Each author explicitly confirms that the abstract meets the ethical standards for authors
and coauthors.**

CONFERENCE PROGRAMME

Thursday, 28 th September 2023		
09:00 -12:30	Registration of participants	Aula Magna “Mihai Șerban”, UASVM Cluj-Napoca
09:00 -13:30	Poster Display (For more details, please see the program)	
10:00-10:10	Opening ceremony Rector, Cornel CĂTOI Vice-Rector, Dan C. VODNAR	Aula Magna “Mihai Șerban”, UASVM Cluj-Napoca
10:10-13:10	Plenary Session Chairpersons: Sanda ANDREI, Mirela CORDEA, Sonia SOCACI, Cristian Ovidiu COROIAN, Mignon SANDOR, Horia VLASIN	Aula Magna “Mihai Șerban”, UASVM Cluj-Napoca
10:10-10:40	THE ONE HEALTH APPROACH IN THE CONTROL AGAINST ZOO NOTIC DISEASES: ARE SMALL RUMINANTS RELEVANT HOST IN THE EPIDEMIOLOGY OF TUBERCULOSIS IN SPAIN?	DAVID CANO-TERRIZA, Spain
10:40-11:10	EVALUATION OF GREENHOUSE GAS EMISSIONS OF QUINOA SEED PRODUCTION IN GREECE	DIMITRIOS BILALIS, Greece
11:10-11:40	NEW TECHNOLOGIES IN THE SERVE OF FOOD CRISIS AND AGRONUTRITION	MAGDALINI KROKIDA, Greece
11:40-12:10	APPLICATIONS OF ALUMINOSILICATES IN AGRICULTURE	DEJAN PRVULOVIĆ, Serbia
12:10-12:40	CHALLENGES OF SEQUENCING TECHNOLOGIES: FROM GENOTYPING THE RS12979860 OF IL28B HUMAN GENE TO WHOLE GENOME SEQUENCING OF DROSOPHILA SUZUKII	ATTILA CRISTIAN RAȚIU, România
12:40-13:10	WATER AND SOIL: CHALLENGES FOR SUSTAINABLE AGRICULTURE UNDER CLIMATE CHANGE	TOM VANWALLEGHEM, Spain
13:30 –14:30	Lunch – Biodiversity Research Center	
15:00-18:30	Oral Sessions (sessions I-X) - For more details, please see the program	
19:00-24:00	Gala Dinner (Restaurant Wonderland Resort)	
Friday, 29 th September 2023		
09:00-13:00	Poster Presentation and Evaluation Oral Sessions (sessions I-X) For more details, please see the program	
13:00-13:30	Break	
13:30 –13:40	Closing ceremony and Best Poster Awards-	Aula Magna “Mihai Șerban”, UASVM Cluj-Napoca
13:40 –14:30	Lunch – Biodiversity Research Center	
Saturday, 30 th September 2023		
08:00-20:00	Post - conference tour (optional) - Transylvania Route: Cluj-Napoca-Hunedoara-Apold-Cluj-Napoca	

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ORAL PRESENTATIONS

SESSION 1: AGRICULTURE

APPLICATIONS OF ALUMINOSILICATES IN AGRICULTURE

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Introduction: Aluminosilicates are compounds containing oxides of both silicon and aluminum. Two of the most prevalent types of aluminosilicates are phyllosilicates (clays), with extended layered structures, and tectosilicates (zeolites), with structures that extend through a three dimensional network of covalent bonds. Two factors determine the possibility of using zeolites in agriculture and industry, namely the presence of an active site in the channel system as well as shape and geometry, which are responsible for shape selectivity, which in turn determines the possibility of performing specific reactions. Active sites are present in zeolites both inside the structure in the channels or pores as well as on their surfaces. The shape and size of pores in zeolites favours specific reactions, conditioned by the sphericity of zeolites.

Aims: Assessment of multiple applications of aluminosilicates in agriculture.

Material and Methods: Aluminosilicates have effects on animal nutrition and health, crop production, plant and environmental protection and others. There is an abundance of published data which indicate that the dietary use of natural aluminosilicates reduces the incidence and decreases the severity and the duration of diarrhoea in calves and pigs. Aluminosilicates also have effects on weight gain of some domestic animal species.

Results: The dietary use of aluminosilicates appears to be effective in the prevention of poisoning due to their high ion-exchange capacity. They have been used effectively for the prevention of heavy metal, ammonia, certain mycotoxins and herbicides toxicity in animals. Zeolite incorporation in soil was found to increase crop yields and to promote nutrient use efficiency. Zeolites has significant positive effects on soil or water pollution, contamination by heavy metals, loss of nutrients, and loss of water-use efficiency. Different silicates and aluminosilicates are often used as inert dusts to control insect pests of field crops and stored products.

Conclusion: Zeolite application finds several potential uses in agriculture, particularly in animal nutrition, soil management and environmental, plant and health protection.

Keywords: Aluminosilicates, animal nutrition, clays, crop production, zeolites

Acknowledgement: This work has been supported by the Ministry of Science, Technological development and Innovation of the Republic of Serbia (grant no. 451-03-47/2023-01/200032 and 451-03-47/2023-01/ 200117).

CELL-CELL BACTERIAL SIGNALLING IN THE PLANT BENEFICIAL MICROBIOME

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Introduction: The low cost in next-generation-sequencing and development of computational tools is generating extraordinary insights into the taxonomic and functional composition of microbes associated with plants.

Aims: Discussing plant associated microbial communities key roles in biotic and abiotic stress tolerance and nutrient acquisition.

Material and Methods: Plant-microbe associations occur at the leaf aerial parts in the phyllosphere and at root level in the rhizosphere. The rhizosphere (the nearest soil area to the roots) hosts a rich microbial plant community which provides a series of beneficial outcomes related to plant growth. Plant roots recruit their rhizosphere microbiome from bulk soil and a small number enter colonising the root endosphere and some then move to other plant organs. The phylogenetic conservation of plant microbiomes infers an organized assembly which is directed by mechanisms at large unknown. These involve cell-cell interactions, plant-microbe signalling and root exudate effects. Microbial cell-cell communication regulates metabolic and physiological activities in response to the host, environment and microbial neighbors.

Results: Plant microbiomes contain a large number of bacterially produced molecules such as quorum sensing signals, volatiles and secondary metabolites which play cell-cell signaling roles amongst members of the microbiome. Our understanding of the different signal molecules and their roles which are produced in a microbial community, is very much in its infancy.

Conclusion: Understanding the chemical languages that shape the plant microbiome will be informative on how these communities contribute to plant health. It will also lead to the development of prebiotic compounds and probiotic competence for a more sustainable agriculture of economically important crops.

Keywords: cell, signal, plant, microbiome.

POPULATION DYNAMICS OF AMERICAN GRAPEVINE LEAFHOPPER AND INCIDENCE OF FLAVESCENCE DORÉE IN EASTERN CROATIA

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Introduction: Flavescence dorée is a devastating quarantine plant disease caused by a phytoplasma and primarily spread by American grapevine leafhopper (*Scaphoideus titanus* Ball, 1932). These insects feed on infected vines. When they move on to feed on healthy vines, they can transmit the phytoplasma into the plant's phloem, disrupting nutrient transport and causing a range of symptoms, and finally lead to vine decline and death. Due to the extreme importance of this problem, in 2023 the Ministry of Agriculture adopted the new "Action plan for preventing the spread of Flavescence dorée for the period from 2023 to 2025."

Aims: The aim of the research was to determine the population dynamics of the American grapevine leafhopper and the presence of the Flavescence dorée disease in several vineyards in the area of the town of Ilok during seasons 2021, 2022 and 2023.

Materials and Methods: The research was carried out in four cultivated and two non-cultivated vineyards so that, from June to September, five yellow sticky traps were placed in each vineyard and changed every 14 days. For the purposes of DNA isolation and molecular analysis, samples of adult vector individuals and leaf samples from symptomatic plants were taken.

Results: The first adult grapevine leafhoppers were recorded in mid-July. The obtained results confirmed the presence of the American grapevine leafhopper in all investigated vineyards but their number varied significantly. The highest number of adult vectors was recorded in uncultivated *Berlandieri* x *Riparia* Kober 5BB rootstocks vineyard in each year and amounted to hundreds of individuals per yellow sticky trap. Together with attendance of Flavescence dorée, presence of Bois noir disease was also confirmed in the vineyard with Chardonnay cultivar.

Conclusion: The presence of disease and high population of primary vectors necessitates proactive and coordinated efforts involving growers, regulatory bodies and researchers to manage the disease and minimize the impact of these issues on viticulture.

Keywords: flavescence dorée, *Scaphoideus titanus*, Croatia.

PRELIMINARY RESULTS REGARDING THE EFFECTS OF GREEN FERTILIZERS ON WHEAT CULTIVATION ON THE ACIDIC SOILS OF THE NORTH-WEST REGION OF ROMANIA

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Introduction: Green manures are composed of specific plants that are cultivated with the purpose of incorporating them into the soil during basic agricultural operations. The plants used as green manure should produce a rich vegetative mass in as short a time as possible and should not be demanding in terms of soil. The plants used for this purpose are mostly legumes, but other plants can also be used as well. (Dumitru et al, 2003).

Aims: The evaluation of the impact of green fertilizers, including their combinations with chemical fertilizers, on wheat cultivation. The evaluations encompass production, weed infestation, resistance to diseases and pests, as well as the quality of the main crop.

Materials and Methods: In this experiment, five plant species (triticale, peas, soybeans, sunflower, and rapeseed) intended for incorporation into the soil have been utilized. These will be sown during the summer and then incorporated into the soil at the green stage, before the optimal wheat sowing period. The experiment involves three repetitions, using the split-plot design with three experimental factors: factor A - green manure, factor B - chemical fertilizer, and factor C - fungicide treatment.

Results: Even though the green manure have a positive effect on the production, in the first year did not show any significant results compared to the chemical fertilization. The process of mineralization of the organic nitrogen did not occur in the short interval of time between their incorporation and the making it available to plants

Conclusion: The results of this study could contribute to the development of integrated nutrient management strategies that incorporate both green manure and chemical fertilizers for sustainable agriculture in acidic soils in Northwestern Romania. The findings could provide insights into the interactions between these two factors and inform the optimal use of these fertilizers to maximize soil productivity while minimizing environmental impacts.

Keywords: acidic soils, fertilizer, green manure, wheat

References

1. Dumitru M., (2003). Cod de bune practici agricole, Vol. 1, Editura Expert.

THE INFLUENCE OF SOME TECHNOLOGICAL FACTORS ON THE PRODUCTION OF TRITICALE

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Introduction: *Triticosecale* Wittmack results from the hybridization between *Tr. aestivum* and *S. cereale* taking from wheat the high production capacity and a high protein content and from rye the ability to adapt and resist biotic and abiotic stress factors (Soare A., 2015). They make very good use of lands with low fertility and an acidic pH. It is especially used in poultry and pig feed for its high protein content.

Aims: The current study aims to establish the influence of technological factors on triticale production. We try to highlight the most important technological factors and their effect on production.

Materials and Methods: The experience use split-plot experimental design, with three experimental factors: factor A – the variety (Negoiu, Utrifun, Zvelt, Tulnic), factor B – fertilization (chemical, foliar, biostimulator) and factor C – density of sowing (450, 550, 650 germinabil grains/m²). The soil type is a typical preluvosol, with low humus content and acidic reaction.

Results: Factor A had the greatest influence on production, being distinctly significantly positive. The influence of factor A on production resulted in the variety Tulnic having a distinctly significant negative difference. The influence of factor B on production shows that foliar and biostimulant fertilization show significantly negative differences. The influence of factor C on production did not show significant differences.

Conclusion: The technological factor that most influenced production was Factor A, with Utrifun having the highest production and Tulnic the lowest. The experimental variants foliar fertilization and with biostimulator recorded significantly negative differences. The sowing density did not show any significant differences in production.

Keywords: experience, technology, triticale

References

1. Soare A (2015), „*Note de curs Fitotehnia cerealelor păioase și leguminoaselor pentru boabe*” Facultatea de inginerie Brăila, Specializarea Agricultură.

THE VALENCES OF MIT APP INVENTOR IN SOIL PROTECTION AND AGRICULTURAL PRACTICES

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Introduction: *MIT App Inventor* is well-known to generate and implement numerous applications for different mobile devices, all over the world, with high agricultural and also ecological importance. Since 2021, it was demonstrated that mobile-based applications can also sustain the current and innovative development of agriculture-based communities.

Aims: Taking into account the former experimental models of different mobile applications, we considering that MIT App Inventor applications are produced at very low levels of software engineering know-how, and have a potential way to produce validated information for decision-making in the soil protection field. Among different strategies to increase apps production and structural functionalities, MIT App Inventor could be one efficient strategy to provoke important increases in mobile apps production yield.

Materials and Methods: Different workspaces and applications functionalities were produced using the menu offered by MIT App Inventor. The graphical design and operational functions were done step by step based on numerous tutorials and scientific paperworks.

Results: The combined use of MIT App Inventor and eco-pedological indicators used and implemented provoked a synergistic effect increasing even more the levels of soil protection via mobile apps.

Conclusion: In the present research work, we demonstrated that MIT App Inventor is an innovative technology focusing on mobile apps production improvement by different soil protection indicators integration.

Keywords: App Inventor, eco-pedological indicators, soil protection.

TECHNIQUES FOR THE STUDY OF NODULATING BACTERIA FROM LEGUMES

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Introduction: Nitrogen (N) is one of the three basic macronutrients for the good development and growth of all plants. Nitrogen being the main component of proteins, amino acids, nucleic acids, chlorophyll, and some metabolites. Even if fertilizers are applied on a large scale, the amount of nitrogen in the soil can be reduced or depleted due to the following processes: volatilization, denitrification, leaching and soil erosion.

Aims: The aim of the paper is to analyse the relevant literature related to the techniques used in the study of soil rhizobia.

Materials and Methods: The research was carried out on Web of Science, with a combination of multiple keywords related to soil and plant conditions, and laboratory techniques for isolating and assessment of rhizobia.

Results: The atmosphere contains huge amounts of nitrogen, but it cannot be absorbed directly by plants, only legumes have developed mechanisms of association with nitrogen-fixing bacteria. *Rhizobia* is the general name given to a phylogenetically diverse group of soil bacteria that form nitrogen-fixing symbioses with leguminous plants. Nitrogen deficiency can cause reduced root growth, altered root architecture, plant wilting, biomass and reduced photosynthesis. A structured flow of steps is required to study the rhizobia in relation to their host. Nodules formed on leguminous roots are collected from soil, to extract the bacteria inside them. Pure cultures of bacteria are tested against legumes to evaluate their symbiotic capacity. Based on the assessment of symbiotic capacity, an inoculation test is done to determine the symbiotic efficiency of each extracted bacterial strain.

Conclusion: In current agronomic context, there is a constant need to improve the symbiotic fixation of nitrogen, to increase the quality of soil and their capacity to sustain crops. Rhizobia represents a solution to this need due to their capacity to fix nitrogen within a symbiotic relation with legumes.

Keywords: soil condition, laboratory techniques, rhizobia

References

1. Somasegaran, P., & Hoben, H. J. (2012). Handbook for rhizobia: methods in legume-Rhizobium technology. Springer Science & Business Media.
2. Zaidi, A., Khan, M. S., & Musarrat, J. (Eds.). (2017). Microbes for legume improvement. Springer.
3. Palacios, R., & Newton, W. E. (2005). Nitrogen fixation: origins, applications, and research progress. Genomes and genomics of nitrogen-fixing organisms Springer, Berlin Heidelberg New York.

CULTIVARS PLOIDY INFLUENCE ON VARIABILITY OF SOME RED CLOVER MORPHOLOGICAL TRAITS AND PERENNIALITY

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Introduction: Red clover known as *Trifolium pratense* L. is a perennial plant belonging to the genus *Trifolium* and *Leguminosae* family. Red clover it's an allogame plant that present a higher variability due to its heterozygosity (Muntean, 2006) and has two forms: diploid and tetraploid (Amdahl *et al.*, 2016).

Aims: The study aim was to conduct a comparative analysis between the two groups, diploid and tetraploid cultivars, following average values, the morphological traits variability and the limits variation.

Materials and Methods: The study was carried out in the pedoclimatic conditions from USAMV Cluj-Napoca agrobotanical garden between 2022–2023. In the study were used 70 diploid and 20 tetraploid cultivars. The traits values were processed using R4.3.1 statistical software and were shown as mean ($\bar{X}$), the corresponding errors ($S\bar{x}$) and the variability coefficient (s%).

Results: The plant height, the green matter weight, the number of ramifications/stem, the number of stems/plant and the number of inflorescences/50g in the 2nd year were higher at tetraploids than at diploids. Diploids presented better results than tetraploids in majority of morphological traits from the 3rd year.

Conclusion: This study show that tetraploids are superior to the diploids regarding morphological traits in the 2nd year and inferior to diploids in the 3rd year.

Keywords: diploid, perennial, red clover cultivars, tetraploid

References

1. Amdahl H., Aamlid T.S., Ergon Å., Kovi M.R., Marum P., Alsheikh M., Rognli O.A. (2016). Seed yield of Norwegian and Swedish tetraploid red clover (*Trifolium pratense* L.) populations. *Crop Science*. 56(2):603-612.
2. Muntean jr. L. (2006). The variability of the morphological traits of tetraploid red clover cultivars studied in Cluj-Napoca environmental conditions. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. 34(1):79-87.
3. Muntean L. (2008). A comparative study of the variability of some morphological traits in a collection of diploid and tetraploid cultivars of red clover. In *Proceedings. 43rd Croatian and 3rd International Symposium on Agriculture*. Opatija, Croatia. (Vol. 317, p. 321).

STUDIES OF THE IMPACT OF SYNTHETIC AND ORGANIC FERTILIZERS ON THE SOIL FUNGAL COMMUNITY

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Introduction: Over the last five decades, the application of chemical fertilizers has expanded considerably. Furthermore, the use of synthetic fertilizers is not without consequences for soil microorganisms, particularly fungi, whose roles are fairly well known. In this work, we review the research focusing on the negative impacts of synthetic fertilizers on the soil fungal community.

Aims: The main aim of this work is to highlight the impact of the use of chemical fertilizers on the life of soil fungi.

Materials and Methods: This work consists of compiling a body of literature on the impact of synthetic fertilization on the biological life of the soil, particularly on the soil fungal community.

Results: Several studies have shown that fungi are sensitive to variations induced by fertilization, such as changes in nutrient availability, changes in soil organic matter and changes in pH. This influences fungal biomass and the composition of these communities. Furthermore, prolonged exposure to inorganic fertilizers led to a reduction in fungal abundance. Furthermore, a reduction in mycorrhizal fungus species was also observed following applications of phosphorus-based fertilizers. With regard to the use of organic fertilizers, the vast majority of studies consulted show a direct positive impact of these types of fertilizer on the soil fungal community.

Conclusion: Several studies have shown that fungi are sensitive to variations induced by fertilization, such as changes in nutrient availability, changes in soil organic matter and changes in pH. This influences fungal biomass and the composition of these communities. In addition, prolonged exposure to inorganic fertilizers has led to a reduction in fungal abundance.

Keywords: fungus, micro-organism, synthetic fertilizer, organic fertilizer

THE MICROBIAL NECROBIOME INVOLVED IN THE SOIL DECOMPOSITION PROCESS

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Introduction: Soil microorganisms are crucial for carbon and nutrient cycling, including SOM formation and degradation. They decompose organic matter through hydrolysis and oxidation, reducing soil carbon stocks.

Aims: The research aim to identify the key microorganisms and decomposers responsible for the breakdown of organic matter through a keyword structured review.

Materials and Methods: Data and information were extracted from articles on the Web of science platform, based on a keywords structured flow.

Results: Ascomycota and Basidiomycota are two of the most significant fungal groups, and they play crucial roles in cellulose degradation. These fungi produce enzymes, such as cellulases, which can break down cellulose into simpler sugars (glucose) through hydrolysis. These simpler sugars can then be further metabolized by the fungi as a carbon source to support their growth and development.

Three classes, namely Actinomycetes, α -Proteobacteria, and γ -Proteobacteria, are the primary groups of bacteria responsible for the degradation of lignin. Several strains from the genera *Brucella*, *Ochrobactrum*, *Sphingobium*, and *Sphingomonas*, which belong to the α -Proteobacteria class, have the capability to decompose lignin.

Conclusion: The ability of natural and agricultural ecosystems to thrive sustainably relies on the crucial role played by soil organisms in providing the decomposition of organic matter as on ecosystem services, which maintain soil fertility and overall ecosystem health.

Keywords: microbial community, soil organic matter, soil fertility, soil carbon

References

1. Burns, R. G., & Dick, R. P. (Eds.). (2002). *Enzymes in the environment: activity, ecology, and applications*. CRC press.
2. Kuddus, M., & Ramteke, P. (2023). *Value-Addition in Agri-Food Industry Waste Through Enzyme Technology*. Academic Press.
3. Laskowski, R., & Berg, B. (2006). *Litter decomposition: guide to carbon and nutrient turnover*. Amsterdam.

FUZZY COGNITIVE MAP - A GLIMPSE INTO ROMANIAN ORGANIC AGRICULTURE

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Introduction: Despite the recent uptake of innovative production systems, food systems continue to move on unsustainable trajectories (Béné, 2022). This can be explained by many sustainability interventions addressing solely more obvious but less powerful areas of intervention rather than engaging with the root causes of unsustainability. The project aims to elicit the often unspoken knowledge and perceptions of ‘in-field’ experts including farmers, policy makers, researchers and consultants in the 7 countries of the FOODLEVERS consortium.

Aims: The objective is to develop a Fuzzy Cognitive Map using Mental Modeler software which is a semi quantitative modeling tool. The tool will define: the important components of the system, the relationship between those components, the degree of influence that one component can have on another. Once models are built, increasing or decreasing the components included in the model different scenarios of change will be examined.

Materials and Methods: A Fuzzy-logic Cognitive Map can be developed via face-to-face or online workshops, where a group of stakeholders meet in one place at the same time (Pahl-Wostl, 2008). The aim of the FCM methodology is to represent casual relationships as perceived by stakeholders. This requires an elicitation process and a workshop organized involving different categories of stakeholders. Moderated group discussions in which respondents take up and integrate contrasting views can provide a more coherent and complete picture of the knowledge domain than a series of individual interviews because respondents can build on each other’s knowledge.

Results: The project will generate novel data that will be of great benefit to a number of stakeholder groups, including: farming businesses currently using unsustainable farming methods; policy makers, and relevant academics and grant-holder networks

Conclusion: The FCM develops a behavioral model of the system exploiting the experience and knowledge of stakeholders. FCM will be used as a decision-making tool to help individuals and communities to understand the impacts associated with environmental, social, governance and economic changes and to develop adequate policy actions and mitigation/adaptation strategies.

Keywords: FOODLEVERS, Fuzzy Cognitive Map, organic, sustainable, food system

References

1. Béné, C. (2022) ‘Why the Great Food Transformation may not happen – A deep-dive into our food systems’ political economy, controversies and politics of evidence’. World Development, Volume 154, 105881.

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THE INFLUENCE OF AGROPHYTOTECNICAL WORKS ON RAPESEED GROWTH STAGES AND IMPACT OF THE NUMERICAL DENSITY OF PEST COMPLEX

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Introduction: Agricultural systems that minimize environmental damage as well as non-renewable resource use are imperative to sustaining global food production capacity (Gotosa et al. 2020). Agricultural practices, in particular tillage and traffic of machinery, add an extra variation, affecting the movement of water and nutrients, the carbon and nitrogen balance, and the root growth of plants (Strudley et al. 2008).

Aims: We decided to study two tillage systems and compare the results to find the most efficient soil work system for Transylvanian fields, located in Mureș county. These studies will help the farmers to improve agricultural efficiency.

Materials and Methods: Two tillage systems were studied between the years 2022-2023 near Ungheni city (Mureș County, Romania). One of the studied tillage systems was conventional, including stubble cultivation followed by ploughing at 25 cm depth. The second tillage system was reduced tillage, using a trailed field cultivator, at a depth of 20-25 cm, one day before seeding.

Results: In the variant with conventional plough, average height of plants and root development were smaller than in the fields with reduced tillage. In conventional tillage, the maximum height of plant was 162 cm and the maximum number of ramifications was 11. In reduced tillage, the maximum height was almost 181 cm and the number of ramification was 15.

Conclusion: In the present research work, we demonstrated that reduced tillage is more efficient than conventional tillage about growth and yield of rapeseed crops and about numerical density of pest complex.

Keywords: agrotechnics, control, growth, pests

References

1. Gotosa J, Kodzwa J, Gwenzi W, Nyamangara J. Maize nitrogen uptake and productivity under reduced and conventional tillage. *Nutrient Cycling in Agroecosystems*. 2021 Jan;119:23-36.
2. Strudley MW, Green TR, Ascoug II JC. Tillage effects on soil hydraulic properties in space and time: State of the science. *Soil and Tillage Research*. 2008 Apr 1;99(1):4-8.

GRAIN SEEDS IDENTIFICATION BY THE USE OF CONVOLUTIONAL NEURAL NETWORKS

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Introduction: Grain seeds compose a large proportion of crops and are beneficial for health. Technological evolutions have made Machine Learning algorithms a significant part of sustainable agriculture, since variety of features can be extracted from data.

Aims: Scope of this work was to implement Machine Learning models, trained to recognise the type of the seed contained in a photo.

Materials and Methods: Three types of seeds of different plant species (*Triticum turgidum*, *Hordeum vulgare* L. and *Avena sativa*) were selected for recognition through Convolutional Neural Networks. Images were resized to be used as input. Three deep learning architectures named *ResNet50*, *VGG* and *Xception* were trained to identify those seeds and then evaluated based on their accuracy.

Results: Results showed that all three architectures predicted correctly more than 95% of seeds, with *Xception* having the best results. Specifically, its score was 99% in *Triticum turgidum*, 97% in *Hordeum vulgare* L. and 98% in *Avena sativa*, meaning the model understood the data and made accurate predictions.

Conclusion: In the present research work, we developed Convolutional Neural Networks that can be used to accurately recognise the type of seed contained in a photo.

Keywords: deep learning, image processing, seed classification.

DEVELOPMENT OF A DECISION SUPPORT SYSTEM FOR IRRIGATION AND FERTILIZATION OF INDUSTRIAL TOMATO

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Introduction: In Greece, tomato (table and industrial) is the first in production and second in area (after potato) among horticultural crops. In many areas of Greece, and significantly in Thessaly, the availability of irrigation water is limited. New precision farming technologies make it possible to set up networks of sensors in the fields that can collect and record information on an area with great precision. The result is better crop management with many useful results, such as improved fruit quality and reduction of cultivation costs.

Aims: The aim of this work is to develop a network of soil moisture and air temperature sensors to collect key parameters, in order to control the use of high environmental cost inputs, while increasing productivity and improving the quality of the tomato produced.

Materials and Methods: A series of soil moisture and air temperature sensors were installed on 10 fields in 2 areas in Thessaly, Greece. Information regarding the cultivated hybrid, the number of irrigations, the fertilization was recorded. Moreover, soil and plant tissue analyses were carried out, in addition to physiology measurements, as well as measuring the dry weight of cultivated plants. These data were used as an input to develop a model in order to be used for rational irrigation and fertilisation at field level.

Results: The project resulted in decreasing the use of fertilizers, as well as irrigation water, while increasing the quality of the crops. The cost and the environmental impact of the cultivation were reduced. Moreover, the use of Decision Support Systems increased the quantity and the quality of the cultivated crops.

Conclusion: The development of Decision Support Systems using weather, soil and cultivation data extracts correlation between the data and advice the farmer on the procedures that increase the production and the quality of the crops, while reducing the cost of cultivation.

Keywords: Decision Support System, fertilization, irrigation, precision agriculture, tomatoes

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THE INFLUENCE OF CLIMATIC FACTORS IN BIOMASS PRODUCTION IN SOME GRAIN SORGHUM HYBRIDS GROWN IN THE SOUTH-EASTERN AREA OF ROMANIA

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Introduction: Grain sorghum is a cereal whose cultivation is increasingly common both in Romania and worldwide. Grain sorghum is recognized for having very good yields relative to unit area and crop establishment costs. In addition to the production of raw material represented by grains, grain sorghum offers the possibility of harvesting an important amount of biomass. Biomass production is closely dependent on the climatic conditions but also on the type of hybrid. Thus, the higher the phreatic intake, the higher the biomass production. This study was carried out in the 2020-2021 and 2021-2022 agricultural years in the South-East of Romania, in Braila County, an area that has faced in recent years with climatic difficulties that force the efficient utilization of the crops used.

Aims: For the most efficient utilization of the grain sorghum crop, it is very important that the biomass production is superior to be used for energy purposes or as animal feed.

Materials and Methods: The study was carried out in Braila County over a period of two years, in which the potential of eight sorghum hybrids in relation to biomass production was tracked. The determinations were carried out on green plants but also on oven-dried plants to determine the dry substance. At the same time, the determinations were made on different stages of vegetation where it was possible to observe the increase of the green mass and the specific dry substance for this phase.

Results: It was observed that the production of biomass was superior in the case of the 2020-2021 agricultural year, which benefited from better climatic conditions compared to the 2021-2022 agricultural year. Also in the experiments sown at a higher density, the biomass production is superior to the reduced density.

Conclusion: By carrying out this study, it is demonstrated that in order to obtain a larger amount of biomass, it is essential to use some hybrids that have a higher height and ensuring a higher phreatic input leads to obtaining a larger amount of biomass that can be exploited differently depending on the beneficiary's needs.

Keywords: biomass yield, dry matter, green mass, grain sorghum

FROM PIXELS TO PLANTS: AN AI-POWERED ANALYSIS OF AGROBIODIVERSITY USING ADVANCED SATELLITE IMAGERY

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Introduction: The GREENTOP - Agro-Biodiversity initiative harnesses AI for biodiversity management using satellite imagery. We compare Sentinel-2 and PlanetScope imagery results. With the convergence of urban and agricultural spaces, our study underscores AI's pivotal role in agrobiodiversity management and conservation.

Aims: The study overlaps imagery-derived indices in yearly crop and land use identification, showcasing the advantages and bottlenecks to overcome.

Materials and Methods: High-resolution satellite imagery was employed to extract key spectral indices. These indices provided the foundation to train machine learning algorithms, utilizing data from well-identified regions. Post training, models were applied for classification tasks in extended areas.

Results: The analysis revealed that the simple Random Forest (RF) algorithm yielded the most accurate classifications. While PlanetScope's superior resolution initially appeared advantageous, Sentinel-2's broader band spectrum proved more instrumental for specific crop differentiation. Notably, crops with similar growth rates and values often became indistinguishable. Indices like MCARI and ARI2 distinctly differentiated between these crops. Sentinel-2 based classifications predominantly benefitted from NDII and NDVI, without a direct counterpart in PlanetScope. Yet, when indices were held, PlanetScope's enhanced resolution minimized noise and delivered smoother outcomes.

Conclusion: Leveraging EO imagery, our research highlighted the value of specific spectral indices in optimizing machine learning models. The comparison with PlanetScope emphasized the balance between resolution and spectral diversity, underscoring its significance in agrobiodiversity management.

Keywords: AI, Landuse, Earth Observation

References

1. www.greentop.space

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TESTING THE SUITABILITY OF SOME SPECIES FOR THE MICROGREENS PRODUCTION IN THE BABYLON GARDEN SYSTEM

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Introduction: Microgreens are plants that are consumed in the seedling stage, and have a high nutritional level, with a significant content of minerals and vitamins (Zhang *et al.*, 2021). Interest in obtaining microgreens has increased, there are many studies related to the available species and the optimization of production systems.

Aims: Taking into account the preferences of different plant species in terms of vegetation factors and production methods, in this study we tested the suitability of 20 species grown in hydroponic systems, to establish the suitable ones for cultivation as microgreens.

Materials and Methods: The Babylon Garden system used for the production of microgreens consists of a rotating tower, 6 growth trays with a water capacity of 700 ml, and the growth substrate from pressed hemp. The species tested were: rape, basil, broccoli, mustard, radish, fenugreek, cress, lentils, Mung beans, peas, wheat, sunflower, arugula, chia, fava beans, alfalfa, Adzuki beans, soybeans, wheat, and chickpeas. The yield of green mass, the germination rate and the development of the crop were monitored.

Results: The tested species behaved differently, the worst results being obtained for sunflower, chia and basil, with a germination rate between 30-50%. Very good development, uniformity of growth, germination over 95% and high productions in biomass/tray had: radish 180 g, wheat 50 g, fenugreek 70 g and mustard 72 g. Peas, Mung beans, Adzuki beans and soybeans had very good results, the productions of green mass/tray varied between 30-50 g.

Conclusion: The present study demonstrates that microgreens can be easily cultivated in the Babylon Garden system. The testing of different species highlights their different suitability for the microgreens production.

Keywords: microgreens, hydroponic system, production

References

1. Zhang, Y.; Xiao, Z.; Ager, E.; Kong, L.; Tan, L. (2021). Nutritional Quality and Health Benefits of Microgreens, a Crop of Modern Agriculture. *J. Future Foods* 1, 58–66.

VITAMIN CONSUMPTION AND THEIR IMPACT ON THE TARGET POPULATION'S IMMUNE SYSTEM WITH REGARD TO ENERGY DRINKS

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Introduction: Young people frequently consume energy drinks (ED) because they claim to improve mental and physical performance. Additionally, it became popular during parties to blend alcohol and ED consumption. Caffeine, taurine, vitamins from the B group, glucuronolactone, and, if necessary, specific extracts that can enhance the effects of the primary compounds are all found in energy drinks. Studies on prolonged and excessive consumption highlight important health concerns.

Aims: In light of the foregoing, the objective of this research is to review the immunomodulatory effects of vitamins in energy drinks on the intended audience.

Materials and Methods: In order to accomplish this, phrases and keywords have been used to search through research publications and reviews that may be located in many international databases.

Results: Most often, the significant ingredients caffeine and taurine are responsible for the adverse effects. However, because so many vitamins are cofactors for many metabolic processes, the situation is fundamentally different. According to what is currently known, consuming too many vitamins can have adverse health effects. Additionally, their combined effects have synergistic and complementary effects. This has an impact on absorption as well.

Conclusion: In the present paper, we showed that the high doses of vitamins from energy drinks can be linked by side immunological effects.

Keywords: vitamins, energy drinks, taurine, caffeine

CHLOROPHYLL CONTENT EVOLUTION UNDER DIFFERENT SALINITY DOSES OF WHEAT *TRITICUM AESTIVUM* L. VAR. ALEX

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Introduction: Salinity stress can directly influence the plant chlorophyll content, affecting the photosynthetic rate (Ambede et al., 2012). Wheat has various physiological responses to this abiotic factor.

Aims: This study's purpose was to evaluate the changes in wheat chlorophyll content under salinity stress.

Materials and Methods: The experiment was set on October 15, 2022, by sowing wheat seeds var. Alex in mezzo-phyto-cosmos, under six treatments, 0, 15, 30, 45, 60, and 75 mM NaCl, in field conditions. The assessments were taken periodically during and at the end of the experiment. Using the chlorophyll meter, the chlorophyll content for leaves, flag leaves, and spikes was measured.

Results: The highest value for leaves chlorophyll content from all the assessments was registered in the control in the fourth evaluation. This level of chlorophyll content is higher than the one in the 15 mM NaCl treatment with 25% and significantly higher compared to all the other assessments. The smallest value evaluated in all the assessments was at the first evaluation in the 45 mM NaCl treatment. For flag leaves chlorophyll content, measured at the end of the experiment, the highest value was registered in the control treatment, significantly higher compared to the 30, 45, 60, and 75 mM NaCl by 38%, 86%, 88%, and 91%. The spike chlorophyll content showed no significant differences between all the treatments.

Conclusion: Higher doses of saline treatment significantly affect the leaves chlorophyll content. The chlorophyll content of spikes was not significantly affected by salinity doses. The same parameter measured for flag leaves was significantly affected by doses higher than 15 mM NaCl.

Keywords: abiotic stress, chlorophyll, flag leaf, SPAD units, spike

References

1. Ambede, J. G., Netondo, G. W., Mwai, G. N., & Musyimi, D. M. (2012). NaCl salinity affects germination, growth, physiology, and biochemistry of bambara groundnut. *Brazilian Journal of Plant Physiology*, 24, 151-160.

USE OF ECOPLATES IN SOIL POLLUTED WITH HEAVY METALS

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Introduction: The enduring characteristics of non-biodegradable toxic pollutants, specifically heavy metal and metalloid components, have drawn worldwide concern, leading to a focus on environmental contamination. Microorganisms play a crucial role in the soil ecosystem and can actively or passively influence the levels of heavy metals present.

Aims: To investigate the potential use of Ecoplates in the study of microbial community structure and diversity in heavy metal-polluted soil.

Materials and Methods: Multiple keywords combinations were used to filter the most important results in the field.

Results: The studies included in the database demonstrated that Ecoplates are viable tools for the detection of microbial. In metal-contaminated soil, the application of Ecoplates led to observe changes in the microbial community structure, with an increase in metal-resistant and metal-reducing microorganisms. The results highlight the potential of Ecoplates to be used in the assessment of microbiomes from heavy metal-contaminated soil.

Conclusion: Implementing Ecoplates in environmental remediation strategies holds great potential to better understand the microbial community in the context of soil health, mitigating of heavy metal toxicity, and the overall environmental sustainability.

Keywords: functional microbial community, heavy metal toxicity, microbial community structure, substrate assessment

References

1. Kuźniar, A., Banach, A., Stępniewska, Z., Frąc, M., Oszust, K., Gryta, A., ... & Wolińska, A. (2018). Community-level physiological profiles of microorganisms inhabiting soil contaminated with heavy metals. *International Agrophysics*, 32(1), 101-109.
2. Hu, X., Wang, J., Lv, Y., Liu, X., Zhong, J., Cui, X., ... & Zhu, X. (2021). Effects of heavy metals/metalloids and soil properties on microbial communities in farmland in the vicinity of a metals smelter. *Frontiers in Microbiology*, 12, 707786.

ANTIBIOTIC RESISTANCE OF WATERBORNE PATHOGENS

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Introduction: Antibiotic resistance represents a worldwide issue that has significant implications for human well-being. Irresponsible antibiotic usage in various sectors, including medicine, agriculture, aquaculture, and the food industry, has led to the wider propagation of resistance. Waterborne pathogens are microorganisms, including bacteria, viruses, and protozoa, that can contaminate water sources.

Aims: To investigate the antibiotic resistance in waterborne pathogens from water sources and land use patterns.

Materials and Methods: Multiple keywords combinations were used to filter the most important results in the field.

Results: The studied included in the database revealed insights into the prevalence of antibiotic resistance in waterborne pathogens and its association with various sources of contamination. The results are presented in terms of the relationship between land use patterns and microbial water quality. In agricultural and urban land usage, microbial contamination is higher, primarily as a result of factors such as agricultural runoff, discharge of sewage, and various human-related activities.

Conclusion: Understanding the genetic and environmental factors driving antibiotic resistance development is crucial for effective water treatment strategies, infection control measures, and the prudent use of antibiotics.

Keywords: microbial contamination, antibiotic resistant bacteria, waterborne pathogens, pathogenic microorganisms

References

1. Yadav, S., Kapley, A. (2021). Antibiotic resistance: Global health crisis and metagenomics. *Biotechnology Reports*, 29, e00604.
2. Włodarczyk, R., Kwarciak-Kozłowska, A. (2020). Treatment of waterborne pathogens by reverse osmosis. In *Waterborne Pathogens* (pp. 57-80). Butterworth-Heinemann.

THE VARIABILITY OF QUANTITATIVE TRAITS PARAMETERS OF FACULTATIVE WHEAT AFFECTED BY SOWING TIME

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Introduction: wheat (*Triticum aestivum* L.) is a staple food cereal for an estimated 35% of world population. Climatic changes are expected to affect more the wheat production cause to the heat and drought stresses. One of the genetic mechanisms for avoided these abiotic stresses are the use of an appropriate biologic material for minimize the effect of stress factors. Facultative wheat can be a viable alternative for mitigate the effect of unfavourable conditions on wheat grain yield.

Aims: the aims of this study were to investigate the behaviour of three facultative wheat varieties regarding the yield components, grain quality and rheological parameters as a result of genotype x environment interaction.

Materials and Methods: three facultative wheat varieties- two Romanian wheat varieties (Taisa and Ciprian) and one foreign variety (Lennox) was used as biologic material being sown in autumn and spring field condition at Agricultural Research and Development Station Turda. Quantitative traits were analysed (number of grain/spike, weight of grains/spike, thousand kernel weight, hectolitic weight) alongside by grain quality traits (protein content, wet gluten content, Zeleny index) and rheological parameters (dough extensibility- L, dough tenacity- P; L/P ratio, deformation energy- W).

Results: the results shows that the sowing time has a significant effect on wheat agronomic trait. Taisa and Lennox varieties has a significant reaction on grain quality parameters when they are sown in spring compared to autumn sowing. Regarding the rheological parameters these are most similar regardless to sowing date.

Conclusion: the use of facultative wheat has a major advantage for farmers due to the shifting the sowing time. The accumulation of assimilates in wheat grains can be different according to the specific genotype adaptability.

Keywords: facultative wheat, grain quality, quantitative traits, rheological parameters

THE RESPONSE TO NATURAL INFECTIONS WITH *ERWINIA AMYLOVORA* (BURRILL) OF FIVE QUINCE (*CYDONIA OBLONGA* MILL.) CULTIVARS IN BISTRITA AREA, ROMANIA

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Introduction: Quince is the bright yellow fruit of *Cydonia oblonga* Miller, a tree native to northern Iran and TransCaucasia (Abdollahi, 2019) that is presently grown in most temperate regions of the world. *Erwinia amylovora* Burrill, the bacteria which causes the fire blight of rosaceous plants is a wide-spread pathogen of quince. In Transylvania, the quince growing is in decline mainly because of the fire blight infections that often occurred in the last twenty years. The climate conditions in 2022, in Bistrita region, were favorable for bacterial diseases.

Aims: The aim of this study was to assess the response to natural infection with *Erwinia amylovora* of five quince cultivars grown in Bistrita region, in the climatic conditions of the year 2022.

Materials and Methods: The biological material was represented by the following cultivars: 'Aurii', 'Adonia', 'Cedonia', 'Bereczki' and 'Aromate'. Trees were planted in 2021 at Fruit Research and Development Station Bistrita. The density of the conventional orchard is 1111 trees/ha, cultivated in three replications with two plants per replication. The visual observations were performed in June and September. We assessed the frequency of blighted shoots and collected the meteorological data. The data analysis was performed with Microsoft Excel using One-way Anova test and then the Least Significant difference was calculated.

Results: The results revealed that 'Aromate' and 'Aurii' had better behavior than the cultivar 'Bereczki', while 'Adonia' and 'Cedonia' appeared to be the most sensitive in the climatic conditions of Bistrita. The second wave of infections, proved to be less damaging than the first one.

Conclusion: Although all five cultivars were damaged by *Erwinia amylovora*, they behaved differently in the climatic conditions of Bistrita area.

Keywords: bacterial disease, blighted shoots, frequency of infection

References

1. Abdollahi H. (2019) A review on history, domestication and germplasm collections of quince (*Cydonia oblonga* Mill.) in the world. Genetic Resources and Crop Evolution, 66-5, 1041-1058.

DATA ANALYSIS ON SOIL MICROBIAL FUNCTIONAL PROFILE

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Introduction: The current agronomic context requires a better understanding of microbial processes in soil to find the best solutions to increase the quality of this substrate for crops. Microbial functional profile (in Ecoplates) is a fast and reliable solution to assess the shape effect of agronomic inputs on soil microbiome.

Aims: The aim of the paper is to analyse the potential use of microbial functional profile as a discriminator between agronomic practices.

Materials and Methods: The functional profile method uses small quantities of soil and provides information on microbial capacity to decompose a specific substrate. The output of analysis is a large database comprising 31 specific microbial profiles, along with the possibility of multiple synthetic index calculation.

Results: The classic approach on microbial functional profile relies on the assessment of average well development color and sum of microbial activities, supplemented by the computation of diversity indices as a comparison of functional diversity. The drawback in this approach is represented by the reduced performance of comparison and the low sensitivity of data analysis, which do not permit the assessment in relation to a targeted input. The next level in data analysis is the use of ordinations, which for the data output have a reduced ability to discriminate between different treatments. As an alternative to this type of analysis, the use of Detailed Exploration of Microbial Sociological Assemblage enables the use of the Ecoplate output in a more detailed analysis. Based on the selection of the control variant, there is the possibility to calculate the normal increase of activity for all functional groups and all the increases that exceed the maximum of control. On the other hand, the method enables the calculation of normal decreases and the ones that exceed the minimum recorded by the control.

Conclusion: Based on functional microbiome approach there is the possibility to assess the specific microbial profile of each functional ecological niche, which gives a more accurate view on soil microbiome in relation to targeted agronomic inputs.

Keywords: soil condition, laboratory techniques, rhizobia

References

1. Stoian, V., Vidican, R., Florin, P., Corcoz, L., Pop-Moldovan, V., Vaida, I., ... & Pleșa, A. (2022). Exploration of Soil Functional Microbiomes—A Concept Proposal for Long-Term Fertilized Grasslands. *Plants*, 11(9), 1253.
2. Nakamura, M., Terada, C., Ito, K., Matsui, K., Niwa, S., Ishihara, M., ... & Tokuchi, N. (2022). Evaluating the soil microbe community-level physiological profile using EcoPlate and soil properties at 33 forest sites across Japan. *Ecological Research*, 37(3), 432-445.
3. Jacobsen, C. S., & Hjelmsø, M. H. (2014). Agricultural soils, pesticides and microbial diversity. *Current opinion in biotechnology*, 27, 15-20.

SESSION 2: ENVIRONMENTAL PROTECTION

DEVELOPMENT OF THE COMPETENCE CENTER FOR THE IMPLEMENTATION OF THE EU MISSION “RESTORE OUR OCEAN AND WATERS” THROUGH PUBLIC-PRIVATE PARTNERSHIPS IN THE FIELD OF RDI

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Introduction: The Competence Center was developed to create a sustainable, predictive and simplified environment for the development of business activities, increasing access to financing, through the development of tools adapted to the needs of businesses.

Aims: (1) Development of integrated observatory system for lower Danube basin; (2) Identification of nature-based solutions and business for river, wetland and coastal system resilience; (3) Design of innovative technologies for water pollution abatement – towards zero pollution; (4) Empower stakeholders and local community to foster societal transformation towards sustainability; (5) Development of the National Research Infrastructure Road maps and policy instruments as support for the EU mission 3.

Materials and Methods: A group of four Romanian universities, one research and development institute, and five small medium enterprises have joined into the “Competence Center on Lower Danube Basin-coastal Black Sea ecosystems protection and restoration” to develop a complex scientific research agenda according to EU Mission 3 targets, by proposing and implementing five specific and complementary projects.

Results: The specific projects that will be implemented within the Competence Center are the following: SP1. Model-driven decision support solutions (MDSS) for complex ecological systems; SP2. Integrated analysis of ecosystems for conservation and ecological restoration; SP3. Community development through sustainable blue tourism entrepreneurship and ecological restoration of coastal and marine areas; SP4. Sustainable bio-products, added-value products and energy from marine macroalgal: a step toward circular economy; and SP5. Integrated solutions for water pollution abatement – towards zero pollution.

Conclusion: the development of the Competence Centre offers important opportunities, such as: collaboration with regional and local authorities that joined the EU Missions, new submissions to Horizon EU Missions calls, participate in national programmes correlated with EU missions, or participate in co-creation activities with local and regional stakeholders.

Keywords: Competence Center, EU missions, lower Danube basin

Acknowledgement: This study was financially supported by the PNRR-III-C9-2022 – I5 Project, financing contract no. 760010/30.12.2022, code 18/16.11.2022.

ANALYSIS OF GLYPHOSATE AND ITS DERIVATIVES IN DIFFERENT MATRICES

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Introduction: Among all known compounds with herbicide activity, N-phosphonomethylglycine, commonly known as glyphosate, has been the most commercially successful. All other plant protection products, apart from undoubted advantages, they also have certain limitations and disadvantages.

Aims: There is currently considerable public interest in the safety of its use in the context of human health. A lively debate is ongoing on this topic, but regardless of who is right in this dispute, the use of glyphosate should be under strict control.

Materials and Methods: Glyphosate and its derivatives can be determined by various analytical methods and techniques. Usually, these are separation methods with suitable detectors such as high-performance liquid chromatography (HPLC) and gas chromatography (GC); capillary electrophoresis (CE); as well as spectrophotometric methods, and immunoenzymatic methods, among which are ELISA tests, and recently ion chromatography and related techniques.

Results: The scientific literature on the study of glyphosate and its derivatives is extensive. Studies are primarily concerned with their determination in surface, and river waters, soils and plants in agricultural areas, and in air and rain samples.

Conclusion: Glyphosate has come a long way from the world's best-selling herbicide to a substance the use of which is under evaluation and potentially significantly restricted. Therefore, contingency plans should not only focus on a glyphosate-free crop scenario, but should address crops with limited herbicide availability. For this purpose, it is necessary to use suitably sensitive, selective, repeatable and available also in laboratories performing routine analyses methods and measurement techniques.

Keywords: analytical methods, environment, food, glyphosate

References

1. Klingelhöfer, D.; Braun, M.; Brueggmann, D.; Groneberg, D. A. (2020). Glyphosate: How do ongoing controversies, market characteristics, and funding influence the global research landscape? *Science of The Total Environment*. 765: 144271.
2. Valle, A. L.; Mello, F. C. C.; Alves-Balvedi, R. P.; Rodrigues, L. P.; Goulart, L. R. (2018) Glyphosate Detection: Methods, Needs and Challenges. *Environmental Chemistry Letters*. 17: 291–317.
3. Michalski R., Pecyna-Utylska P. (2023). Determination of glyphosate and its derivatives by ion chromatography methods. Review. *Journal of Separation Sciences*. 46/12: 2300038

EVALUATION OF THE POSSIBLE USE OF FLAX (*Linum usitatissimum* L.) IN PHYTOREMEDIATION OF SOILS POLLUTED WITH HEAVY METALS

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Introduction: Nowadays, due to increased industrialization and population growth, the problem of heavy metal soil degradation is becoming more and more important. Phytoremediation is a method with huge potential for remediation of polluted soils, using different plant species with good biomass, fast growth, tolerance to contaminants and efficient detoxification mechanisms.

Aims: The aim of this research is to evaluate the possibilities of using flax (*Linum usitatissimum* L.) plant for phytoremediation of soils degraded with heavy metals from Baia Mare, Romania.

Materials and Methods: The samples taken into account for the analysis consisted of: 4 soil pots samples from 4 representative points from Baia Mare and a control sample taken in 3 replicates; flax (*Linum usitatissimum* L.) plant, the Vasilelin - Romanian fiber variety. Determinations of heavy metals in soil and plants probes were performed using an ElvaX Mobile - a portable Energy Dispersive - X-Ray Fluorescence (ED-XRF) analyser.

Results: Results showed that the soil samples are moderately acidic with pH in H₂O - $5,60 \pm 0,01$. Concerning heavy metals content from soil and plants samples, the analysis performed showed high concentrations for all of the studied trace elements (Cu, Pb, Cd, Zn). The highest accumulation of Pb was detected in soil samples - 3130 ppm and for Zn – 1700 ppm in plant samples. The lowest heavy metals content values was registered for Cd, both in soil and plants samples.

Conclusion: The results of the study revealed that *Linum usitatissimum* L. may potentially be useful for restoring heavy metal contaminated sites. Phytoremediation is a very promising and green approach for remediation of polluted sites but it is uncertainty about the use of flax in open field conditions where plant have to survive under various abiotic and biotic environmental pressures and polluted environment.

Keywords: phytoremediation, heavy metals, *Linum usitatissimum* L, ED-XRF, soil degradation

THE IMPACT OF HIGH TEMPERATURE ON *RAPHANUS SATIVUS* PLANTS GROWTH AT ELEVATED CARBON DIOXIDE

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Introduction: Global warming caused by humans reached approximately 1 degree Celsius, between 0.8 and 1.2 degrees Celsius above preindustrial levels in 2017. According to current measurements, the global mean temperature in 2022 has been around 0.86 °C higher than the 20th-century average of 13.9 °C. The amount of carbon dioxide in the atmosphere has increased more than ever in recent years, from 385 ppmv in 2010 to 416 ppmv in December 2022. Since the start of the Industrial Age, this rise represents a 47 percent gain.

Aims: We studied the influence of elevated carbon dioxide (400, 800, and 1200 ppmv) on plants from the *Brassicaceae* family (*Raphanus sativus* var. Johanna, *Raphanus sativus* var. Helga, *Raphanus sativus* var. Rozaria) subjected to heat stress in order to study the impact of both stressors on the photosynthetic parameters, terpene emission, and biochemical characteristics.

Materials and Methods: The plants were grown at different concentrations of carbon dioxide (400 ppmv, 800 ppmv, 1200 ppmv) and then submitted to heat stress for 5 minutes at different temperatures (25 – 60 °C). The photosynthetic parameters (net assimilation rate, stomatal conductance to water vapor) have been determined using a gas-exchange system for both control and treated plants. Gas chromatography-mass spectrometry techniques have been used to determine the emission of volatile organic compounds (monoterpenes). Furthermore, the total phenolic compounds, the total concentration of flavonoids, and the photosynthetic pigments present in the plants have been determined.

Results: We have shown the photosynthetic parameters as assimilation rates and stomatal conductance to water vapor decrease for plants grown at elevated CO₂. Furthermore, the concentration of the primary and secondary metabolite in the plant leaves decreases with the stress strength, and the VOCs emission decrease for plants after the heat stress. Regarding the total phenols, the total concentration of flavonoids and the photosynthetic pigments present in the plants decrease drastically after a short period of heat stress.

Conclusion: In the present research work, we demonstrated that elevated carbon dioxide could negatively impact plants, making them less tolerant to heat stress.

Keywords: elevated carbon dioxide, heat stress, photosynthesis, secondary metabolites

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THE SYNERGIC EFFECT OF ELEVATED CARBON DIOXIDE AND BIOTIC STRESS ON PLANTS PHYSIOLOGIC PARAMETERS AND SECONDARY METABOLITES

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Introduction: Carbon dioxide concentrations in the Earth's atmosphere have been gradually growing as a result of human activities such as the use of fossil fuels, deforestation, and industrial operations. The annual rate of rise was at 2-3 parts per million (ppm). The amount of carbon dioxide in the atmosphere was 423 ppm in June 2023. Higher CO₂ concentrations can impact the plants that insects interact with, altering the plants' growth, nutritional content, and chemical composition.

Aims: We studied the influence of elevated carbon dioxide (800 and 1200 ppm) on plants from the *Brassicaceae* family in order to determine how those plants respond to different biotic stress.

Materials and Methods: The control plants have been grown at an actual CO₂ concentration – 400 ppm, while the priming plants have been raised at elevated carbon dioxide (800 and 1200 ppm). We used plant species from *Brassicaceae* family (*Brassica oleracea*, variety *capitate*, *Brassica oleracea*, variety *botrytis*,) grown at high carbon dioxide to test their sensitivity to cabbage moth (*Mamestra brassicae*), cabbage white (*Pieris brassicae*), Greenhouse whitefly (*Trialeurodes vaporariorum*).

Results: We found that photosynthetic parameters, volatile organic compound emissions, chlorophyll content, and total polyphenol concentrations change in plants growing in high carbon dioxide environments. Furthermore, all secondary metabolites concentrations have been modified differently for plants grown at elevated carbon dioxide.

Conclusion: The research presented here demonstrates that elevated CO₂ levels negatively affect plant health, decreasing their ability to withstand biotic stress.

Keywords: elevated carbon dioxide, photosynthesis, secondary metabolites, biotic stress

Acknowledgment: This work was supported by a grant from the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2020-0410.

THE NUTRACEUTICAL POTENTIAL OF RASPBERRY AND BILBERRY IN ENVIRONMENTAL SPECIFIC CONDITIONS – A REVIEW

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Introduction *Rubus idaeus* L. (raspberry) and *Vaccinium myrtillus* L. (bilberry), are species known for their rich content of bioactive substances with benefits for human health, such as antioxidants, vitamins, and phenolic compounds. Bistrita-Năsăud county offers a particular climatic environment favorable for the development of above-mentioned species.

Aims: The proposed study aims to analyze the bibliographic resources in which aspects regarding the nutraceutical potential of *Rubus idaeus* L. and *Vaccinium myrtillus* L. are addressed and treated in the specific climatic context of Bistrița-Năsăud County.

Materials and Methods: To carry out the present research, a bibliographic study was initiated and carried out. In this sense, we mention the fact that titles from the bibliography useful for the undertaking of the scientific approach were selected.

Results: The research shows that lots of methods are used worldwide for the chemical analysis performed to determine the content of bioactive substances such as antioxidants, vitamins and phenolic compounds in the fruits of the two studied berry species. The results of the implementation of the specific analyze methodology revealed significant concentrations of antioxidants in both plants, with variations by species. At the same time, our study shows that the content of vitamins and phenolic compounds was influenced by climatic factors area specific.

Conclusion: Our study shows that raspberry and bilberry are valuable sources of bioactive substances with nutraceutical potential. The research also emphasizes that climatic factors must be taken into account for the analyzing their nutritional potential when these species are used as raw materials in order to obtain products with benefits to human health.

Keywords: antioxidants, climatic factors, phenolic compounds, vitamins

HEAVY METAL SOIL POLLUTION - LEGISLATIVE PROVISIONS AND IMPACT ON HUMAN HEALTH

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Introduction: All soils contain heavy metals, but concentrations vary considerably and some cannot be detected by analytical procedures. They are permanent because they are not subject to degradation or breakdown by bacteria and accumulate in the tissues of organisms through the process of bioaccumulation.

Sources of heavy metals in the environment are diverse and complex, of natural and anthropogenic origin. They affect the soil and subsoil, groundwater, surface water and not least the atmosphere.

Aims: This paper aims to analyse the international, European and national (Romanian) legislation on heavy metal soil pollution and its impact on human food safety.

Materials and Methods: As far as the research methodology is concerned, in this work the comparative method was used between the present legislation in force regarding the regulated standards on the content of heavy metals present in the soil, namely the international, European and national (Romanian) legislation.

Results: While there are few significant differences in the case of essential metals, the legislative variations are considerable, with the exception of mercury, where the regulations show similar values. For nickel (Ni), zinc (Zn), cadmium (Cd) and chromium (Cr), national and European legislation have the same reference values.

Conclusion: As we can see, the legislative provisions vary according to different geographical regions and levels of industrialisation. Romanian legislation currently has no maximum permitted value for the chemical element arsenic, and the reference values are taken from those mentioned at European level. As regards Ni, Zn, Cd and Cr, the national legislation together with the European one presents the same reference values.

Keywords: food safety, heavy metals, human health, soil pollution

References

1. Coman M., Oros V., Făluş B., Pop R., (2010a). Poluarea solurilor cu metale grele – probleme specifice pentru zona Baia Mare, ProEnviroment, 3, pp. 155-158.
2. Lăcătuşu R., (2014). Contributions regarding heavy metals flow within soil-plant-animal system in polluted Areas, Acta Metallomica – Meemb, Tome XI, No. 1, pp. 73-88.

THE IMPACT OF FOREST BIOMASS ON SOIL QUALITY – A REVIEW

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Introduction: This forest biomass harvesting has a high impact on soil in forests. This issue also has a high ecological and economic importance because rational forest biomass harvesting can contribute to solving the problems connected to the sustainable management of forest resources.

Aims: The purpose of the research is to obtain a critical evaluation based on bibliographical studies of the changes induced by biomass harvesting on soil properties.

Materials and Methods: Material and method include literature review and field studies on the effects of biomass harvesting on soil chemical composition, structure and biodiversity. The bibliographic sources consisted of specialized books, scientific articles, summaries of some research projects, international databases, etc.

Results: The results summarize that biomass harvesting can cause soil degradation, by decreasing the content of organic matter, changes in pH and decreasing the diversity of microorganisms. However, variations in results are influenced by harvesting techniques, soil type and management measures adopted.

Conclusion: According to our bibliographical study, the integrated approach to biomass harvesting is of great importance considering the local specificity and maintaining the ecological functions of the soil. Thus, this paper provides an insight into the challenges and strategies for sustainable exploitation of forest resources in the northwestern region of Transylvania.

Keywords: bibliographical study, degradation, resources, sustainable management

SESSION 3: FOOD SCIENCE AND TECHNOLOGY

NEW TECHNOLOGIES IN THE SERVE OF FOOD CRISIS AND AGRONUTRITION

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New technologies have the potential to play a significant role in addressing food crises and improving agronutrition. Food crises often stem from a combination of factors, including climate change, war, population growth, limited resources, and distribution challenges. Agronutrition focuses on enhancing the nutritional value of agricultural products.

Some new technologies that can help address these issues include precision agriculture, valorization of food waste, adoption of smart agricultural practices and application of modern computing tools, smart packaging and other technologies for process optimization.

By harnessing these technologies and promoting their adoption, we can make significant strides in addressing food crises, improving agronutrition, and building a more sustainable and resilient food system for the future.

ADVANCED TECHNOLOGIES IN SPAIN: FROM 3D FOOD PRINTING TO VIRTUAL REALITY EXPERIENCE

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Food 3D printing and virtual reality are some of the most promising and innovative techniques in the food industry. Over time, these technologies have undergone a fascinating evolution, giving rise to several revolutionary applications in gastronomy, personalized nutrition, and the creation of cutting-edge consumer experiences. In this conference authors present the results obtained in these areas during the last few years.

On 3D food printing the iFood Team has studied the effect of temperature, composition, or printer parameters on the characteristics of printed samples. Also, the use of different printing materials has been evaluated. Rheological and textural properties of samples before or after the printing process are discussed to validate their use as variables to define sample printability. On the other hand, the use of a double-head printer is shown as a tool to obtain inhomogeneous distribution on several components by 3D printing. Finally, new technologies to apply heat during the printing process are presented.

The world of food, including food companies and gastronomy, has been impacted by the technological advancements driven by the fourth industrial revolution: the “Digital Industry 4.0”. Due to the rapidity of lifestyle changes in the population, the magnitude and quality of developments in the food and beverage industries and the world of gastronomy are increasing daily. Consumers are interested in the effects of these technologies on their food preferences. Based on that, our team investigated the opportunities that virtual reality offers to sensory science. We studied the impact of immersion in a virtual environment on visual expectations of food by comparing virtual and real contexts.

Keywords: Food Technology Research, 3D food printing, virtual reality, consumer experience

EXTERNAL FIELDS AS MILD EXTRACTION AND SEPARATION STRATEGIES FOR MICROALGAL FUNCTIONAL FOOD AND NUTRACEUTICAL INGREDIENTS

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Introduction: Microalgae are single cell plants which convert carbon dioxide into functional ingredients such as proteins, carbohydrates, lipids, pigments and secondary metabolites. Their conversion efficiency is generally regarded as higher than the one of higher plants, while the resource input such as fertilizers, fresh water, pest control and quality soil, is significantly lower or even absent. However, due to high cultivation and processing costs, with the latter often being the highest part of total production costs, wide-scale adoption of these novel ingredient sources remains out of reach.

Aims: One strategy to tackling this issue is to both simplify the processing of this biomass, as well as to go beyond current single-product approaches, and look towards multiproduct biorefineries. Using mild treatment strategies such as external fields could enable this. For instance, unique phenomena occur when combining microfluidic channels with laser, electric, inertia and acoustic fields. These allow precise manipulation, extraction and even separation of microalgal cells and their structures.

Materials and Methods: The present research employs high frequency ($\approx 2\text{MHz}$) acoustic standing waves to harvest microalgal cells in a targeted fashion based on their biomass composition. Subsequently, lower frequency ($\approx 0.5\text{MHz}$) acoustic pulsing waves were employed to gently open the microalgal cells, releasing their components. The separation potential of the released cell structures based on their acoustic properties was further confirmed *in silico*.

Results: Thus, acoustic fields were used to manipulate and mildly open *Tisochrysis lutea* microalgal cells in order to further fractionate their main cell components. Precisely designed microfluidic chips were manufactured and tested to assess the separation efficiency of these approaches.

Conclusion: Learning how to harness these phenomena could become a cornerstone for many bioprocess applications ranging from novel functional food ingredients to the development of nutraceutical and even pharmaceutical compounds.

Keywords: Acoustophoresis; Algal multiproduct biorefinery; External fields; Microfluidics

ACTUALITIES AND PERSPECTIVES IN THE USE OF MEALWORMS (*Tenebrio molitor* Linné) AMONG EDIBLE INSECTS

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Introduction: Edible insects have grown in popularity as a food source, solving global food security challenges (Van Huis et al., 2013). Entomophagy has a long history in many civilizations throughout the world. However, insect ingestion is frequently seen unfavorably in Western society. *Tenebrio molitor*, *Acheta domesticus*, *Gryllodes sigillatus* and *Hermetia illucens* have all been approved for human consumption by the European Union. *Tenebrio molitor* is notable for its nutritional value. Their short maturity period of roughly 3-6 months enables quick breeding and great egg output. The mealworm has a short life cycle, lasting about 4-6 weeks from egg to adult.

Aims: *Tenebrio molitor* study was carried out to evaluate the influence of different substrates on larval growth and weight increase. Temperature and substrate were discovered to have an effect on their development.

Materials and Methods: Larvae were received USAMV in Cluj-Napoca. They were reared in plastic boxes with oat feed substrate and carrots for hydration. The average temperature 20° C. Different substrates were tried, corn flour, wheat germ, oat bran, and corn flakes.

Results: Higher temperatures slowed egg hatching and shortened larval lifespan. Wheat germ had the highest average growth of 2.32 cm among the substrates examined and the largest average weight increase (1.78 g).

Conclusion: Because of their quick maturity time and great egg output, *Tenebrio molitor* is ideal for farming and flour production. Temperature and substrate influence their growth, with wheat germ providing the best circumstances. It has the potential to be a sustainable food insect choice.

Keywords: Edible insects, lifecycle, mealworm

References:

1. Van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G., & Vantomme, P. (2013). Edible insects: future prospects for food and feed security (No. 171). Food and agriculture organization of the United Nations.

HARNESSING BIOACTIVE COMPOUNDS FROM NATURAL SOURCES FOR HEALTH AND WELL-BEING: ADVANCES IN FERMENTATION PROCESSES AND MICROBIAL PRODUCTION

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This article explores the significance of bioactive compounds in promoting health and vitality. Inadequate food represents one of the leading causes of global premature death and disability from non-communicable diseases (NCDs). Understanding the impact of long-term nutrition and lifestyle choices on progressive disorders is crucial. A healthy and nutritious diet provides essential elements for vital processes in the human body. Bioactive compounds have gained attention for their antibacterial, anticancer, antioxidant, and cardiovascular benefits. They enhance food properties and have potential applications in supplements, cosmetics, and medicine. This article highlights the potential of *Schizochytrium limacinum*, a marine microorganism, in producing valuable compounds such as docosahexaenoic acid (DHA). Fermentation processes offer cost-effective and scalable methods for utilizing renewable resources. *Lactobacillus kunkeei*, a lactic acid bacterium, plays a crucial role in honey fermentation. The article emphasizes the importance of monitoring microorganisms and understanding their growth characteristics in bioprocessing. Overall, this article showcases the advancements in utilizing bioactive compounds for health and well-being through fermentation processes and microbial production.

Keywords: bioactive compounds, bioprocessing, nutrition, docosahexaenoic acid (DHA), fermentation processes, *Lactobacillus kunkeei*, microbial production, *Schizochytrium limacinum*

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FUNCTIONALIZED IRON OXIDE NANOPARTICLES FOR BIOMEDICAL APPLICATIONS

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Introduction: Recently, newly generated iron oxide nanoparticles have been recommended as innovative iron supplements due to their low reactivity and high bioavailability compared to conventional anemia treatments (Elshemy, 2018). In this context, the interaction with cellular structures and their biological effects are still being investigated since they could limit nanoparticle clinical application (Garces et al., 2018).

Aims: To address this need, an *in vitro* study was conducted to examine the interaction between magnetic iron oxide nanoparticles and stomach and intestinal cells (HS-26, CaCo2, and DDL-1) and evaluate the nanoparticle dose-related toxicity.

Materials and Methods: An *in vitro* screening technique was performed to evaluate and compare the cytotoxic activity of iron oxide nanoparticles on human cells. First, the standard MTT colorimetric assay was used to measure cell growth, and cell viability was examined after 12, 24, and 48 hours. In correlation with the cell proliferation assay, the LDH activity assay was determined to demonstrate the cytotoxicity of the compound on the tumor cell line. Also, the investigation into the type of cell death was conducted by evaluating the activity of caspases, which is a crucial indicator and mediator of programmed cell death (apoptosis).

Results: The findings of the MTT test indicated that at a concentration of 250 g Fe/mL, tumor cell lines had their proliferation suppressed by around 10–15%. For the normal human fibroblast line, a slight proliferation of cells was observed at concentrations of 5 or 10 µg Fe/mL, respectively. On the other hand, at 150 g Fe/mL, an increased LDH concentration was recorded, suggesting that the cell membrane was damaged and LDH was being released into the extracellular space. Consequently, caspase activation was not detected in normal human or tumor cells.

Conclusion: These findings provide novel insight into the toxicology of iron oxide nanoparticles and highlight the need for a comprehensive evaluation of their clinical application. Therefore, iron oxide nanoparticles can be further studied for oral drug delivery in biomedical applications.

Keywords: evolution, *in vitro* digestion, olive leaf, microencapsulation, nanoencapsulation, phenolic

References

1. Elshemy, M. (2018). Iron Oxide Nanoparticles Versus Ferrous Sulfate In Treatment of Iron Deficiency Anemia In Rats. *Egyptian Journal of Veterinary Sciences*, 49(2), 103-109.
2. Garces, V., Rodriguez-Nogales, A., Gonzalez, A., Galvez, N., Rodriguez-Cabezas, M. E., Garcia-Martin, M. L., Dominguez-Vera, J. M. (2018). Bacteria-Carried Iron Oxide Nanoparticles for Treatment of Anemia. *Bioconjug Chem*, 29(5), 1785-1791.

EXPLORING THE GUT-BRAIN AXIS: POTENTIAL THERAPEUTIC IMPACT OF PSYCHOBOTICS ON MENTAL HEALTH

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Introduction: Over the last 10 years, there has been a growing interest in the relationship between gut microbiota, the brain, and neurologic-associated affections [1]. Understanding the therapeutic impact of gut bacteria on mental health is of utmost importance for increasing the well-being of the world's population [2].

Aims: We focus on understanding the relationship between gut microbiota and its impact on neurological and neurodegenerative illnesses. In addition, we aim to highlight the potential activity of psychobiotics as a therapeutic approach for the prevention and/or treatment of mental diseases.

Materials and Methods: A systematic literature search of various databases was conducted to identify relevant studies published in the last ten years. Articles were selected based on their focus on the gut-brain axis, psychobiotics and their impact on mental health. Studies involving both preclinical and clinical research were included to provide a comprehensive overview.

Results: The findings reveal a growing body of evidence suggesting that gut microbiota play a crucial role in influencing brain function, behavior, and mental health. Psychobiotics, which encompass certain strains of probiotics and prebiotics, have demonstrated the potential to modulate the gut-brain axis and ameliorate symptoms associated with psychobiotics can effectively treat neurodegenerative and neurodevelopmental diseases, such as depression, anxiety, autism, Attention-Deficit Hyperactivity Disorder, Alzheimer's disease, Parkinson's disease, schizophrenia, Huntington's disease, anorexia nervosa, and multiple sclerosis. The mechanisms underlying these effects include the production of neurotransmitters, regulation of inflammation, and modulation of neural pathways.

Conclusion: However, while the results are promising, the field is still in its early stages, and more clinical trials are warranted to establish the efficacy, optimal dosages, and long-term effects of psychobiotics.

Keywords: Dysbiosis, gut-brain axis, gut microbiota, mental health. Psychobiotics

References

1. Oroojzadeh, P., Bostanabad, S.Y. & Lotfi, H. Psychobiotics: the Influence of Gut Microbiota on the Gut-Brain Axis in Neurological Disorders. *J Mol Neurosci* **72**, 1952–1964 (2022). <https://doi.org/10.1007/s12031-022-02053-3>
2. Sandy Reyes-Martínez, Lorena Segura-Real, Ana Pamela Gómez-García, Emiliano Tesoro-Cruz, Luis A. Constantino-Jonapa, Amedeo Amedei, María M. Aguirre-García. Neuroinflammation, Microbiota-Gut-Brain Axis, and Depression: The Vicious Circle. *J. Integr. Neurosci.* **2023**, 22(3), 65. <https://doi.org/10.31083/j.jin2203065>

EXPANDED CEREALS VS EXTRUDED PRODUCTS: A CAROTENOID APPROACH

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Introduction: Expanded (puffed) cereals are made from whole grains, which make them a good source of nutrients with a positive impact on our health (Paznochta et. al., 2021). Nowadays, the food industry is more focused on extrusion, where products are made from starchy materials (Zhang and Peterson, 2018). Puffed cereals are made in a puffing gun where grains are subject to a high pressure and temperature for several minutes, followed by a shock caused by transferring into it a chamber with decreased temperature and low pressure which determines the expansion of grains according to Cattaneo et. al. (2015).

Aims: Taking into consideration that expanded technology developed and studied more on the side of extrusion technology, we will point out that puffed grains have a good nutritional value, according to studies till now. A new approach of expanded cereals will be necessary to promote them as a good source of nutrients that may have a beneficial effect for human health.

Materials and Methods:

Mainly materials used for puffing are whole grains including rice, rye, barley, wheat, etc. The samples used are evaluated on different aspects. One of them is their chemical composition. An example is total content of carotenoids (TCC) which is determined using chromatography analysis (Paznochta et. al., 2021).

Results: Expansion of whole grains has a lower effect on decreasing TCC than saw in extrusion, making them a better source of antioxidants.

Conclusion: It has been shown that expanded products are a valuable snack, as a good source of nutrients, mainly for using whole grain instead of refined flour as in extruded snacks.

Keywords: Carotenoids, extrudates products, puffed grains

References

1. Cattaneo S., Hidalgo A., Masotti F., Stuknyte M., Brandolini A., De Noni I. (2015). Heat damage and in vitro starch digestibility of puffed wheat kernels. Food Chemistry. 188 286–293.
2. Paznochta L., Burešová B., Kotíková Z., Martinek P. (2021). Carotenoid content of extruded and puffed products made of colored-grain wheats. Food Chemistry. 340 127951.
3. Zhang L., Peterson G. D. (2018) Identification of bitter compounds in extruded corn puffed products. Food Chemistry. 254 185–192.

TOWARDS CIRCULAR ECONOMY: AGRO-INDUSTRIAL BY-PRODUCTS ENABLING *IN SITU* ENZYME PRODUCTION FOR FOOD AND PHARMACEUTICAL APPLICATIONS

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Introduction: Enzymes have found extensive application in the manufacturing of over 500 industrial products. Moreover, nearly 90% of commercial enzymes are fabricated by protein engineering techniques. Leading biotech companies such as Novozymes, DSM, DuPont, and Roche prominently shape the global enzyme market. These companies are at the forefront of enzyme production and play a significant role in the industry. On the other hand, the manufacturing of enzymes is an expensive process. Solid-state fermentation (SsF) is a green process for enzyme production because it has a low cost, high yield, and can use agro-industrial by-products as substrate.

Aims: The study aimed at (I) substrate characterization and SsF using a fungus specialized in enzyme production and wheat bran as substrate; (II) enzyme identification, quantification and isolation; (III) quantifying the total reducing sugar release from fresh wheat bran hydrolyses with microbial enzymes.

Materials and Methods: The experiments were conducted using *Aspergillus awamori* DSM No. 63272. The total reduction sugar, enzymatic activity, organic acids and monosaccharides, enzyme isolation, TEM, differential scanning calorimetry – and thermogravimetric analysis were performed for the samples.

Results: The maximum value for cellulase was >35 FPU/g_{ds} on third day, endoglucanase on day 4, >140 U/g_{ds}, and glucoamylase activities >60 U/g_{ds} after 6 days of SsF. During hydrolysis, total reducing sugars increased considerably with a final value of ≥84 g/kg hydrolysed substrate after 72 hours.

Conclusion: The data reported in this study provides an example of how SsF, enzyme isolation and hydrolyse technologies can be combined to valorize wheat bran.

Keywords: hydrolysis, enzyme production, enzyme isolation, solid-state fermentation, wheat bran

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ITALIAN CITRUS FRUITS: FROM PEELS TO ESSENTIAL OILS; FORMULATION AND CHARACTERIZATION OF NANO-EMULSIONS

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Introduction: Kumquat (*Citrus Japonica*), Citron (*Citrus medica*), Orange (*Citrus sinensis*), Bergamot (*Citrus bergamia*), Lemon (*Citrus lemon*), and Tacle (*Citrus sinensis x Citrus clementina*) are citrus fruits specific to southern Italy. Their peels are important sources of essential oils (EOs) with manifold possibilities to be used as active antioxidant and antimicrobial ingredients in food, cosmetics, or pharmaceutical products.

Aim: The aim of the study was to maintain or even enhance the physical-chemical stability and functionality of the above-mentioned EOs through nano-encapsulation, as their uses are limited by their susceptibility to external factors such as light, temperature, pH, oxygen, and humidity.

Method: Citrus peels mixed with water are subjected to microwave-assisted extraction power (800 W) for one hour to obtain the EOs. The obtained essential oils were nano-encapsulated in nano-emulsions to preserve and enhance their properties and stability. In this study, nano-emulsions were prepared through ultrasonication, using citrus oils as the lipidic phase and Tween 80 and ethanol as a surfactant, and co-surfactant, respectively. Their behavior was evaluated by testing the antioxidant, antimicrobial, and stability capacities.

Results: The best extraction yield was obtained for bergamot, while the lowest was registered for citron and lemon. The PDI, turbidity, morphology, volatile profile, and bioactive properties were investigated and their stability was monitored under different environmental conditions (storage at room temperature, at 37°C, refrigeration, freezing). Each emulsion exhibited different degrees of gravitational separation, the ones stored at 37°C being the most unstable, showing coalescence and phase separation. The antimicrobial activity was tested against Gram-positive and Gram-negative bacteria, with a better response for the Gram-negative. Bergamot nano-emulsions show the best susceptibility against *E.coli*.

Conclusion: Our work aimed to find the best formulations to obtain stable functionalized nano-emulsions, which would be ready to be used in food as green additives or in medicine as non-invasive treatments. Therefore during method development and nano-emulsions characterization, not only the physicochemical properties but the food and human-friendly behavior have to be taken into consideration.

Keywords: bergamot, citron, kumquat, lemon, orange, tacle

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ENHANCEMENT OF CHEMICAL AND PHYSICAL ATTRIBUTES IN MACROALGAE-BIOBASED COATING MATERIALS USING AQUEOUS EXTRACTS FROM OLIVE LEAVES

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Aim: The objective of this study was to incorporate bioactive compounds extracted from olive leaves into biodegradable films designed for the preservation of perishable food items like fruits and vegetables.

Materials and methods: Olive leaves (*Olea europaea* L.) sourced from different regions in Greece were subjected to aqueous extraction, resulting in three extracts: olive leaves 1 (OL1), olive leaves 2 (OL2), and olive leaves 3 (OL3). The antioxidant potential and phenolic compound profile of these extracts were analyzed. Subsequently, these extracts were integrated into 1% sodium alginate solutions, and the resulting mixtures were cast into 90 mm Petri dishes to form solid biofilms. The alginate solutions' light absorption (at 600 nm) and antioxidant activity (using DPPH) were assessed. For the solid biofilms, various physical characteristics such as weight, diameter, density, and thickness were measured, alongside evaluating humidity, solubility in water, and water vapor permeability. Glycerol was added as a plasticizer to all three extracts in combination with alginate solutions.

Results: Significant differences were observed in the investigated parameters between the biofilms containing glycerol and those without the plasticizer, for all three extract variants used. **Conclusions:** Olive leaf extracts enhance the chemical and physical qualities of alginate-based coating materials.

Keywords: olive leaf extract, biofilms, bioactive compounds

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COMPARATIVE STUDY ON BETA-GLUCANS AND PROXIMATE COMPOSITION OF BARLEY SEEDS GENOTYPES OBTAINED IN DIFFERENT CROP SYSTEMS

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Introduction: Barley seeds offer a wide range of valuable compounds that contribute significantly to human nutrition and overall health status; they stand out as an excellent source of β -glucans, known to reduce cholesterol, enhance gut health and facilitate digestion. Leveraging the potency of barley's β -glucans, the food industry has the opportunity to enhance the nutritional profile of cereals, bread, pasta, snacks and other fiber-enriched products, thereby supporting cardiovascular wellness and digestive health.

Aims: This research seeks to assess several two-rowed spring barley genotypes obtained in different crop systems, evaluating their β -glucans' content and proximate composition to pinpoint ideal candidates suitable for functional foods' production.

Materials and Methods: The plant materials originate from field trials encompassing three crop system approaches: conventional (utilizing chemical fertilizers and pesticides), ecological (employing natural products) and a no-treatment control group. Representative grains of eight two-rowed spring barley cultivars were subjected to proximate analyses of a NIR Tango spectrophotometer, while β -glucans' levels were determined using the Megazyme mixed linkage kit, the spectrophotometric measurements being performed at 510 nm on a T80+ UV/VIS instrument. A chemometric data analysis was carried out to highlight similarities between the studied genotypes and to point up those exhibiting the most favorable quality parameters.

Results: The no-treatment approach yielded significantly higher average levels of β -glucans, proteins and fats in the studied spring barley genotypes, while the conventional treatment provided peak average outcomes for starch, sugar and ash content.

Conclusion: This study contributes valuable knowledge for the scientific communities, fostering a deeper understanding of how to harness barley's potential for improved human nutrition and overall well-being.

Keywords: two-rowed spring barley, beta-glucans, proximate analysis, beer, functional foods

EFFECTS OF GYPSUM APPLICATION AT DIFFERENT LEVELS OF ELECTRICAL CONDUCTIVITY OF THE NUTRIENT SOLUTION ON YIELD, QUALITY AND ANTIOXIDANT ACTIVITY OF STRAWBERRY GROWN IN COCONUT FIBER

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Research on strawberries (*Fragaria x ananassa* Duch.) was carried out in a greenhouse in 2022-2023 at the Department of Agriculture of the University of Naples Federico II. The experimental protocol was based on the factorial combination between the application of gypsum, plus an untreated control, and four levels of electrical conductivity (EC) of the nutrient solution, using a split plot design. The transplant of fresh seedlings was carried out at the end of October in coconut fibre substrate and the harvesting period occurred in March, April and May. The 2.2 mS·cm⁻¹ EC resulted in the highest yield and dry matter content. Gypsum application at weekly intervals did not significantly affect production. The highest values of soluble solids and texture were recorded at 2.7 mS cm⁻¹, though texture was not significantly different from 2.2 mS·cm⁻¹. Gypsum application resulted in soluble solids increase. The 2.2 and 2.7 mS·cm⁻¹ EC led to the highest levels of hydrophilic and lipophilic antioxidant activities as well as polyphenols and vitamin C. Gypsum application did not differ from the untreated control in terms of antioxidant activity and compounds. From the research carried out on strawberry grown in coconut fibre, it arose that the 2.2 mS cm⁻¹ EC of the nutrient solution showed the best effect on yield, generally not differing from 2.7 mS·cm⁻¹ regarding the quality of the 'fruits'.

Gypsum treatment represents an effective strategy to improve some important qualitative characteristics of strawberry 'fruits', such as texture, soluble solids and colour components, under the perspective of sustainable management of cropping systems.

Keywords: colour, dry residue, *Fragaria x ananassa* Duch., polyphenols, soilless, soluble solids texture, vitamin C

EXTRACTION OF FREE AND BOUND POLYPHENOLS FROM *SORGHUM BICOLOR*

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Introduction: Sorghum is a drought tolerant, gluten-free cereal, which is known for its abundance of polyphenolic compounds, mainly flavonoids and tannins. It is proved that these compounds have important health benefits as antioxidants, and anti-inflammatory (Awika, 2011). These compounds can be found in the seed walls in a free form or in a bound esterified form, which affects their digestion and utilization (Shen et al., 2018).

Aims: Bound polyphenols are important metabolites for bacteria, thus our aim was to evaluate the ratio of free and bound polyphenols in two sorghum varieties, and analyse the effect of extraction on the extractable polyphenol amount and their antioxidant activities.

Materials and Methods: Two red sorghum were included in this project. Brans were extracted three times using methanol: distilled water and acetone: distilled water solvents, then residues were digested using acid and extracted by diethyl-ether: ethyl-acetate solvent four times. TPC, TFC and CTC with antioxidant properties were measured using colorimetric methods.

Results: Different extraction solvent didn't have significant effect on the polyphenol content and antioxidant activities of sorghum samples, except for the free flavonoid content, which showed statistically significant differences between extraction variables, The bound polyphenol content of acetone extracted samples were significantly higher compared to methanol extracts as well.

Conclusion: In this work 2 high polyphenol source sorghum varieties were identified with the potential to use as a functional agent, but further investigation is necessary for extraction factors and optimalization.

Keywords: Antioxidants, polyphenols, *Sorghum bicolor*

References:

1. Awika, J. Sorghum Flavonoids: Unusual Compounds with Promising Implications for Health. In *ACS Symposium Series*; 2011; Vol. 1089, pp. 171–200 ISBN 978-0-8412-2636-4.
2. Shen, S.; R, H.; C, L.; W, W.; H, C.; J, S.; S, C.; X, Y. Phenolic Compositions and Antioxidant Activities Differ Significantly among Sorghum Grains with Different Applications. *Molecules* (Basel, Switzerland) **2018**, *23*, doi:10.3390/molecules23051203.

EVALUATING THE SOCIAL ASPECTS UNDER THE FRAME OF SUSTAINABILITY ASSESSMENT OF FRESH AND DRIED FRUIT SNACKS

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Introduction: Evaluating the social aspects under the frame of sustainability assessment of fresh and dried fruit snacks is a crucial step in ensuring that these products align with broader sustainability goals and principles. Sustainability assessment encompasses economic, environmental, and social dimensions, and the social aspect considers the well-being of individuals and communities involved in the production, distribution, and consumption of these snacks.

Aims: The aim of this study was to present a conceptual framework to evaluate the social aspects under the frame of sustainability assessment of fresh and dried fruit snacks.

Materials and Methods: Business Model Canvas (BMC), a strategic tool to outline their key components, value propositions, customer segments, revenue streams, and more. PESTLE analysis is a framework used to analyze and assess the external macro-environmental factors that can impact an organization, industry, or business.

Results: Development of a comprehensive business model canvas for the berry industry, highlighting its essential components and their significance in achieving sustainable success. Implementation of a PESTLE analysis that examines the political, economic, social, technological, legal, and environmental factors that impact the fresh and dried berries snacks value chain.

Conclusion: The Business Model Canvas provides a comprehensive framework for analyzing and optimizing a berry business. By evaluating and refining each component, businesses can enhance their understanding of customer needs, optimize their value propositions, and create sustainable revenue streams. The fresh and dried berries industry operates within a dynamic external environment shaped by various factors that can influence its growth, profitability, and sustainability. Conducting a PESTLE analysis allows one to understand the factors that impact their operations and to identify opportunities, mitigate risks, and make informed strategic decisions.

Keywords: Business model canvas, PESTLE analysis, social impact evaluation strategy

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A PREPARATION PROCEDURE OF SOME NATURAL DIETARY SUPPLEMENTS BASED ON COENZYME Q10 FROM CHICKEN HEARTS AND OIL PRESS CAKES

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Introduction: Coenzyme Q10 (CoQ10) is a lipid-soluble molecule in food matrices. The richest sources of CoQ10 are vegetable oils, fish oil, organs, and meat. CoQ10 can be extracted from food matrices using 2-propanol, a green solvent (Semeniuc *et al.*, 2023).

Aims: The current study proposes a preparation procedure of some natural dietary supplements based on CoQ10 from lyophilized chicken hearts, respectively, press cakes of rapeseed, sunflower, pumpkin, and walnut.

Materials and Methods: Preparation of dietary supplements consisted of homogenizing the powders obtained from these matrices with 2-propanol, followed by sonication, overnight maceration, collecting the liquid phase and filtering it under vacuum, removing the solvent by rotary evaporation, eliminating the 2-propanol traces under a slow stream of nitrogen, and, finally, packaging in 10-mL amber glass bottles. These were kept at room temperature for nine months to evaluate the change in the active principle content. Depending on the dietary supplement, 30-50 mg of the sample was dissolved in 2 mL of n-hexane/2-propanol mixture (3:1, v/v), then subjected to HPLC-DAD analysis for determination of CoQ10 content as described by Semeniuc *et al.* (2023).

Results: Dietary supplements prepared from pumpkin and walnut press cakes had a three-month shelf-life regarding CoQ10 stability; those from lyophilized chicken hearts, rapeseed and sunflower oil press cakes were less stable at ambient storage.

Conclusion: The preparation procedure proposed in this study is simple and easily adapted for large-scale production; it uses only a single extraction solvent, 2-propanol.

Keywords: Coenzyme Q10, food matrices, natural dietary supplements, preparation procedure

References

1. Semeniuc C.A., Ranga F., Podar A.S., Ionescu S.R., Socaciu M.-I., Fogarasi M., Fărcaș A.C., Vodnar D.C. and Socaci S.A. (2023). Determination of coenzyme Q10 content in food by-products and waste by high-performance liquid chromatography coupled with diode array detection. *Foods*. 12(12):2296.

EVOLUTION OF THE PHENOLIC COMPOUNDS BY MICROENCAPSULATION AND NANOENCAPSULATION OF OLIVE LEAF EXTRACT DURING GASTROINTESTINAL DIGESTION

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Introduction: Olive leaf extract is characterized by a high content of phenols and flavonoids (oleuropein, luteolin, and their derivatives), presenting functional and healthy properties¹. However, the bitter taste of phenolic substances and their physicochemical instability still limit their use as free compounds in food products. Microencapsulation and nanoencapsulation could represent promising techniques to increase the stability and bioavailability of polyphenols and mask off-flavors.

Aims: This study evaluates the phenolic profile of micro- and nano-encapsulated olive leaf extract in biscuits during the INFOGEST static *in vitro* digestion, aiming to enhance stability and sensorial properties.

Materials and Methods: Ultrasound-assisted extraction and chromatography characterized the extract, while spray drying (maltodextrin-glucose) and nano-encapsulation (maltodextrin, whey protein isolate, and arabic gum) techniques were used with specific solutions.

Results: Encapsulated formulations underwent microscopy (TEM, SEM) and encapsulation efficiency analysis. Micro- and nano-encapsulation improved biscuit functionality by enhancing phenolic stability during digestion. However, the highest concentration adversely affected sensory and textural parameters. According to the *in vitro* results, the biscuits enriched with olive leaf extract can be considered a proposal for functional foods.

Conclusion: These findings contribute to developing functional food products enriched with bioactive compounds, providing improved health benefits while maintaining sensory attributes.

Keywords: evolution, *in vitro* digestion, microencapsulation, nanoencapsulation olive leaf, phenolic

CIRCULAR ECONOMY STRATEGIES IN THE AGRI-FOOD SYSTEMS ACROSS EUROPE

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Introduction: European Union is increasingly promoting awareness of the circular economy agenda. However, the implementation of circular bioeconomy concept within regions necessitates supportive policies promoting side streams usage and recycling. Effective policy measures play a crucial role in the achievement of circular economy targets, fostering innovation, and facilitating network synergies that enable stakeholders to address the multifaceted challenges posed by initiatives related to the circular economy, encompassing social, environmental, economic and strategic dimensions.

Aims: This study reports on the most recent environmental policies in Europe, including the circular economy framework for a cleaner and more competitive Europe.

Material and methods: A comprehensive literature review was conducted with focus on the circular economy strategies in the agri-food systems within EU and Member States.

Results. The analysis exposes a variety of scenarios and opportunities for effectively planning, strategizing, coordinating, implementing, and evaluating circular economy initiatives within sustainable agro-food supply chains in Europe.

Conclusion: Examining the historical progression of European Policy, it becomes evident that it is marked by a series of initiatives and tools that entail substantial financial investments and encompass overarching objectives related to innovation, growth, and the mitigation of climate change. It's important to highlight that in addition to European policy measures, member states and regional governments have introduced their own tailored actions within this shared framework, while both private and public entities have made additional contributions to research and the advancement of new technologies in this area.

Keywords: agro-food systems, circular economy, regulatory framework

SOURDOUGH FERMENTATION WITH LACTIC ACID BACTERIA FOR SUGAR REDUCTION IN BAKED GOODS

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Introduction: High-sugar foods, including baked goods, have been linked to various health problems like obesity, diabetes and cardiovascular diseases. As a result, there is a growing demand for healthier options that can retain the sensory properties and quality of baked goods while reducing sugar content. Sourdough fermentation has garnered interest as a possible solution due to its capacity to improve the texture, flavour, and nutritional characteristics of baked goods.

Aims: This review is focused on analysing the capacity of sourdough to reduce the sugar content in baked goods through the metabolic traits of lactic bacteria to produce polyols.

Literature review: In order to find arguments for our hypothesis, literature survey was performed on recent articles from 2014-2022. Findings and results were re-examined and reconsidered.

Results: The study explored the potential of sourdough fermentation with lactic acid bacteria (LAB) as a viable method to reduce sugar while improving product quality. Polyols are commonly used as sweeteners for sugar reduction, offering both sweetness and volume to bakery products as a 1:1 substitute for sucrose. Sourdough plays a crucial role in enhancing various properties of bread dough, including technological, nutritional, organoleptic, and shelf-life properties. Lactic acid bacteria from the genera *Leuconostoc* and *Bacillus* produce various polyols (mannitol, xylitol, erythritol, maltitol, sorbitol, lactitol) and exopolysaccharides and have a high capacity to reduce the amount of sugar in bakery products due to their sweetening properties.

Conclusion: *Leuconostoc citreum* was utilized as the primary microorganism for sourdough fermentation as part of the initiative to lower sugar levels in baked goods.

Keywords: baked goods, LAB, sourdough, sugar reduction

RESEARCH ON FRUITING POTENTIAL OF THREE *PLEUROTUS* SPP STRAINS

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Introduction: *Pleurotus* mushrooms are widely known and cultivated due to their gastronomic properties along their adaptability to various substrates, in addition to their therapeutic qualities. A sustainable mushroom farming demands the use of a premium biological material (spawn) in order to generate high and consistent yields of fruiting bodies.

Aims: The purpose of the research was to investigate the fruiting potential of three *Pleurotus* spp. strains that were propagated through multiple biotechnological approaches and cultivated on both culture media and substrates produced with agro-industrial byproducts.

Materials and Methods: As biological material, 3 *Pleurotus* spp. strains were used: PoM-77 (*P. ostreatus*), PcM-98 (*P. columbinus*) and PeM-41 (*P. eryngii*). The culture media and substrates were labeled as follows: V0 (control), V1 (white grape marc), V2 (red grape marc), V3 (beer waste), V4 (corn cobs), V5 (coffee grounds) and V6 (fruit waste). For the production of the grain spawn, precooked wheat caryopses were homogenized with calcium amendments and inoculated solid and liquid inoculum. In order to produce the liquid spawn, Erlenmeyer flasks containing liquid media were inoculated with liquid inoculum. The total weight of the substrate was 94.5kg, which was distributed among 189 bags. Inoculation was performed employing a 5% spawn rate, followed by a 2-3 weeks incubation period at 24-26°C.

Results: The variants supplemented with brewery by-product (V3) produced the best results for all three *Pleurotus* strains. The most productive commercial mycelium for *P. ostreatus* strain was grain spawn from solid inoculum. *Pleurotus columbinus* produced the most productive mycelia from solid inoculum on granular support, whereas *Pleurotus eryngii* provided superior results primarily on same spawn type as *P. columbinus*.

Conclusion: Mushroom farming is an environmentally friendly alternative which bioconverts lignocellulosic waste into highly valuable protein-rich food with therapeutic benefits.

Keywords: fruiting, mycelium, *Pleurotus*, substrates

THE STUDY OF CONSUMER BEHAVIOUR IN THE HONEY MARKET WITH EMPHASIZING QUALITY AND NUTRITIONAL VALUE

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Introduction: The main reasons of honey consumption may be associated with the fact that honey contains a variety of biological qualities, including antioxidant, anti-inflammatory, and antibacterial characteristics (Pocol and Bolboacă 2013)

Aims: The purpose of the research was to identify mineral content in selected honey samples as well as to study consumer behaviour in the honey market emphasizing its quality and nutritional value.

Materials and Methods: The consumer research was conducted by implementing a questionnaire survey, where 600 Slovak honey consumers participated. Mineral content was determined by inductively coupled plasma optical emission spectrometry (ICP-OES). In total, 40 honey samples were analysed.

Results: The consumer research showed that the most preferred types of monofloral honey are honeydew honey, linden honey and acacia honey. Female honey consumers prefer more acacia honey and tend to use honey in cosmetics as well as a remedy for various illnesses. The analytical research showed that honey samples produced by Slovak beekeepers contained trace and major minerals such as K, Ca, Mg, Na, Mn, Al, Fe, Ba, Sr, Li, Zn. The highest mineral content was identified in honeydew honey.

Conclusion: The obtained results provide essential information towards nutrition marketing for beekeepers and their marketing activities.

Keywords: consumption patterns, honey preferences, mineral content, Slovakia

References:

1. Pocol, C. B., & Bolboacă, S. D. (2013). Perceptions and trends related to the consumption of honey: A case study of North-West Romania. In *International Journal of Consumer Studies* (Vol. 37, Issue 6, pp. 642–649). Wiley. <https://doi.org/10.1111/ijcs.12046>

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A TWO-STEP BIOCONVERSION APPROACH OF WHEAT BRAN FOR GELLAN GUM OBTAINING

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Introduction: The worldwide production of wheat grains has witnessed a substantial surge, exceeding 790 million tons (Mt) in 2022, displaying a noteworthy rise from the slightly over 580 Mt produced in 2000. The milling industry generates bran as a by-product, and approximately 0.25 million tons of wheat bran can be produced from one million tons of wheat (Safaripour M *et al.*, 2021).

Aims: This work focused on using a two-step bioprocess of wheat bran enzymatic hydrolysis, followed by submerged bacterial fermentation to obtain gellan gum.

Materials and Methods: In the first step, commercial wheat bran was subjected to an enzymatic hydrolysis optimization using 3 different enzymes and 4 different moisture concentrations at 50 °C for 72 h. In the second step, the best result was then used as a rich carbon source in submerged fermentations using *Spingomonas paucimobilis* ATCC 31461, with inoculum size varying from 5-15% and total reducing sugars (TRS) concentrations of 20, 30 and 50 g/L at 30 °C for 72 h. The resulting TRS from enzymatic hydrolysis was determined using DNS assay. At the same time, the obtained raw gellan gum was extracted by centrifugation of fermented media at 10000 rpm/30 min, followed by overnight supernatant precipitation in 3 volumes of ethanol and freeze-drying of the obtained slurry.

Results: In the case of enzymatic hydrolysis optimization, the best results were obtained using a final moisture content of 20% and the enzymatic blend Celic CTEC2, yielding a TRS concentration of 67.2 g/L. In the second step, the highest gellan gum yield of 11.9 g/L was achieved using an inoculum size of 10% and the final concentration of TRS of 50 g/L.

Conclusion: The results of this work prove that wheat bran can be used as a carbon source by applying a two-step bioconversion process for obtaining valuable compounds such as gellan gum.

Keywords: enzymatic hydrolysis, gellan gum, submerged fermentation, wheat bran

References

1. Safaripour M, Hossain KG, Ulven CA, Pourhashem G (2021). Environmental impact tradeoff considerations for wheat bran-based biocomposite. *Science of The Total Environment*. 781:146588.

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BIOACTIVE COMPOUNDS IN *SORBUS ACUPARIA*: A REVIEW

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Introduction: The era of functional foods, nutraceuticals, and individualised nutrition has increased interest in underutilised plants. Therefore, natural bioactive substances may be essential in the creation of health-promoting products (Sołtys et. al., 2020). Recent research has shown that the *S. aucuparia* diverse anatomical parts contain important phytochemicals.

Aims: The aim of this review is to provide a thorough summary of our current knowledge of the chemical composition and bioactive properties of *S. aucuparia*.

Chemical composition: Different portions of the plant have yielded isolated and identified classes of bioactive substances, including phenolic compounds, flavonoids, anthocyanins, terpenoids, and vitamins. (Olszewska, 2010) The aforementioned compounds demonstrate antioxidant, anti-inflammatory, antibacterial, and potentially anti-cancer properties (Formenko et. al., 2016)

Conclusion: Studies on the phytochemicals, antioxidant capacity, and other bioactivities of *Sorbus* extracts are becoming more and more widespread, and this has opened up the possibility of expanding its uses as a valuable source of bioactive compounds for the pharmaceutical, nutraceutical and food industry. However, more thorough research is needed to create practical and palatable consumer applications for *Sorbus* components in foods or dietary supplements.

Keywords: bioactivities; nutraceuticals; phytochemical composition, *Sorbus aucuparia*

References

1. Olszewska, M.A.; Nowak, S.; Michel, P.; Banaszczyk, P.; Kicel, A. Assessment of the content of phenolics and antioxidant action of inflorescences and leaves of selected species from the genus *Sorbus* sensu stricto. *Molecules* 2010, 15, 8769–8783..
2. Sołtys, A.; Galanty, A.; Podolak, I. Ethnopharmacologically important but underestimated genus *Sorbus*: A comprehensive review. *Phytochem. Rev.* 2020, 19, 491–526.
3. Fomenko, S.E.; Kushnerova, N.F.; Sprygin, V.G.; Drugova, E.S.; Momot, T.V. Chemical composition and biological action of rowanberry extract. *Russ. J. Bioorg. Chem.* 2016, 42, 764–769

BOG BILBERRY (*VACCINIUM ULIGINOSUM* L.) LEAVES: CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES

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Introduction: *Vaccinium uliginosum* L. is a small wild shrub belonging to the Ericaceae family, indigenous to several parts of the Northern Hemisphere, particularly in regions located at high altitudes.

Aims: The present research aims to establish the phenolic content of the bog bilberry leaves and to determine their biological activities, making the current work innovative and significantly improving the current state of the knowledge.

Materials and Methods: The leaves of bog bilberry were collected from natural habitat. The chemicals were purchased from Sigma-Aldrich (Steinheim, Germany). The solvent used was 40% ethanol in water. The extracts were used to determine the chemical composition and biological activities.

Results: In the extracts obtained were found 16 phenolic compounds belonging to four phenolic classes: phenolic acids, flavonols, flavanols and anthocyanins. The major phenolic compound detected was the feruloylquinic acid, a hydroxycinnamic acid (109.31 mg/g). Anthocyanins were found in small quantities (< 0.7mg/g). *Staphylococcus aureus* and *Rhodococcus equi* were the most susceptible Gram-positive bacteria, with the extract reporting a MIC of 0.06 mg/mL and a MBC of 0.12 mg/mL. Regarding Gram-negative bacteria and fungi, the extract had no effect when compared to the control. The bog bilberry leaf extract reported low inhibition capacity towards *Salmonella typhimurium* TA98, and moderate antimutagenic effect towards *S. typhimurium* TA100.

Conclusion: The results suggest that bog bilberry leaf extract is an alternative source of phenolic compounds, with antimicrobial and antimutagenic activities. The biological activities sustain the health-related benefits of bog bilberry leaves. This study highly contributes to current knowledge on the chemical composition and biological activities in bog bilberry leaves.

Keywords: Biological activities, chemical composition, *Vaccinium uliginosum* L

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CIRCULAR BIOECONOMY: UNLOCKING ITACONIC ACID PRODUCTION FROM FOOD BY-PRODUCTS THROUGH INNOVATIVE SOLID-STATE FERMENTATION

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Introduction: Global warming and pollution raise grave concerns for our planet's future and future generations. The widespread use of fossil fuels and landfill disposal within the linear economy model contribute to environmental deterioration. Global plastic production, about 350 million tons in 2017, exacerbates the issue. Responding, the European Commission advocates bio-based, biodegradable plastics with reduced emissions, fostering a transition to a circular economy. Biomass waste can replace non-renewable petrochemicals, facilitating circularity. The U.S. Department of Energy identified 12 promising bio-based chemicals, including itaconic acid (IA), an eco-friendly option for polymers and nano-hydrogels. IA, a bio-based unsaturated monomer derived from fermentation, boasts significant potential due to its unique structure with trifunctional groups, enabling the creation of diverse polymers.

Materials and Methods: This study proposes an innovative approach employing solid-state fermentation (SsF), where microorganisms grow on a solid-substrate matrix, and utilize food industry by-products as substrates. Fungi, such as *Aspergillus*, play a pivotal role in this process, producing cellulase and hemicellulase to break down lignocellulosic biomass. Additionally, the use of food industry by-products as substrates offers economic advantages.

Results and discussions: The project's objective is to utilize SsF for IA production using the fungi *Aspergillus awamori* and *A. terreus*. The project aims to establish a sustainable bioprocess, converting food by-products into IA, which can then be incorporated into biodegradable packaging for the food industry. This novel approach aligns with the transition to a circular economy, minimizing waste and promoting reusability.

Conclusion: The project managed to optimize fungal fermentation, substrate utilization, enzyme production, hydrolysis, and IA fermentation. The innovative use of SsF and enzyme-based processes holds significant promise for cost-effective IA production and integration into a circular economy model.

Keywords: Circular economy, downstream purification, enzyme production, itaconic acid, solid-state fermentation

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EFFECT OF PARTIAL REPLACEMENT OF PORK MEAT BY MICROENCAPSULATED EXTRACT OF *BOLETUS EDULIS* ON THE QUALITY OF VIENNA SAUSAGES

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Introduction: Polyphenols are ubiquitous by-products in many plants. Their consumption has been linked to several health benefits, including a decreased risk of diabetes, cardiovascular disease, or cancer and improved neurodegenerative outcomes (McDougall, 2017). These bioactive compounds can be successfully extracted from *Boletus edulis* mushrooms using a mixture of water/acetic acid (9:1, v/v) (Fogarasi et al., 2021). However, the acidic extract may influence the sensory or textural properties of the product to which it is added for enrichment or fortification. This inconvenience can be avoided by microencapsulating and using the extract as microcapsules.

Aims: In this study, pork Vienna sausages were reformulated to obtain Vienna sausages enriched with polyphenols by replacing 2.0% of the cured meat weight with microcapsules containing aqueous extract of *Boletus edulis* (VS_m) and by replacing ice flakes, an ingredient of 22.9% of the Vienna sausage recipe with ice cubes prepared from aqueous extract of *Boletus edulis* (VS_e).

Materials and Methods: The three batches of Vienna sausages (VS_m, VS_e, and VS_c-control sample) were subjected to physicochemical analysis (to determine the proximate composition, pH, and easily hydrolyzable nitrogen content) and to the determination of total phenolic content using a spectrophotometric method. These were conducted during refrigerated storage of VS (initial day, on the 3rd, 5th, and 8th day of storage). The sensory analysis of the three VS samples was also performed.

Results: A significant difference in total phenolic content was found between VS_e (0.28 mg GAE/g) and VS_c (0.15 mg GAE/g) but non-significant between VS_c and VS_m (0.10 mg GAE/g) or between VS_m and VS_e. Total phenolic content did not vary significantly in the three VS samples during storage, showing stability in this matrix. There were no significant differences among the sensory scores of VS_m and VS_c. VS_e scored significantly lower than VS_c and VS_m for appearance, colour, consistency, odour, taste, aftertaste, and overall acceptability. VS_m was the most preferred formulation, with an overall score of 7.8 points, followed by VS_c (7.4 points), while VS_e was slightly disliked (4.8 points).

Conclusion: By microencapsulating the aqueous acid extract of *Boletus edulis* mushrooms and using it in this form at the formulation of sausages, an enrichment effect with polyphenols can be obtained without affecting their manufacturing process respectively sensory properties if the microcapsules are used in sufficient quantity.

Keywords: aqueous extract, *Boletus edulis* mushrooms, microcapsules, polyphenols, Vienna sausages

OPTIMIZATION OF VITAMIN B12 PRODUCTION BY *PROPIONIBACTERIUM* *FREUDENREICHII* ON MODEL MEDIA FERMENTATION

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Introduction: Producing vitamin B12-fortified plant-based food products is becoming increasingly important and fermentation is, by far, the most attractive field of exploration.

Aims: The present paper aims we aim to optimize the model media fermentation conditions of *P. freudenreichii* for a higher vitamin B12 production yields.

Materials and Methods: The culture of *P. freudenreichii* subsp. *freudenreichii* DSM 20271 was used for the experiments carried out in a 1.5 L BIOSTAT bioreactor with a working volume of 1 L during 7 days of fermentation. Each strain was grown in triplicate on model fermentation medium supplemented with precursors as follows: with and without riboflavin (40 µM), co-supplementation of riboflavin (40 µM) and nicotinamide (27 mM), (these were added in day 0 of fermentation) and DMBI (100 µM added on day 6 of fermentation).

Results: The media compositions, such as nutrients (carbon, nitrogen, mineral salts, etc) and precursors of the vitamin B12 biosynthetic pathway, such DMBI, together with the fermentation conditions, such as temperature, kinetics, fermentation period, inoculum size, were optimized for maximum vitamin B12 synthesis. The cell count was 9.0 log colony forming units (CFU)/ml. Fermentation conditions were: temperature of 25°C under stirring conditions (200 rpm), for 7 days. On the 3rd day of fermentation, oxygen was introduced, because it is necessary for the biosynthesis of DMBI.

Conclusion: The effect of supplementation on cell growth was dependent on the type of supplementation. In general, supplementation did not restrict cell growth, however, co-supplementation with riboflavin and nicotinamide together had a stimulatory effect on cell growth.

Keywords: model media, optimization, solid-state fermentation

Acknowledgement: This work was supported by a grant of the CNCS-UEFISCDI, project number PN-III-P1-1.1-TE-2021-1052, 7TE/2022.

SESSION 4: HORTICULTURE

EVALUATION OF GREENHOUSE GAS EMISSIONS OF QUINOA SEED PRODUCTION IN GREECE

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Introduction: Population growth has led to an increase in food production, resulting in an increase in agricultural products in terms of quantity and quality (Kakabouki *et al.*, 2018). Quinoa (*Chenopodium quinoa* Willd.) cultivation is prevalent in most areas of the world, due to its high-quality grain and its potential to produce high yields under tough growing conditions (Bilalis *et al.*, 2019). Currently, as a result of the increased attention to quinoa as a highly nutritious crop and increased international demand, the cultivation of this crop is expanding in Greece (Kakabouki *et al.*, 2019).

Aims: The study aimed to investigate all greenhouse gas (GHG) emissions generated by quinoa seed production in Greece and their relationship with farm-related factors, from fertilizer production to energy consumption, for all cultivation techniques.

Materials and Methods: The amount of all GHG emissions was estimated using Cool Farm Tool software. In order to collect data, a questionnaire including questions regarding cultivation details, soil characteristics, inputs, fuel, and water use was distributed and completed by four quinoa producers from Central Greece.

Results: Based on a mean area of 3.57 ha and 2451.9 kg of quinoa seed per hectare, the estimated total carbon footprint of quinoa cultivation was 4187.31 kg CO₂-eq. Accordingly, the estimated carbon footprint values per hectare and per kilogram of quinoa seed were 1159.65 and 0.48 kg CO₂-eq, respectively. The present research also found that the highest CO₂-eq emissions per kilogram of quinoa seed were found to be associated with the production of fertilizers, with a value of 0.20 kg CO₂-eq corresponding to 40.88% of the total emissions per kilogram of produced seeds.

Conclusion: Consequently, attention must be given for the mitigation of the environmental impact of quinoa seed production. It is particularly important to manage chemical fertilizers and agricultural machinery properly, in order to ensure the sustainable cultivation of quinoa.

Keywords: carbon dioxide emissions, climate mitigation, sustainability, quinoa cultivation

References

1. Bilalis D., Roussis I., Kakabouki I. and Folina A. (2019). Quinoa (*Chenopodium quinoa* Willd.) crop under Mediterranean conditions: a review. *Ciencia e Investigación Agraria: Revista Latinoamericana de Ciencias de la Agricultura*. 46(2):51-68.
2. Kakabouki I.P., Hela D., Roussis I., Papastylianou P., Sestras A.F. and Bilalis D.J. (2018). Influence of fertilization and soil tillage on nitrogen uptake and utilization efficiency of quinoa crop (*Chenopodium quinoa* Willd.). *Journal of Soil Science and Plant Nutrition*. 18(1):220-235.
3. Kakabouki I., Roussis I.E., Papastylianou P., Kanatas P., Dimitra H.E.L.A., Katsenios N. and Fuentes F. (2019). Growth analysis of quinoa (*Chenopodium quinoa* Willd.) in response to fertilization and soil tillage. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. 47(4):1025-1036.

EFFECT OF MODIFIED ATMOSPHERE PACKAGING ON STORABILITY OF FRESH FIGS

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Introduction: Fig, *Ficus carica* L. fruit, is a good source of nutrients and bioactive compounds that contribute to a healthy diet, while it has medicinal properties in addition to its exquisite taste. Due to its morphological characteristics in terms of delicate epidermal tissue and the growth of yeasts and moulds, fruits are highly perishable after harvest, with limited shelf-life period (Martínez-Damián *et al.*, 2020; Pereira *et al.*, 2015). The perishable and short shelf-life characteristics of figs result in nutrient loss and fruit waste.

Aims: The present study aimed at evaluating the effects of modified atmospheres packaging “MAP” on storability and quality attributes of figs, during storage at 1°C.

Materials and Methods: The current study was carried out over two consecutive seasons (2021 and 2022), in a completely randomized design. Mature sound fig fruits were chosen for the experiment. Fruits were active packaged in biaxial oriented polypropylene (BOPP) bags and injected with CO₂ at 15% and 20%, while bags without gas injection served as control. Each treatment was tripled and stored at 1°C and 90-95% RH. Evaluations of physical and chemical quality parameters were performed at 5-day intervals.

Results: The use of MAP (15% CO₂) was found to be the most effective treatment in terms of fig weight loss and decay reduction, maintaining higher firmness, a general good quality and fruit appearance, as well as extending shelf-life. At both applied concentrations, MAP effectively retained Total soluble solids (TSS), titratable acidity, color, and CO₂ level. In the meantime, higher content of total phenolic, total flavonoid, total ascorbic acid, and O₂ level were maintained.

Conclusion: Active modified atmospheres packaging MAP (15% CO₂) significantly helped to maintain a better overall quality and extended storage life of figs at 1°C.

Keywords: *Ficus carica* L., modified atmosphere packaging, overall quality, shelf life

References

1. Martinez-Damian M.T., Omegar C.A. and Oscar C.A. (2020). Effect of modified atmosphere packaging on nutraceutical quality and overall appearance of figs stored at 1 C. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. 48(4):2292-2305.
2. Pereira C., Serradilla M.J., Martín A., del Carmen Villalobos M., Pérez-Gragera F. and López-Corrales M. (2015). Agronomic behaviour and quality of six fig cultivars for fresh consumption. *Scientia Horticulturae*. 185:121-128.

SERVICE LEARNING METHODS TO TEACH SUSTAINABLE FOOD PRODUCTION

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Introduction: This presentation will outline service-learning teaching methods that can support university instructors to connect complex interdisciplinary issues in sustainable development, through student application in community settings (Bringle and Hatcher, 1996). By doing so, instructors in food-production related disciplines can provide students with experiences that both apply knowledge gained in their courses and engage community partners in obtaining benefits from sustainable food production.

Aims: Presentation attendees will learn how service learning methods can be used in horticulture and related food production disciplines to enhance student learning about sustainable food production, while at the same time provide support for local community ties to food production. Components of effective service learning courses will be shared.

Materials and Methods: After a brief description of concepts, we will provide examples of service-learning experiences that can be incorporated into existing horticulture or other plant science courses, as well as models of capstone projects that can be used towards the end of students' degree programs (Waliczek and Zajicek, 2010; Pearson and Moore, 2017). We will also examine the procedures for identifying community partners, including these partners in the teaching/learning process for students, as well as monitoring the student/community engagement experience (Vorstermans and MacDonald, 2022). Rubrics for evaluation of the students' service learning experience and methods for feedback from community partners will conclude the presentation (Cebrián, Junyent and Mulà, 2020).

Conclusion: The presentation is designed for attendees to use or enhance their use of service learning as a method for instruction that engages students with community partners for effective instruction in sustainable development.

Keywords: community engagement, service-learning instruction, sustainability, teaching for subject mastery

References

1. Pearson B.J. and Moore K. (2017). Identification of industry needs and development of professional skills in students of horticulture. *HortTechnology*. 27(5):580-582.
2. Vorstermans J. and MacDonald K. (2022). Essential participants: centering the experiences of southern hosts in global service-learning pedagogy and practice. *Frontiers: The Interdisciplinary Journal of Study Abroad*. 34(3):94-122.
3. Waliczek T.M. and Zajicek J.M. (2010). The benefits of integrating service teaching and learning techniques into an undergraduate horticulture curriculum. *HortTechnology*. 20(5):934-942.

IMPROVED METHOD FOR OBTAINING SUNFLOWER COMPOSITE PLANTS

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Introduction: The composite plant system, consisting of wild type shoots and transformed roots, is a useful tool for analysing the transformed roots functionality when the availability of fully transformed plants is restrictive. Very often, a composite system is considered as such if even a transformed root is present, but, in order to be meaningful, it is desirable that the transformation efficiency, defined by the ratio of transformed/non-transformed roots, to be as high as possible. This condition is difficult to be achieved using the protocol of transformation with *Rhizobium rhizogenes* (Parks and Yordanov, 2020), the only one available for sunflower up to now.

Aims: The study aimed at optimizing the transformation protocol for sunflower, in order to increase the efficiency of regeneration of transformed roots in the composite plants (Ri roots).

Materials and Methods: The injection of wild type *R. rhizogenes* suspension in the hypocotyl of one week old plants, at one cm above the natural roots, leads, within a week, to the callus growth, at the wounding site. After obtaining the callus, the natural roots can be removed allowing the adventitious roots to develop. After two weeks the tips of the newly formed roots, ten for each plant, were collected and subjected to qPCR analysis.

Results: From the tested plants, 100% were transformed with a transformation efficiency of up to 80-100%. Only the first developed roots were analysed, so overestimation of transformation efficiency is expected, since new roots can grow from the non-transformed tissue. Following their development, the composite plants show more vigour than the control, with better developed foliage, suggesting that the transformed roots are functioning well.

Conclusion: This is a new non-GMO technology method for sunflower transformation and it seems promising for obtaining a good composite system. This would facilitate the performance analysis of the Ri roots in normal and water deficient conditions, allowing for future developments regarding sunflower tolerance to drought.

Keywords: genetic transformation, non-GMO plants, root traits

References

1. Parks T., Yordanov Y.S. (2020). Composite plants for a composite plant: an efficient protocol for root studies in the sunflower using composite plants approach. *Plant Cell, Tissue and Organ Culture (PCTOC)*. 140:647-659.

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THE INFLUENCE OF TREATMENTS WITH AMINO-ACIDS AFTER HAIL FALL ON WHITE AND RED GRAPE VARIETY HARVEST

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Introduction: There are few studies published in the literature on how hailstorms affect grapevines, because they were mainly limited occurrences till now. Hail can cause severe damage in the vineyard due to the loss of quantity and quality of harvest. For this reason, it is extremely important to stimulate the growth of the canopy and nutrient uptake after the hail damage (Baniță *et al.*, 2020).

Aims: The utility of use of fertilizers containing amino acids in recovering grapevine plants after hail stress, on the quality and quantity of harvest.

Materials and Methods: After the hail damage on April 30th 2019, three treatments with Delfan Plus (amino-acids complex) were applied to the grapevine canopy (at 20-25 cm shoots length, at 35-40 cm shoots length, and at berries growth). The research was carried out in 2019, on four *Vitis vinifera* L. cultivars – Tămâioasă românească, Fetească neagră, Pinot Noir and Chardonnay, at Serve winery, Ceptura wine growing centre, Dealu Mare vineyard. At harvest, the quality and quantity of harvest were tested.

Results: The number of grapes on the treated variants was significantly higher for all four grapes varieties, with a direct influence on harvest quantity. The sugar content in grapes varied, with a higher value for Fetească neagră – 271 g/l. Regarding total anthocyanins, it was noted Fetească neagră variety on the treated variant with 198,29 mg/100g FW and for the untreated variant - 211,12 mg/100g FW. The content of total polyphenols was 376,8 g/100g FW for the treated variant, significantly higher compared with the untreated variant which had 320,7 g/100g FW. The content of flavonoids for the treated variant was of 130,4 g/100g FW, significantly lower than the untreated variant - 147,8 g/100g FW.

Conclusion: The treatment with amino acids influenced the quantity and the quality of grape harvest affected by the hail, with significant results.

Keywords: amino-acids treatments, Delfan Plus, grape, hail, harvest quality

References

1. Baniță S., Sestraș A., Olteanu I., Călugăr A., Bunea C.I. (2020). The influence of hail and treatments with amino-acids on the fertility and biologic balance of grapevines. RJH Vol. I:111-118.

INFLUENCE OF PLANTING TIME ON PLANT GROWTH AND PRODUCTION FOR SOME VARIETIES OF CHARD, IN WESTERN PART OF ROMANIA

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Introduction: Petiole beet or chard (*Beta vulgaris* L., ssp. *vulgaris* (sin. ssp. *cicla*), convar. *vulgaris*, var. *flavescens* DC., is grown for whole leaves or only for its petiole, which is pleasant to taste, very fleshy, tender and juicy. In Romania, it is currently less cultivated, being present in some areas of Transylvania.

Aims: The aim of the research was to establish how some chard cultivars behave, in summer and autumn crops, respectively. Plant growth, petiole production and total production, as well as dry matter and vitamin C content were monitored.

Materials and Methods: Research took place between 2021-2022, in a vegetable farm, in Săcueni, jud. Bihor, in the Western part of Romania. The soil on which the experiment was placed was of alluvial type. The following cultivars were tested: Carde Blanche d'Ampuis, Liscia Verde da Taglio, Verte a Carde Blanche, Lucullus and Couleurs Rainbow. Chard culture was carried out by direct sowing on April 28-29, for summer crop, respectively on May 10-12, for the autumn crop.

Results: Chard plants' growth 60 days after emergence, was higher at summer crops compared to autumn one. Petiole length was 5.84 cm longer within summer crop. Plant growth recorded higher values in Verte a Carde Blanche variety. On average, production was 45.74 t/ha for the summer crop and 32.83 t/ha for autumn crop, respectively. Maximum yield of 49.75 t/ha was recorded for Lucullus variety in summer crop, followed by Couleurs Rainbow, with 47.61 t/ha. In autumn, Lucullus variety registered 35.32 t/ha, followed by Verte a Carde Blanche variety with 34.50 t/ha.

Conclusion: Summer crop ensured higher yields compared to the autumn one, for all cultivars. Maximum production of 49.75 t/ha was recorded for Lucullus variety in summer crop. In autumn crop, chard plants accumulated more DM and had a higher content of vitamin C.

Keywords: chard, cultivar, plant development, production

LOOKING FOR SCAB RESISTANCE IN SOME APPLES GENOTYPES FROM THE UASMV COLLECTION CLUJ-NAPOCA BY USING MOLECULAR ASSAYS

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Introduction: Apples are one of the most consumed fruit in the world, as well as one of the most important crops in temperate areas (Muneer *et al.*, 2017). *Malus* species are affected by some diseases with significant economic impact. Apple scab, caused by *Venturia inaequalis*, is one of the most damaging diseases that affects apple species (Jha *et al.*, 2009) and causes up to 70% yield losses (Militaru *et al.*, 2021) depending of cultivar's resistance. In order to control this disease, costly chemical pesticides are necessary, which increase the pollution of the environment by their toxicity.

Aims: The aim of the study was to identify the potential presence of the scab resistance gene (*Vf*) in some apple cultivars of pomological collection from UASVM Cluj-Napoca, using specific markers.

Materials and Methods: Nine apple cultivars (Fuji Kiku, Red Cap, Lena, Katja, Gala Mitchgla, Fiesta, Yellow, Pinova and Rennet du Canada) belonging to UASVM Cluj-Napoca germplasm collection, were tested for the presence of the *Vf* gene. Marker Assisted Selection was applied to looking for scab resistance based on *Vf* mechanism. Thus, three pairs of specific markers were used: two codominant primers pairs (AL07 and *VfC*) and another one codominant (AM19).

Results: According to the molecular assays, the results revealed that dominant form (with all three markers used) was found only in two out of the nine cultivars tested. This indicates a good opportunity to bring them into apple breeding programs for resistance to apple scab, by using *Vf* gene. Although the gene that confers resistance to scab was not found in the genome of the other varieties studied, they are characterized by other aspects such as: harvesting time, good storability or high content of nutrients and antioxidants.

Keywords: MAS, cultivars, scab, resistance, *Vf* gene

References

1. Jha G., Thakur K. and Thakur P. (2009). The *Venturia* apple pathosystem: Pathogenicity mechanisms and plant defense responses. *BioMed Research International*. 1-10.
2. Militaru M., Stuzeanu M. and Iancu A. (2020). Molecular screening of some Romanian apple cultivars for scab resistance genes. *Fruit Growing Research*, Vol. XXXVI, 5-11.
3. Muneer A.S., Bhat K.M., Mir J.I., Nabi S., Bhat M.A., Hilal A., Shafi W., Zaffer S., Jan S. and Raja H. (2017). Phenotypic and molecular screening for disease resistance of apple cultivars and selection against apple scab (*Venturia inaequalis*). *International Journal of Chemical Studies*. 5(4):1107-1113.

EFFECTS OF GREEN HUSKS OF HUNGARIAN-BRED CULTIVARS ON WALNUT BACTERIAL BLIGHT SUSCEPTIVITY

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Introduction: The Persian walnut (*Juglans regia* L.) is the most cultivated nut tree crop in Central Europe. In the green husks of walnut, one of the most important bioactive compounds is phenolics (hydroxybenzoic acids, hydroxycinnamic acids, flavonoids, naphthoquinones), which play an important role in the plant defense mechanisms against stress caused by various pathogens, e.g. Xaj (Medic *et al.*, 2022).

Aims: The aim of the study was to examine the full Hungarian walnut assortment to detect the difference in phenolic profiles of their green husks. Furthermore, the relationship between the concentration of phenolic compounds and their effects on tolerance against Xaj was investigated.

Materials and Methods: All the phenological stages were recorded by Ctifl scheme. The phenolic compounds were determined by HPLC-ESI-DAD method. The phenolic compounds were determined by HPLC-DAD-QDA method. The susceptibility test was carried out based on the methods of Ozaktan *et al.* (2008).

Results: The concentration of phenolic compounds varied within tested cultivars; it was higher in the locally-bred cultivars compared to ‘Chandler’. The phenolic compounds inhibited the artificial Xaj infection in the green husk. This effect had a strong correlation with the high phenolics’ concentration, except on ‘Bonifác’.

Conclusion: The obtained results lead to the idea that concentration of the phenolics in the walnut green husk has an important role in defense against Xaj infection.

Keywords: Hungary, phenolic compounds, walnut blight immunity test

References

1. Medic A., Jakopič J., Hudina M., Solar A. and Veberic R. (2022). Identification and quantification of major phenolic constituents in *Juglans regia* L. leaves: Healthy vs. infected leaves with *Xanthomonas campestris* pv. *juglandis* using HPLC-MS/MS. Journal King Saud University-Science. 34(1):101890.
2. Ozaktan H., Erdal M., Akkopru A. and Aslan E. (2008). Evaluation of susceptibility of some walnut cultivars to *Xanthomonas arboricola* pv. *juglandis* by immature nut test. Proceedings of the COST873, Athens, Greece.

THE RESPONSE OF TWO CHOKEBERRY CULTIVARS TO THE INFLUENCE OF CLIMATIC FACTORS IN BISTRITA AREA, ROMANIA

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Introduction: Aronia (*Aronia melanocarpa* Michx.), also called chokeberry, is one of the most popular superfoods in Europe and around the world. It is one of the most appreciated among berries in terms of the positive influence on health, due to the high phenolic content, antioxidants, vitamins, minerals and others. The main advantages of this perennial shrub are that does not require many phytosanitary treatments and it has high resistance to low temperatures in winter. The data available in the literature (Sidor *et al.*, 2019; Wawer *et al.*, 2019) indicate that chokeberry is a deciduous fruiting shrub that is easily adapted to different growth conditions.

Aims: The aim of the research was to reveal the climatic factors influencing on two foreign chokeberry cultivars 'Viking' and 'Galicjanka', regarding vegetative development and fruiting process in Bistrita region, Northern Transylvania.

Materials and Methods: The biological material was represented by two chokeberry cultivars, namely 'Viking' and 'Galicjanka', planted in 2021 at Fruit Research and Development Station Bistrita (FRDS). The experimental plots were established in randomized blocks, in three replicates, with 7 plants per replication, spaced at 1.5 × 4 m (1667 plants/ha). The phenological phases were calculated using BBCH scale (Biologische, Bundessortenamt and Chemische Industrie) and the meteorological data were collected from the FRDS Bistrita weather station. The data analysis was performed with XLSTAT 2019.1.1. (Add-in soft France) using Duncan's multiple range.

Results: The research showed that 'Viking' cultivar has high resistance to drought and low temperatures which occurred in winter, while 'Galicjanka' cultivar proved to be slight sensitive. The biometric measurements showed that chokeberry cultivars were different regarding the vigor of the bush and the ability to adapt to the tested growth conditions.

Conclusions: The results of the study revealed that 'Viking' chokeberry cultivar behaves better than 'Galicjanka' cultivar in the pedoclimatic conditions of Bistrita area, Northern Transylvania.

Keywords: aronia, Galicjanka, growth, Viking

References

1. Sidor A. and Gramza-Michałowska A. (2019). Black Chokeberry *Aronia melanocarpa* L. A qualitative composition, phenolic profile and antioxidant potential. *Molecules*. 24(20):3710.
2. Wawer I. and Katarzyna Zawada M.G.I. (2019). *Aronia melanocarpa* berries: phenolics composition and antioxidant properties changes during fruit development and ripening. *Emirates Journal of Food and Agriculture*. 31(3):214-221.

RICEBEAN, A PULSE CROP FOR FOOD SECURITY: STUDY CYCLE AND YIELD OF 24 ACCESSIONS INTRODUCED IN BURKINA FASO

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Introduction: Burkina Faso population is increasingly suffering from the negative effects of climate change, which plays a major role in food and nutritional security (Neya, 2019). Ricebean (*Vigna umbellata*), an underutilized multipurpose legume (Katoch, 2020) has greater potential to provide an inexpensive and sustainable solution to climatic variations. Unfortunately, few studies have been done on this crop of interest so far.

Aims: The study aimed to evaluate the cycle and yield of seeds and fodder of 24 rice bean accessions.

Materials and methods: Accessions were evaluated in a three-replicate Fisher block design. Data collection concerned phenological and yield parameters. The Farakoba Environment and Agricultural Research Institute hosted the trial. Analyses of variance and correlations were performed with XLSTAT 2016 software.

Results: The average in days of the 50% flowering date was 43 days. Seed maturity varied from 68 to 82 days. Accessions R85 (2.1 t/ha and 6.02 t/ha respectively) and R80 (6.4 t/ha and 1.6 t/ha) presented a better quantitative production of seeds and fodder compared with the other accessions tested. Strong correlations were observed.

Conclusion: Introducing ricebean into the farming system is a cost-effective and sustainable approach to addressing malnutrition and strengthening local food systems. These accessions could be exploited within the framework of future rice bean improvement programs.

Keywords: Burkina Faso, cycle, rice bean, yield

References

1. Katoch R. (2020). Ricebean: Exploiting the Nutritional Potential of an Underutilized Legume. Springer Nature Singapore Pte Ltd. ISBN 978-981-15-5292-2.
2. Neya B.J. (2019). Foire aux Semences de l'INERA, 10^{ème} Edition tenue du 06 au 09 Juin 2019. Thème « Point sur les variétés améliorées disponibles, les itinéraires techniques de production, les modules de formations sur les cultures orphelines et de niches ».

THE BREWERY BARLEY PRODUCTION IN GREECE- THE CHALLENGE OF HIGH-QUALITY PRODUCTS THROUGH THE SELECTION OF SUITABLE GENOTYPES

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Introduction: The malting barley cultivation creates prospects for national economy by strengthening various agricultural production in Greece. In the evolving development of brewery, the collaboration of AUA with Athenian Brewery SA (HEINEKEN Group) since 2011, plays a significant role, based on the selection for cultivation of suitable genotypes, adapted to Mediterranean dry-heat environment.

Aims: The selection of genotypes and commercial cultivars showing adaptability to dry-heat conditions meet the standards of AB such as, the stability of yields and quality characteristics (grain size > 2.5mm at least 90% and grain protein content between 9.5-11.5%). Emphasis is placed on earliness of genotypes to avoid overlapping between the maturity of the production and the often adverse dry-heat conditions of this period.

Materials and Methods: The experiment was conducted for 2 years (2020-2021 and 2021-2022), in 3 regions of Greece (Farsala, Boeotia, AUA). A modified Zadoks scale was used for phenology. Samples of 1 m² were taken for yield determination; N content of the seeds was determined by the Kjeldhal method and protein was calculated by multiplying the N content by a factor of 6.25. Grain size was determined by size fractionation, using a screening machine with 3 slotted sieves of different widths (2.8, 2.5 and 2.2 mm).

Results: According to the research, 3 modern commercial varieties cultivated in Greece and 4 new genotypes, under registration in the National Catalogue of Crop Varieties, were selected based on high quality characteristics and yields.

Conclusion: The study presents the importance of selecting modern malting barley varieties and “promising genotypes with wide adaptability” to mitigate the effects of dry-heat conditions and to combat intense climate instability of the present period, which generally affects agricultural production worldwide, as well as the brewery barley.

Keywords: brewery barley, genotypes, yields, quality

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EVALUATION OF GENETIC RELATIONSHIPS BETWEEN TWO *STREPTOCARPUS* CULTIVARS AND THEIR F₁ PROGENIES BY MORPHOLOGICAL TRAITS AND SCoT MOLECULAR MARKERS

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Introduction: *Streptocarpus* is a very popular houseplant with colorful flowers, thus piqued the curiosity of plant enthusiasts and breeders. In this context, plant breeders developed different breeding strategies to enhance the 'beauty of *Streptocarpus*'. Among them, conventional crosses, including inter- and intra-specific hybridization represent the main practical approach to develop new valuable *Streptocarpus* varieties. The application of innovative breeding strategies that combine morphological traits with molecular markers allows a more efficient characterization of the species.

Aims: The present study aimed to identify genetic variations between two genitors and their *Streptocarpus* F₁ progenies from a reciprocal cross using both morphological characteristics and molecular markers.

Materials and Methods: "Natalie" and "Bristol Gum Drop" were artificial hybridized to study the influence of the parental reciprocal crosses (P₁xP₂ and P₂xP₁) on morphological traits of F₁ progeny. To assess the genetic relationships between genitors and F₁ plants from each reciprocal cross, SCoT molecular markers were used.

Results: Mean comparisons for morphological characters of genitors and F₁ plants from both crosses revealed that F₁ plants were able to express hybrid vigour for several valuable morphological characteristics. Pearson correlations showed both significant negative and positive correlations between morphological traits of F₁ plants from P₁xP₂ cross, while in the case of P₂xP₁ no significant negative correlations were observed. The SCoT genetic profiles of the F₁ plants with the identifiers P₁xP₂.19 and P₁xP₂.35 were remarkably similar, and they grouped with the maternal parent in a small group, supporting the findings of clustering based on morphological data. The parental combination P₂xP₁ revealed the presence of closely-related progenies to parental genitor, namely P₂xP₁.16 and P₂xP₁.5.

Conclusion: Two F₁ plants named P₁xP₂.33 and P₂xP₁.21 were selected based on their phenotypic characteristics and SCoT molecular fingerprinting with the aim to create and promote new valuable *Streptocarpus* cultivars.

Keywords: Cape primrose, genotypes, inheritance, ornamental traits, reciprocal cross

STUDY OF THE PRODUCTION CYCLE AND YIELD OF INTRODUCED ACCESSIONS OF HORSE GRAM (*MACROTYLOMA UNIFLORUM* L.) IN BURKINA FASO

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Introduction: Neglected or underutilized crops have attracted the attention of researchers due to their diversity and nutritional values (Hughes, 2009), with the aim of finding other alternative food sources. Horse gram, a drought resistant, highly nutritious legume, with ethno-medicinal values and adaptable to poor soil conditions unlike other legumes (Kumar, 2006) is currently underutilized.

Aims: The study aimed to evaluate the genetic variability of introduced horse gram accessions in Burkina Faso through the production cycle and grain yield.

Materials and Methods: The study was conducted at INERA/Farako-Bâ on twenty-five (25) horse gram accessions following a Fischer block device with three repetitions. Variance and correlation analyzes were performed using XLSTAT software. The data collected were the 50% flowering date, the 95% maturity date of the pods and the grain yield.

Results: Flowering varied from 21 to 41 days and maturity from 63 to 76 days. For the accessions tested, the average seed yield (kg/ha) was 1,243.89 kg/ha. The highest seed yields were recorded in accessions H75 and H55 (2,185.65 kg/ha and 2,336.54 kg/ha). The H15 accession produced the lowest seed yield (719.70 kg/ha). Strong correlations were observed between seed yield and the number of days at 50% flowering and the number of days at 95% maturity.

Conclusion: The H75 accessions was identified as performing for its short production cycle and its high yield. It can therefore constitute an elite genotype base.

Keywords: Burkina Faso, horse gram, study, variability

References

1. Hughes J. (2009). Just famine foods? What contributions can underutilized plants make to food security? Arusha, Tanzania. *Acta Horticulturae*. 806:39-48.
2. Kumar A. (2006). Horsegram in India, Scientific Publishers India.

SKIN ANTI-AGING PROPERTIES OF *ROSA* SPP.

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Introduction: This research highlight the anti-aging properties of *Rosa* spp., a genus of plants known for their abundant biochemical compounds. Studies on phytochemical compounds have shown that the extract from these shrubs contain active compounds such as phenolic acids, tannins, flavonoids, unsaturated and polyunsaturated fatty acids, phospholipids, minerals, galactolipids and carotenoids. Extracts that delay or prevent the aging process come in a variety of forms and aim to eliminate the most prominent and visible signs of age, repairing the damage caused by free radicals.

Aims: The aim of this research is to examine the potential of *Rosa* spp. as a natural alternative solution for skin aging, addressing a global demand for plant-based, non-invasive skincare treatments.

Materials and Methods: Data collection involved the extraction of *Rosa* spp. compounds using solvent extraction methods, followed by their identification and characterization through High-Performance Liquid Chromatography and Mass Spectrometry. The anti-aging effects were investigated via in vitro assays on human dermal fibroblasts and keratinocytes, focusing on parameters like collagen synthesis, cellular proliferation, and antioxidant activity (Widen et al., 2012).

Results: The results revealed the presence of numerous bioactive compounds such as flavonoids, terpenes, and phenolic acids in *Rosa* spp. These compounds exhibited potent antioxidant activity and stimulated collagen production, demonstrating significant anti-aging potential. Furthermore, *Rosa* spp. extracts showed promising results in improving skin elasticity and reducing the appearance of wrinkles (Mármol et al., 2017). These findings underline the significance of *Rosa* spp. as a potent, natural anti-aging agent, shedding light on its potential incorporation into skincare formulations and also suggests a promising path for future research into the therapeutic potentials of other plant species.

Conclusion: This research provides compelling evidence for the anti-aging properties of *Rosa* spp., emphasizing its potential role in advancing the field of natural skincare solutions. It is hoped that these findings will stimulate further exploration into plant-based therapies for skin aging.

Keywords: bioactive compounds, herbal products, phytochemicals, natural treatments, skincare

References

1. Mármol I., Sánchez-de-Diego C., Jiménez-Moreno N., Ancín-Azpilicueta C., Rodríguez-Yoldi M. (2017) Therapeutic Applications of Rose Hips from Different *Rosa* Species.
2. Widen, C., Ekholm, A., Coleman, M. D., Renvert, S., Rumpunen, K. (2012). Erythrocyte antioxidant protection of rose hips (*Rosa* spp.). Oxidative Medicine and Cellular Longevity, Article ID 621579.

GARDENING DURING COVID-19: A NARRATIVE REVIEW

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Introduction: There is increasing evidence that gardening provides substantial human health, well-being and social benefits during previous periods of crises. These benefits were also evident during the COVID-19 pandemic.

Aims: The paper presents a narrative review exploring gardening during the stages of the COVID-19 pandemic, to investigate the effects of gardening on the health status and the healthy lifestyle of adults.

Materials and Methods: Keywords relating to gardening activities and COVID-19 were combined to conduct online search in the electronic databases including PubMed, Web of Science, Science Direct, Scopus, and Google Scholar. Primary studies integrating quantitative or qualitative research, published in English, between 2019 and 2023, were eligible for inclusion in the hereby review. The selected studies were read and entered into an instrument whose extracted data were authors, year, objective, study design, sample, target population, outcomes and relevant findings. We used narrative synthesis to report our results related to the overall effects of gardening activities on population health and healthy lifestyle and to elucidate the gardening experiences, in the context of COVID-19 pandemic.

Results: The review included 22 observational studies that reported an overall positive effect of gardening, in lowering mental distress and decreasing anxiety levels. Moreover, a significant relationship was shown between gardening activities and exercise habits, physical activity, eating vegetables, subjective happiness, and social cohesion.

Conclusion: The COVID-19 pandemic has posed a challenge to the physical health of millions of people worldwide and resulted in a devastating threat to human society in terms of economy and lifestyle. However, findings revealed that gardening was effective in improving people's lifestyle and health during the stressful pandemic context.

Keywords: Covid-19 pandemic, gardening, health, healthy lifestyle

A FIRST APPROACH OF ATMOSPHERIC CO₂ REDUCTION BY GREEN ROOFS IN RELATION TO PLANT SPECIES PHOTOSYNTHESIS TYPE

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Introduction: The climate crisis requires environmental strategies in urban areas to act as filters for purifying the atmosphere. Green roofs provide numerous services to the ecosystem, including removing CO₂ through photosynthesis. Succulents (CAM photosynthesis plants), are internationally the most used species on green roofs, mainly due to their low water needs. However, the question arises as to whether, under water stress, CAM plants contribute to atmospheric CO₂ reduction compared to C₃ and C₄ plants.

Aims: The aim was to investigate the effectiveness of plant species of the three photosynthesis types in reducing atmospheric CO₂ when grown in green roofs under water stress.

Materials and Methods: Six drought-tolerant plant species, i.e. CAM plants, *Sedum sediforme* and *Mesembryanthemum cordifolium*, C₃ Mediterranean plants *Pallenis maritima* and *Cistus* × *purpureus* 'Alan Fradd', as well as C₄ plants *Atriplex halimus* and *Muhlenbergia capillaris*, were grown in a greenhouse, in containers, with green roof infrastructure fitted and 10 cm deep substrate (grape marc compost:perlite:pumice, 3:3:4, v/v), under regular and sparse irrigation (substrate moisture 17-20% and 8-11% v/v, respectively). Plant canopies fully covered the containers, and were all kept to the same height. CO₂ measurements were taken in transparent domes over each container at morning, midday and evening, during spring and summer seasons.

Results: In both irrigation frequencies, C₄ plants showed slightly higher CO₂ assimilation in the day compared to C₃, while within CAM plants, a positive day-night CO₂ balance was noted only in *M. cordifolium*. *S. sediforme* appeared to emit a significant amount of CO₂ during the day, which was not compensated by the CO₂ absorbed at night. *S. sediforme*, *P. maritima* and *M. capillaris* were the least efficient in CO₂ absorption compared to the other species of the same photosynthesis type.

Conclusion: To improve the carbon sequestration of green roofs in semi-arid climates, suitable plant species should be used, excluding *Sedum sediforme*.

Keywords: CAM plant, C₃ plant, C₄ plant, carbon sequestration

GLUCOSIDASE, PHOSPHATASE AND UREASE ACTIVITIES IN SOILS: INFLUENCE OF COPPER, LEAD, CADMIUM AND VARYING SOIL TYPES

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Introduction: Soil enzymes play an important role in the whole field of biogeochemical cycling in soil ecosystems. In a previous paper, the authors showed that the addition of Cu, Pb, and Cd strongly inhibited dehydrogenase (DH) activity in soils of different origins, especially Cu (Schaller and Beickler, 2022). DH is an indicator of living organisms, while glucosidase, phosphatase and urease are free or bound enzymes that release substances that are important for soil microorganisms or can provide nutrients for plants.

Aims: It should be shown that heavy metals can have a strong influence on the whole biological network in the soil. It should be checked with the proposed limit values of the EU, how the individual "indicator enzymes" react to the various heavy metal additives.

Materials and Methods: Increasing amounts of Cu, Pb and Cd were added to 5 different soils (pH 3.5 - 7.4; C-content: 1.1 - 4.3), incubated at 27 °C and 75% of maximum water capacity for 56 days, and sampled every 14 days. Enzyme activities were determined according to accepted methods.

Results: All soil enzymes studied were inhibited to a greater or lesser extent by all heavy metals. The glucosidases very effectively at low pH. The phosphatase by Cu and low pH. The urease was significantly inhibited by all heavy metals, in almost all soils. The results with Cd were not completely consistent. In soils with higher pH the inhibitory potential was near zero, whereas at low pH-values, the inhibition was remarked.

Conclusion: With the present investigation, it could be shown that the heavy metals represent a large problem in agricultural production, since they intervened in important geochemical cycles, e.g. nitrogen (urease) and can damage the soil fertility in the long term lastingly. Special attention must certainly be paid to copper in soils and copper application as a plant protection agent.

Keywords: heavy metals, soil enzymes, soil fertility, soil health

References

1. Schaller K. and Beickler G. (2022). Dehydrogenase activity in soils: Influence of Copper, Lead, Cadmium, and varying soil types. Bulletin UASVM Horticulture. 79:83-88.

EVALUATION OF GROWTH OF FABA BEAN (*VICIA FABA* L.) POPULATION ORIGINATED FROM PERU, IN GREECE

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Introduction: Faba bean (*Vicia faba* L.) is one of the most important sources of plant – based protein, for human and animal consumption (Jensen *et al.*, 2010). The crop is originated from southwestern Asia (Mínguez and Rubiales, 2021). In Greece, faba beans are cultivated as annual, cool season crop (Katsoulieri *et al.*, 2020).

Aims: The aim of this study was to evaluate the growth of faba bean seeds from Peru in the Mediterranean conditions and the comparison of its characteristics with an already cultivated variety in Greece.

Materials and Methods: A field experiment was laid out at the experimental field of Agricultural University of Athens. The measurements considered plant height, the number of leaves, the number of branches, the number of pods, the pod's length, the number of seeds per pod, the Thousand Seeds Weight (TSW) and the yield of the crop. There were also measurements for the crude protein and fat content of the seeds. The statistical analysis was performed with SigmaPlot 12 statistical software, at the level of significance was 5%.

Results: According to the results, there were not significant differences between the two cultivars for the plant height, the number of leaves, the number of flowers per plant, the number of seeds per pod, the total yield and the protein content. The number of branches, the number of pods, the pod's length and the TSW were significant higher at the population originated from Peru. The fat content of the seeds was lower at the Peru's population.

Conclusion: In the present research work, we demonstrated that faba bean population from Peru can be cultivated in the Mediterranean region. The measurements showed that the crop's growth was normal and some characteristics of Peruvian beans showed better results than the local cultivated varieties.

Keywords: agronomic characteristics, faba bean (*Vicia faba* L.), population

References

1. Jensen E.S., Peoples M.B. and Hauggaard-Nielsen H. (2010). Faba bean in cropping systems. *Field Crops Research*. 115(3):203-216.
2. Katsoulieri A., Papastylianou P., Travlos I., Vlachostergios D., Tigka E., Kargiotidou A., ...and Bilalis D. (2020). Yield performance of faba bean cultivars under different environmental conditions in Greece. *Bulletin UASVM Horticulture*. 77:2.
3. Mínguez M.I. and Rubiales D. (2021). Faba bean. In *Crop physiology case histories for major crops*, pp. 452-481. Academic Press.

VARIATION IN MORPHOLOGICAL CHARACTERISTIC AND BIOACTIVE COMPOUNDS CONTENT IN TOMATO CULTIVARS DURING TWO YEARS OF ECO FARMING CONDITIONS

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Introduction: Tomato (*Solanum lycopersicum*) is one of the most important vegetables in the human diet due to its high nutrient content and culinary value. The primary goal of cultivators is to maintain sustainable agriculture, taking into consideration the ever-changing climate conditions and the ongoing battles between the plants and their pathogens. There are several tomato varieties that differ in appearance, flavour, and nutritional content. One of the missions of our botanical garden is to preserve the seeds of these tomato cultivars and varieties in its collection. To assess the impact of ecological growth on these cultivars and varieties, we conducted a comparative analysis of their morphological characteristics and the content of certain bioactive compounds (ascorbic acid, lycopene, and beta-carotene) in the fruits.

Aims: The objectives of this study were to present the collection of tomato cultivars grown under ecological conditions in the Jibou Botanical Garden and to conduct a comparative study of the morphological and biochemical features of the fruits.

Materials and Methods: All tomato varieties were cultivated in the "Vasile Fati" Botanical Garden's ecological garden in Romania, treated with certified organic substances, and watered as needed. Fruits were harvested in August-September, depending on the ripening times of each cultivar. In total, fruits from 36 cultivars were analyzed, and both weight and the selected bioactive compounds were measured in the years 2021 and 2022. Lycopene, beta-carotene, and ascorbic acid were extracted and quantified using spectrophotometry.

Results: In total, 36 cultivars were characterized, and the shape and weight of the fruits were measured and classified. Measurements of the bioactive components were conducted, and the results were statistically analyzed. Based on these results, a comparative analysis of the tomatoes was performed, focusing on lycopene, ascorbic acid, and beta-carotene.

Conclusion: Based on the study, it can be concluded that preserving the diversity of tomato varieties grown under ecological conditions and examining the biochemical characteristics of the fruits are crucial for sustainable tomato cultivation and nutrition.

Keywords: tomato varieties, eco-gardening, lycopene, ascorbic acid, beta-carotene

QUALITY ATTRIBUTES OF FOUR KALE CULTIVARS GROWN IN A HIGH TUNNEL ECOLOGICAL FARMING SYSTEM

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Introduction: Leafy green vegetables are rich sources of antioxidants, minerals, vitamins and dietary fiber, which cannot be produced by the human body, the only way for assimilation being by food ingestion. One of the best source of these nutrients, among the *Brassicas* vegetables, is kale (Ayaz and et., 2006). According to its fiber content, kale is one of the vegetables recommended in preventing and treating digestive diseases (Maciejak & Kosmala, 2019). Dry matter content of kale is important not only for fresh consumption, but also for preserving and processing of leaves (Ötles & Ozgoz, 2014). In Romania kale is less cultivated, but still being present in several areas of Transylvania.

Aims: The aim of the present research was to establish the influence of cultivar on quality attributes of kale cultivated in a high tunnel ecological farming.

Materials and Methods: The research was performed in 2022 in a high tunnel, located in Băbuțiu village – Cluj County. Four kale cultivars ('Red Siberian', 'Black Tuscany' – control, 'Dwarf curled' and 'Scarlet') cultivated in an ecological farming system were evaluated for quality attributes including dry matter, total soluble solids and insoluble fiber contents.

Results: The highest dry matter content in leaves was revealed by 'Scarlet' followed by 'Black Tuscany' (control) and 'Dwarf curled' cultivars. 'Dwarf Curled' cultivar recorded the highest insoluble fiber content (8.66 mg/100 g fresh matter), while 'Red Siberian' cultivar recorded the highest total soluble solids (8.4%) in comparison with control ('Black Tuscany' cultivar).

Conclusion: The assimilation of analyzed quality attributes in kale was influenced by the cultivar. Among the studied cultivars, 'Red Siberian' revealed the highest total soluble solids content and a good insoluble fiber content.

Keywords: dry matter, ecological system, fiber, high tunnel, kale

References

1. MACIEJAK, A., & KOSMALA, M. (2019). Kale (*Brassica oleracea* L. var. *acephala*) as a source of dietary fibre. *Biotechnology and Food Science*, 83(2), 135–142
2. AYAZ, F. A., GLEW, R. H., MILLSON, M., HUANG, H. S., CHUANG, L. T., SANZ, C., & HAYIRLIOGLU-AYAZ, S. (2006). Nutrient contents of kale (*Brassica oleracea* L. var. *acephala* DC.). *Food Chemistry*, 96(4), 572–579
3. ÖTLES, S., & OZGOZ, S. (2014). Health effects of dietary fiber. *Acta Scientiarum Polonorum Technologia Alimentaria*, 13(2), 191–202

SESSION 5: ECONOMICS AND RURAL DEVELOPMENT

FOSTERING SUSTAINABLE CROSS-BORDER LINKS: THE IMPACT OF HIGH-VOLUME AGRICULTURAL TRADE BETWEEN UKRAINE AND ROMANIA IN ADDED VALUE CHAINS

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Introduction: The agricultural trade partnership between Ukraine and Romania represents a noteworthy case study in the realm of cross-border cooperation and economic growth. In this article, we explore the transformative impact of their agricultural trade partnership on sustainable cross-border links and the broader implications for regional and global agriculture.

Aims: This study aims to analyse the multifaceted implications of this partnership, performance of key agricultural value chains showcasing its transformative impact sustainable practices in the agricultural sector.

Materials and Methods: To compile this analysis, we conducted an exhaustive review of trade statistics, policy documents, and interviews with key stakeholders from both Ukraine and Romania. Additionally, our study takes into consideration various agricultural sectors, including grains, livestock, and specialty crops, to assess their contributions to the development of added value chains.

Results: As a result, we identified 4 main value-added chains in which Romania and Ukraine can increase bilateral trade turnover, leading to a significant increase in trade volumes, improved product quality, and a diversification of agricultural products.

Conclusion: In the present research work, we demonstrated that the high-volume agricultural trade between Ukraine and Romania serves as a compelling case study in fostering sustainable cross-border links and advancing value chain development.

Keywords: Added value chains, agricultural trade, cross-border links.

References

1. Andra N., Alicia H. (2021). United States Department of Agriculture (USDA): Exporter Guide. RO2021-0017
2. Electronic catalog of the State Customs Service of Ukraine [<https://data.gov.ua/dataset/scsu-bi-trade-src-en>]: [Depersonalized summary information on customs issues, used to establish quantitative characteristics of mass phenomena (processes) in customs affairs]. – Access mode: data.gov.ua (12.08.2023).
3. Proceedings of the 8th International Smart Cities International Conference (2020) / D. Sumpor et al. Springer International Publishing AG, (2022), pp. 9 – 27.

STUDY ON EXPORTS OF ARMENIAN WINE

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Introduction: The significance of nurturing this industry is underscored by the fact that alcoholic beverages produced from grapes are high-value items in Armenia's export portfolio, accounting for approximately 8.4% of total exports in 2020.

Aims: This article explores the connections between wine production and exports in Armenia, highlighting the wine industry's crucial role in the country's economy.

Materials and Methods: As part of this research, a thorough examination of wine production was undertaken within the study's framework. Utilizing econometric analysis, we evaluated how an increase in wine exports impacts wine production. Additionally, we conducted empirical analyses to understand how fluctuations in the exchange rates of the US Dollar (USD) and Russian Ruble (RUB) affect Armenia's wine industry.

Results: In summary, the results of our econometric analysis reveal that both the volume of wine exports and movements in the USD exchange rate have a significant impact on Armenia's wine industry. Based on these findings, we assert that the Armenian government should actively promote wine exports through policy measures and concurrently diversify the destinations for these exports.

Conclusion: Consequently, the outcomes of this study can serve as a robust foundation for the formulation of evidence-based sector-specific strategies by the Armenian government.

Keywords: wine, exports, Armenia

References

1. Ministry of Economy. Republic of Armenia Government, Tbilisi (2011). The Strategy of Export-Led Industrial Policy of Republic of Armenia.
2. UN Comtrade Database (2023). <https://comtrade.un.org/data>, Accessed on 25/06/2023.
3. United States Agency for International Development (USAID) (2010). Rapid assessment of value chain opportunities in Armenia.

RISK MANAGEMENT AT THE LEVEL OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE AGRICULTURAL FIELD IN ROMANIA- A SYSTEMATIC LITERATURE REVIEW

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Introduction: SMEs are an essential component of the economies of a number of nations since they are the primary generators of new products and services, social cohesion, and employment (European Central Bank, 2013). SMEs in the agriculture sector also substantially contribute to economic change in developing nations by addressing a wide array of unemployment, nutrition, income poverty, and food security issues. In spite of their vital role and contribution to economic development, they have received significant criticism for their poor performance (Mang'ana *et al.*, 2023).

Aims: The objective of this study is to assess the current state of knowledge regarding risk management at the level of small and medium-sized businesses in the Romanian agricultural sector.

Materials and Methods: A systematic literature review was carried out and completed in accordance with the recommendations provided by PRISMA in order to provide answers to the research questions that were outlined. Using the two most popular literature-searching databases, Science Direct by Elsevier and Web of Science Core Collection by Clarivate Analytics, a database containing relevant articles on risk management in SMEs from the Romanian agriculture sector was compiled.

Results: The following dangers can be seen in the context of the cited works: demographics, climatic/natural resources, lack of or inadequate equipment, land dispersion, lack of market, lack of acces to subsidies, supply chain risks.

Conclusion: Due to the lack of studies on the topic of risk management at the level of small and medium-sized enterprises in the agricultural sector of Romania, it is impossible to generalize or provide an overview of their current situation.

Keywords: agriculture, SME, risk management, Romania

References

1. European Central Bank, Economic and monetary developments (2013). Small and medium-sized enterprises in the euro area: Economic importance and financing conditions.
2. Mang'ana K.M., Ndyetabula D.W. and Hokororo S.J. (2023). Financial management practices and performance of agricultural small and medium enterprises in Tanzania. *Social Sciences & Humanities Open*. 7(1):100494.

STUDIES REGARDING THE DEVELOPMENT OF THE EUROPEAN FOOD QUALITY SCHEMES IN ROMANIA

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Introduction: Growing global interest in food sustainability, along with recent medical research into the role of food intake in clinical disease and growing consumer concern about health indicate that consumers are adopting more conscious eating habits in favour of sustainable, certified, high-quality food.

Aims: The fundamental objective of this research was to establish a broad framework for analysing the general impact of the geographical indications and European Certification Schemes through the Romanian society. The study was focused on Romania, and a top-to-bottom methodology was used for the analyses.

Materials and Methods: This chapter is divided into four main sections: the study of the literature review on GIs in Romania, the experts on the field perception on GIs and certification schemes, consumer knowledge and willingness to pay a higher price for certified products, and lastly, as an alternative to the European certification schemes AgroTransilvania formulated and expanded 4 certification schemes.

Results: The overall findings after conducting all the meetings with the panel of experts revealed that: at first, before mentioning the concept of quality, it is essential to define it and ascertain what this notion means to each individual consumer and how important it is for the consumer to have this requirement satisfied. Two of the certifications proposed are recognized by the EU, that demonstrates once again that the value of a certification schemes does not always come from the fact that was created by a public institution.

Conclusion: To make the transition to a well-educated consumer, the Romanian society behavior has to change from scratch. On long term, a better-informed consumer become a loyal customer of the product/ producer itself. As a general conclusion, in Romania there is an increasing concern and market on certified products.

Keywords: cultural heritage, national regulations, traditional products, voluntary certification

References

1. Brons A. and Oosterveer P (2017). Making sense of sustainability: A practice theories approach to buying food. *Sustainability*. 9(3):467.

CONSUMER BEHAVIOR AND BARRIERS REGARDING THE CONSUMPTION OF ORGANIC PRODUCTS IN ROMANIA

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Introduction: At the European level the consumption of organic products has an upward trend, with an average of 102 euros per capita (Schlatter *et al.*, 2020). However, at the Romania level the consumption is relatively low, only 2 euros per capita (Schlatter *et al.*, 2020). Thus, Romanians spend 50 times less on organic products than the EU average.

Aims: Therefore, the purposes of this paper are to identify the perception of Romanian consumers on organic products, demographic characteristics of the respondents, the motivation to consume but also the barriers to become consumers of organic products.

Materials and Methods: The research method used was online survey. A structured questionnaire was used which employed with multiple-choice questions and Likert scale questions. The collected data were analysed using descriptive statistics.

Results: The results indicated that healthy lifestyle, desire to protect the environment and sustainable consumption are the main reasons for consuming organic products. The high prices, mistrust, and lack of proper promotion for organic food are the most important barriers in consumption. The low level of confidence in organic products is determined by the confusion and the low information level.

Conclusion: The study shows an increase in consumer interest for organic products, so that the change according to their behaviour shall generate an increase in the organic products market in Romania.

Keywords: barriers, consumer behaviour, organic products, Romania

References:

1. Schlatter B., Travnicek J., Lernoud J., Willer H.E., Willer H. and Kemper L. (2020). Current statistics on organic agriculture worldwide: area, operators and market. The World of Organic Agriculture: Statistics and Emerging Trends. 32-131. Available online: <https://orgprints.org/id/eprint/42971/1/willer-et-al-2022-world-of-organic.pdf#page=34>

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A NATURE-BASED TOURISM LITERATURE REVIEW: FOCUSING ON LOCAL COMMUNITIES IN PROTECTED AREAS

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Introduction: Tourism has been regarded by researchers as one of the fastest growing industries in the world (Korstanje, 2023; Weng *et al.*, 2022; UNWTO, 2021). And with its continuous development and increasing demand, challenges arise. While a vast domain of the existing literature focuses on studying tourism through the tourists' perception and expectations, some turn their interest towards the effects it has on the environment. Not as much attention is given though to the effects of tourism on the local communities and their perception.

Aims: To do a brief review of the research literature aimed at understanding the local communities residing within protected areas or their close proximity, with their needs and the impact that nature-based tourism activities have on the peoples' lives.

Materials and Methods: Articles published in English and registered on the Clarivate Analytics' online database Web of Science between 2000 and 2021 have been reviewed. Statistical information showing the research trend on the matter addressed has been collected and presented.

Results: The main objectives and applicability of the analysed papers was of foremost interest, trying to identify what sparks the need for tourism research of the local communities that often shelter a vast amount of services.

The type of methods applied and whether or not the research has been funded is also covered in the present research.

Conclusion: While nature-based tourism is identified with different forms and activities, the research efforts are often guided towards understanding tourists and demand, and less towards the local residents of protected areas where the touristic activities take place.

Keywords: local communities, national parks, nature-based tourism, sustainable development

References

1. Korstanje M.E. (2023). Tourism imagination: a new epistemological debate. *Current Issues in Tourism*. 26(2): 199-211.
2. Weng W. and Akova O. (2022). Tourism as a promoter of social welfare. 204-220.
3. World Tourism Organization (2021). *International Tourism Highlights, 2020 Edition*. UNWTO, Madrid.

THE ECONOMIC SUSTAINABILITY OF INDUSTRIAL POTATO PRODUCTION WITH ENTREPRENEURIAL STRATEGIES TO ENHANCE PRODUCTION

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Introduction: The agricultural sector, one of the largest in the world with over one billion workers, contributes 4% to the global GDP and helps drive economic growth (World Bank, 2023; Mupfasoni et al., 2018). One of the main foundations of food security (Neima *et al.*, 2023).

Aims: This study sought to uncover entrepreneurial activity and spirit to attain economic sustainability through industrial potato growing, and risks in Sulaimani Governorate, Kurdistan Region, Iraq.

Material and Methods: The study took place in Sulaimani governorate, Iraq. The farmer interviewed, observed, and talked to for this investigation used a single case study approach to qualitatively examine how farmers use agricultural entrepreneurship to attain economic sustainability through industrial potato production.

Results: This study classifies farmers as entrepreneurs based on their involvement in entrepreneurial activities like product diversification, hiring professional farmers, implementing an irrigation system, owning resources, conducting research and development, adding value to products, inter-sector interactions, and job creation. The farmer also shows entrepreneurial spirit through agro-climatic zoning, risk analysis, marketing strategies, vision, taking advantage of possibilities, motivating others, critical thinking, and resilience.

Conclusions: Green Iraq Company's Lays chips production was the biggest potential for farmers. Finally, political instability and financial services shortages were serious dangers.

Keywords: agriculture, entrepreneurship, entrepreneurial strategy

References

1. World Bank (2023). Agricultural and food. Retrieved from: <https://www.worldbank.org/en/topic/agriculture/overview>
2. Mupfasoni B., Kessler A. and Lans T. (2018). Sustainable agricultural entrepreneurship in Burundi: drivers and outcomes. *Journal of Small Business and Enterprise Development*. 25(1):64-80.
3. Neima H.A., Hassan K.M., Sirwan K. and Hameed K. (2023). Trends in broiler chicken meat production and food security in the Sulaymaniyah governorate. *Emirates Journal of Food and Agriculture*. 35(8): 701-707

EXPLORING THE FACTORS INFLUENCING ENTREPRENEURIAL DISABILITY AMONG ECONOMIC GRADUATES

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Introduction: The entrepreneurial behaviour of one person is influenced by different factors: socio-demographic characteristics, education, economic environment, however the factors that determine the entrepreneurial intention of a person are not clear (Linan *et al.*, 2011).

Aims: The purpose of this study was to identify which were the factors that affect the entrepreneurial intention of the graduates with economic studies.

Materials and Methods: An on-line survey was employed among inhabitants from North-West and West Development regions of Romania. A set of 20 items was used to determine the behaviour and entrepreneurial intention of the respondents. A total number of 582 responses were validated out of which 312 were from respondents with economic background, and included in the analysis. Furthermore, descriptive statistics was used to analyse the respondents' demographic profile. Principal component analysis with varimax rotation was conducted to reduce the dimensionality of the used items. Linear regression analysis was run to determine the prediction of professional attraction, entrepreneurial capacity, social norms and demographic characteristics on the entrepreneurial intention.

Results: The principal component analysis led to a four components solution, explaining 84.2% of the variance: entrepreneurial intention, professional attraction, entrepreneurial capacity and social norms. The regression analysis indicated that the professional attraction and entrepreneurial capacity are significantly positive influence the entrepreneurial intention ($\beta=0.301$, $p<0.05$; $\beta=0.724$, $p<0.05$), while social norms and age are significantly negative influence the entrepreneurial intention ($\beta=-0.201$, $p<0.05$; $\beta=-467$, $p<0.05$). Gender has no influence on the entrepreneurial intention of the participants.

Conclusion: The current studies revealed information on the entrepreneurial intention of those with economic background. It was confirmed that the entrepreneurial intention is influenced by the entrepreneurial capacity and professional attraction, being more attractive for young people.

Keywords: entrepreneurial intention, entrepreneurship, behaviour

References

1. Linan F., Rodríguez-Cohard J.C. and Rueda-Cantuche J.M. (2011). Factors affecting entrepreneurial intention levels: a role for education. *International Entrepreneurship and Management Journal*. 7:195-218.

STUDIES ON THE USE OF A EUROPEAN COMMUNICATION PLATFORM TO PROMOTE QUALITY AGRI-FOOD PRODUCTS

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Introduction: Communication networks play a crucial role in the development and modernization of agriculture. By connecting different actors in the production chain, these networks facilitate the cultivation of land, maintenance of natural pastures, ecological grazing, and the production and distribution of agricultural products. In Romania, the effectiveness of various communication channels in promoting natural grazing activities is being analyzed to address current challenges and identify opportunities for development. This research highlights the importance of communication networks in promoting sustainable and resilient agriculture in Romania. According to citizen surveys (Jackson, et al., 2020). Grazing-based production systems have the ability to produce high-quality foods like milk and meat while also having a favourable impact on a variety of socioeconomic and environmental factors because of their multifunctionality.

Aims: Increase awareness of the importance of grazing. Creating links between stakeholders: farmers, public institutions, educational institutions, researchers, and the public to improve farming practices. Support farmers in implementing grazing, environment, livestock, and population-based systems. Healthier food with less impact on natural resources. reduced greenhouse gas emissions.

Materials and Methods: The Materials and Methods section has been divided into two parts, the first part focusing on existing work in this area, while the second part of the Materials and Methods chapter has involved the creation of a national quality certification aimed at raising consumer awareness of the importance of local products, and products from sustainable grazing.

Results: The results chapter of this article provides a detailed analysis of the study's findings.

Conclusion: Communication is a powerful tool in driving progress and opening doors to new resources and opportunities in agriculture. It enables key players in agribusiness to connect, have their voices heard, and empowers marginalized communities and small farmers who practice neutral grazing methods to influence financing decisions that support these practices economically. By fostering dialogue and collaboration, communication plays a crucial role in promoting sustainable and inclusive agricultural practices.

Keywords: grazing, Geographical Indication, agribusiness

References

1. Jackson A., Green M., Millar K. and Kaler J. (2020). Is it just about grazing? UK citizens have diverse preferences for how dairy cows should be managed. *Journal of Dairy Science*. 103(4): 3250-3263.

RESPONSIBLE TOURISM IN PROTECTED AREAS: HUMAN-CENTERED DEVELOPMENT PATTERNS FOR ROMANIA

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Introduction: Nature-based activities are recommended for their well-being benefits to individuals, and research also indicates their significance in societal meaning-making processes. While the importance of a connection to nature is well-established for individuals, its role in societal contexts remains underexplored. Visitor experiences in these areas can be transformative, contributing to personal growth and well-being. However, how post-communist Romania manages its protected areas to enhance public health remains a topic requiring exploration. To address this, human-centered development patterns for responsible tourism in protected areas are being designed to improve people's health and well-being. Although design is often associated with product quality and aesthetics, its primary goal is to enhance people's quality of life. Designers focus on identifying and removing barriers to well-being, addressing emotional, cognitive, and aesthetic aspects across various life domains.

Aims: This study aims to evaluate the well-being benefits perceived by visitors to Romania's national and nature parks, with the objective of developing a prioritized, human-centered development framework for responsible tourism in these protected areas.

Materials and Methods: Service design, characterized by its collaborative and interdisciplinary approach, places humans at the center. It relies on research, prototyping, and a set of straightforward activities and visualization tools to create experiences that meet the needs of the 'business,' users, and other stakeholders.

Results: Recognizing that service design is not merely a theoretical exercise but an active endeavor, this research will propose practical solutions for implementation in Romanian national and nature parks to enhance well-being and create suitable settings and contexts for responsible tourism.

Conclusion: In this research we have demonstrated the necessity for research of this nature, utilizing these methodologies, methods, and tools.

Keywords: human-centered, protected areas, responsible tourism, service design, well-being

UNPACKING THE FARMS' NEEDS RELATED TO GRAZING THROUGH PARTICIPATORY INTERACTIVE WORKSHOP

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Introduction: The need for sustainable grazing management through co-development agroecological innovations in a multi actor approach is recognized by several researchers (Fielke *et al.*, 2018). In this process, knowledge sharing among farmers is crucial. The innovations implemented by some farmers are the best evidence of the benefits a grazing-based agricultural production system may bring. However, the success of adopting an innovative practice depends on the ability to identify the real needs at the farm level.

Aims: To reveal the current needs at the farm level related to grazing as a premise to develop tools/strategies to overcome the challenges a livestock farm is facing nowadays.

Materials and Methods: A participatory interactive workshop in person took place on 20 July 2023 at the University of Agricultural Sciences and Veterinary Medicine in Cluj-Napoca, Romania. It was attended by project Partner Farmers (50% PF) from the North-West Region of Romania. Needs at the farm level were identified within two groups of PF and presented back to the plenary.

Results: Several needs were identified at technical (e.g. lack of examples of farms practicing rational or rotational grazing, lack of regenerative agricultural group), political (e.g. lack of legislation adapted to grazing period, land leasing), environmental (e.g. carbon/biodiversity certificate, legislation on animal waste), social (e.g. lack of competent employees, lack of educated consumer), and economic/marketing levels (e.g. lack of market for living animals/processed meat, payment for quality).

Conclusion: Participatory interactive workshops are useful tools that can be successfully used to reveal and understand farmers' needs. Farmer's engagement through such actions may speed up the process of finding solutions to the current challenges.

Keywords: participatory approach, knowledge sharing, grazing

References

1. Fielke S.J., Botha N., Reid J., Gray D., Blackett P., Park N. and Williams T. (2018). Lessons for co-innovation in agricultural innovation systems: a multiple case study analysis and a conceptual model. *The Journal of Agricultural Education and Extension*. 24(1): 9-27.

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DISSEMINATION CHANNELS ADAPTED TO FARMERS NEEDS FOR IMPROVED AGRICULTURAL KNOWLEDGE AND INNOVATION SYSTEM

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Introduction: Knowledge and innovation play a key role in agriculture and rural areas to address current challenges like climate change risks mitigation, environment protection, circular economy etc. EU has different development AKIS pathways with countries with strong and integrated systems (Ireland, Austria, Denmark) in contrast with weak and fragmented ones (Greece, Portugal, Romania) (EU SCAR, 2019). Improve knowledge flows can boost the system performances through rapid innovation adoption by downstream industry actors (farmers, small rural industries, advisors etc.). Currently little is known about the efficiency of different dissemination channels in the process of innovation adoption in the downstream industry (Pathak *et al.*, 2019).

Aims: To identify the most efficient communication channels and tools adapted to the farmers needs from the grazing sector.

Materials and Methods: A web-based survey was launched in November 2022 on 183 farmers. The questionnaire was translated and implemented in 8 EU countries: France, Germany, Ireland, Italy, the Netherlands, Portugal, Romania, and Sweden. Throughout the study, the data are collected and stored online on Google Drive platform.

Results: Farmers need ready to use knowledge about animal husbandry practices and technologies as well as about grazing management. The most efficient ways to reach grazing farmers are: face-to-face interaction with advisors, researchers, farmers, technical people, etc.; peer-to-peer learning (learning from peers/colleagues); internet; printed media (e.g. magazines, newspapers, brochures, professional journals); advisory services and training courses. Less efficient tools are the ones used on large scales like: scientific journals; social media platforms; phone calls/SMS; TV/Radio Broadcast; Other (books, fairs, own experience)

Conclusion: The process of innovation transfer can be optimised by adapting the tolls to the farmers needs. Face-to-face interactions and peer-to-peer learning are the most efficient practices.

Keywords: AKIS, dissemination tools, peer-to-peer learning.

References

1. EU SCAR (2019). Preparing for future AKIS in Europe. Brussels, Belgium, 375 p.
2. Pathak H.S., Brown P. and Best T. (2019). A systematic literature review of the factors affecting the precision agriculture adoption process. *Precision Agriculture*. 20:1292–1316.

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TOWARDS A SUSTAINABLE FOOD SYSTEM THROUGH THE TRUE COST OF FOOD

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Introduction: The current challenges of the food system arise from unaccounted external costs, which remain absent from market prices and decision-making in food value chains (Hendriks *et al.*, 2021). Healthy diet benefits are also overlooked in pricing. While Europe's context lacks quantification, significant costs are expected. Until sustainable, healthy foods match profitability of unsustainable counterparts, obstacles to achieving sustainable food systems persist (Hendriks *et al.*, 2021).

Aims: The aim of this presentation is to summarize the side effects of agriculture, known as 'externalities' (Papandreou, 1994). Furthermore, the paper includes an overview of the existing policies within the EU and Romania that aim at integrating different externalities in the agri-food prices.

Materials and Methods: This work involves the gathering of pertinent data, and by scrutinizing the current policies in the EU and Romania concerning the integration of externalities, presenting the existing tools aimed at achieving accurate food cost assessment.

Results: There were 28 selected policies from Romania that can (a) be used for the mitigation of externalities and (b) incorporate externality costs in the final price of certain agri-food categories. The ultimate beneficiaries that were identified the most were the consumers, with 16 public policies being aimed at their benefit directly. Out of all the 28 policies, 19 had social externalities at their scope, 5 environmental externalities and 4 economic externalities.

Conclusion: Agriculture can create positive externalities - particularly through organic farming, and negative externalities – such as air pollution, etc. The existing food pricing system needs a comprehensive and inclusive approach that accounts for externalities.

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Keywords: European Union, food system, Romania, sustainability

References

1. Hendriks S., de Groot Ruiz A., Herrero Acosta M., Baumers H., Galgani P., Mason-D'Croz D., et al. (2021). Scientific Group of the UN Food Systems Summit 2021. Retrieved from United Nations Food Systems Summit 2021: https://sc-fss2021.org/wp-content/uploads/2021/06/UNFSS_true_cost_of_food.pdf

IMPORTANCE OF QUALITY LABELS IN MARKETING FOOD PRODUCTS

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Introduction: Everyday food practices are constantly changing (Amilien *et al.*, 2022), the demand for local food in the world is in a process of continuous growth and quality labels are becoming a tool that plays an important role in consumer choices. Capturing the attention of consumers by providing certain information about quality, origin, food culture, local economic development, becomes a "must" in the development of marketing strategies.

Aims: The aim was to investigate the level of knowledge and acceptance of quality labels among consumers and to find means to support the increased use of quality schemes in sustainable and innovative marketing strategies in Europe, taking into account the sustained efforts of the European Union to develop a „fairer, healthier, and more environmentally friendly food system by 2030” (European Commission, 2020).

Materials and Methods: The bibliographic method was used to explore research performed in several European countries. The analysis focused mainly on the level of knowledge, consumption habits and willingness to pay for quality food products.

Results: The need for quality food products and the affinity for the area of origin of food have grown in importance in recent years. However, the level of knowledge of quality schemes is still quite low. It was also found that marketing strategies that include consumer information campaigns are more efficient. Improving knowledge levels and continuous correct communication with the consumer should be the target, leading to an increased willingness to pay more for quality food products.

Conclusion: The quality label is a necessary element in shaping consumer behaviour, a marketing tool used to show consumers the efforts of producers to improve product quality, and an important support for the development of the communities in which we live.

Keywords: consumer preferences, informed choices, quality food label

References

1. Amilien V., Discetti R., Lecoœur J.L., Roos G., Tocco B., Gorton M., Biasini B., Menozzi D., Dubois de Labarre M., Filipović J., Meyer K., Török A., Veljković S., Wavresky P., Haugrønning V., Csillag P., Simons J. and Ogjanov G. (2022). European food quality schemes in everyday food consumption: An exploration of sayings and doings through pragmatic regimes of engagement. *Journal of Rural Studies*. 95:336-349.
2. European Commission (2020). A farm to fork strategy for a fair, healthy and environmentally-friendly food system. European Commission, Brussels.

A REVIEW OF FOREIGN LANGUAGES IN ADVERTISING AND PRODUCT PACKAGING: SOCIO- AND PSYCHOLINGUISTIC PERSPECTIVES

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Introduction: There has been a salient academic interest on the impact of foreign languages (FLs) in advertising that has includes varied fields such as linguistics, marketing, multilingualism, sociolinguistics, psycholinguistics, international advertising, and consumer research. This interest of FLs in advertising has been largely researched through the lenses of socio- and psycholinguistic perspectives. The former looks at the psychological and neurological factors that enable humans to process a foreign language and the mental representation involved in comprehending the marketing messages whereas delves into how society influences the usage of language and its connotations related to its country of origin.

Aims: Based on the numerous theories that exist on for language-related IB research and drawing on the intertwining nature of Fls in advertising with the theories of linguistics, sociolinguistics and psycholinguistics, we have singled out the most prominent theories in this review we group the review into two big clusters: FLs as symbols and ethnocultural associations and FLs as mental processes. These clusters aim to give an insight into the competences and mechanisms of FLs in advertising and how they affect consumer behavior.

Materials and Methods: In our search for linguistic theories relevant for the study on foreign languages (FLs) in advertising, we retrieved relevant literature through the electronic database ‘Taylor & Francis Online’ which provides access to journals spanning Marketing, Linguistics, Psychology, Social Sciences etc. It also houses the ‘Journal of International Consumer Marketing’ which has contributed with seminal research on FLs in advertising and product packaging.

Conclusion: Based on the concise linguistic theories presented in our article, we believe that research on foreign languages in advertising and packaging on consumer behavior can be greatly advanced through direct and conceptual replication of the seminal studies mentioned our article, taking cue also from the clusters of linguistic theories that shed light on the complex role of language on consumer behavior.

Keywords: advertising, country-of-origin, foreign-language display, association

BIBLIOGRAPHIC STUDY ON THE DEVELOPMENT OF TOURISM IN PROTECTED AREAS

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Introduction: Protected areas primarily exist to protect and safeguard biodiversity. With judicious management, these areas can serve multiple objectives, including tourism development. Tourism in protected areas is expressed differently, depending on visitor preferences (Telbisz *et al.*, 2020). The management of protected area must consider tourists' expectations (Wang *et al.*, 2022) capitalizing on both the natural and the cultural heritage potential of the area (Esfehani *et al.*, 2018).

Aims: Studying recent developments on tourism in protected areas holds great significance. Tourism can bring forth numerous advantages. Yet, in the case of protected areas, it is imperative to scrutinize the potential adverse repercussions that succeed from unrestricted growth of tourism, in order to achieve sustainability.

Materials and Methods: A bibliographic method was used on scientific articles published in the last 10 years to study the scientific literature on the development of tourism in protected areas.

Results: The growth of tourism in protected areas provides an opportunity for development, yet it may stir dissatisfaction among local communities. Development directions must start from capitalizing on the natural and cultural potential of the area, finding a balance with biodiversity conservation.

Conclusion: This article's scope extends to examining the current situation of tourism in Romania's protected areas. Its results aid in the implementation of new directions and establishing objectives to attain sustainable development in tourism.

Keywords: sustainable development, protected areas, sustainable tourism

References

1. Esfehani M.H. and Albrect J.M (2018). Roles of intangible cultural heritage in tourism in natural protected areas. *Journal of Heritage Tourism*. 13(1):15-29.
2. Telbisz T., Sulc I., Mari L. and Kaufmann P.R. (2022). Attitudes and preferences of visitors of Krka Natinal Park,Croatia. *Hungarian Geographical Bulletin*.71(2): 117-132.
3. Wang B., He S., Sun Y. and Min Q. (2022). Giving voice to tourists: Improving the governance of protected areas through tourists' perceptions and expectations. *Forests*. 13(9):1523.

KRISP AS A NEW RURAL INNOVATION PARADIGM: LOCAL DECISION-MAKERS PERSPECTIVE

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Introduction: Regional development, rural development, and culture all affect rural attractiveness. Development includes regional and rural development. Global information growth has increased Internet information resources. Many information resource systems are constructed utilizing different platforms and languages, resulting in heterogeneous platforms (Zou et al., 2009). Accessibility and Internet use among rural communities are required to take advantage of information development potential (Stojić, 2023).

Aims: Create a Kurdistan Rural Information System Platform (KRISP) to gather and publish farmer-collected rural data online.

Material and Methods: The study took place in rural Sulaimani, Kurdistan, Iraq. This SWOT-analyzed focus group interview includes six agricultural directors as decision-makers.

Results: The current position of the Agricultural director was disclosed, enabling future development through the utilisation of SWOT analysis. The primary finding underscores the significance of adopting KRISP in rural regions, notwithstanding potential extrinsic influences that may impact its efficacy.

Conclusions: Identify process owners: Process owners, especially leaders, were identified, and maintain process relationships: Business processes are not separate, so they are represented with attention. Recording all process modeling stages allowed the discovered processes to be examined, analysed, and validated. Note that the documentation was both physical and digital.

Keywords: Rural Innovation, Rural Management, KRISP

References

1. Stojić V. (2023). Information and communication technologies and rural development of Serbia. *Ekonomika*. 69(1):69-80.
2. Zou J., Yang L. and Sun R. (2009). Research and design of rural information service platform based on Soa. *Computer and Computing Technologies in Agriculture II*. 3:1863-1869.

THE STUDY OF EXPLORING THE POLICY OF SEED MANAGEMENT SYSTEMS (PSMS)

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Introduction: Seeds fulfill several roles within the agricultural sector, hence assuming a pivotal position in a multitude of discussions encompassing rural development, food security, biodiversity, business growth, knowledge, and technology, as well as cultural aspects.

Aims: This study seeks to examine the progression of seed systems in the Kurdistan Region, with a specific focus on the rationale and methodology behind the selection of the formal seed system over alternative options.

Material and Methods: This study addresses analytical questions and main research questions by gathering additional data through mixed methods and interviews with key actors in the seed sector in Kurdistan. To conclude the data, focus group discussions with 27 representatives of experts and researchers from public and private institutions in agricultural and environmental governance, including public seed enterprises, private seed companies, decision-making and regulatory bodies, NGOs, agro-dealers, and extension service providers.

Results: The general view among the participants was that the seed policy of the region is essential. The answered questions were noted by a comprehensive investigation of the structure of both policies. The findings addressed the knowledge gap on the impact of policies and programs on agricultural diversification. They also highlighted the substantial investment made in the seed industry by the Kurdistan Regional Government (KRG), driven by the objective of enhancing seed and other related systems.

Conclusions: The analysis facilitates comprehension of how the government has prioritized certain seed sector initiatives while ignoring others from various politicians. It also examines the policy orientations, advantages, disadvantages, and potential dangers associated with these decision-making processes. The guiding concepts of the strategy shall be informed by principles developed from the nation's experience and study of obstacles and potential within the current seed sub-sector.

Keywords: seed management system, seed policy, management strategy

References

1. Spielman D.J. and Kennedy A. (2016). Towards better metrics and policymaking for seed system development: Insights from Asia's seed industry. *Agricultural Systems*. 147:111-122
2. Almekinders C.J.M., Mausch K. and Donovan J. (2021). Editorial introduction: Design issues and practical questions for demand-oriented seed systems. 50(4):353–355.

CURRENT TRENDS IN RESEARCH ON THE ROLE OF UNIVERSITY LIBRARIES IN STUDENTS' ACADEMIC SUCCESS: A REVIEW

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Introduction: Universities frequently ask their libraries to document their value in order to receive resources. The students' academic success is considered as a measure of institutions' performance and their departments, therefore also of the libraries. It is defined by academic achievement, satisfaction, acquisition of skills and competencies, persistence, achievement of learning goals and career success. ISO standards for assessing library performance and impact on individuals are ISO 11620 and ISO 16439.

Aims: The purpose of this paper is to review the literature to determine the impact of university libraries on student academic success.

Materials and Methods: Web of Science Core Collection and Google Scholar were used to identify scientific articles. The search terms were: "academic library", "library impact" and "student success". The following restrictive settings were used: document type: article, publication period: 2002-2023. A number of 35 scientific articles were investigated.

Results: The most used elements to measure students' academic success were: grade point average, semester grades and retention. The most used library services were: borrowing, information literacy, library visits, using the computer and consulting the library's online catalog. The use of various services and resources from the academic library had a positive influence on the grade point average, retention, semester grades, persistence. Also, libraries have a role in maintaining academic integrity and promote 9 SDGs (Mashroofa, 2022). Regarding sustainability, the focus is on environmental aspects (Tribelhorn, 2023).

Conclusion: The literature analyzed in this research shows that university libraries have a clear positive impact on the students' academic success. The importance given to this subject increases starting from 2017. Another aspect that should be mentioned is the fact that there are no articles that come from the Central and Eastern Europe region.

Keywords: academic library, library impact, student success

References

1. Mashroofa M.M. (2022). Contribution of academic libraries towards sustainable development goals. *Annals of Library and Information Studies*. 69:51-58.
2. Tribelhorn S.K. (2023). Preliminary investigation of sustainability awareness and activities among academic libraries in the United State. *The Journal of Academic Librarianship*. 49:102661.

THE VALUE CHAIN AND SUSTAINABLE EFFICIENCY OF INDUSTRIAL POTATOES THROUGH AN ENTREPRENEUR

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Introduction: The value chain is a high-level representation of the processes by which firms take in raw materials as input, add value to the raw materials through various processes, and then sell completed goods to customers (Akyüz *et al.*, 2023), and it provide comprehensive information on the whole production process, from the original production and producers to the final uses and consumers (Hellin and Meijer, 2006).

Aims: This study was to conduct a comprehensive analysis of the industrial potatoes value chain, with a specific focus on mapping out the major actors involved.

Material and Methods: The study was carried out in the rural districts of Sulaimani Governorate, Kurdistan Regional of Iraq. This study is a survey with employed purposive sampling techniques.

Results: The main actors in the value chain for industrial potato production were identified: input suppliers, producers, processors, traders, and the ultimate users. The producer (potato farmer) was the focus of the study, followed by input suppliers in the backward, and processors, traders, and consumers in the forward.

Conclusions: The biggest opportunity was industrial potato production (increased product value and enhanced seed). In contrast, industrial potato value chain restrictions were expensive market pricing for production resources, corporate product terms, lack of banking service, and market unfamiliarity with this type of potato.

Keywords: value chain, entrepreneurship, sustainable efficiency

References

1. Akyüz Y., Salali H.E., Atakan P., Günden C., Yercan M., Lamprinaki, L., Kårstad S., Solovieva I., Kasperczyk N., Mattas K. and Lazaridou D. (2023). Case study analysis on agri-food value chain: A guideline-based approach. *Sustainability*. 15(7):6209.
2. Hellin J. and Meijer M. (2006). Guidelines for value chain analysis. Food and Agriculture Organization of the United Nations (FAO). Rome. Italy.

TOURIST ALTERNATIVES BASED ON GLAMPING IN THE NORTH-WEST REGION OF ROMANIA

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Introduction: Recent studies show that rural tourism consumers prefer locations made up of small accommodation units, where they can enjoy an ambient environment, additional or complementary services and activities in the open air, tastings of local gastronomy, or even participation in agricultural activities such as collecting hay, crops, vegetables or fruits.

Aims: Considering the current socio-economic context, the present study aims to identify some future trends in the new normal (Alatovic, 2020) relevant from the perspective of agritourism, in general, and glamping in particular, which would lead to the increase of the economic competitiveness of the NW Region of Romania, by capitalizing on local and regional agritourism potential.

Materials and Methods: The research was of a theoretical-applicative type, as it includes both theoretical analyzes (previous academic research, reports of public authorities, governmental institutions, international and community bodies), as well as a case study – here we applied the Balanced Score Card (BSC) strategic planning, because the study aims to identify some directions of action so that the conclusions drawn are transposed into the reality of the economy.

Results: Against the background of the Covid-19, people have become aware of the necessity and special importance of inter-human relations and the connection with nature, the consumption of technology, including marketing methods, has developed exponentially. In tourism, communication channels have multiplied and the community of people promoting tourism through various e-platforms has grown. Our study shows that the tourist potential of the NW Region of Romania has been rediscovered and amplified, and glamping is still a niche tourist segment.

Conclusion: Glamping represents a niche tourism activity separated from the camping segment, which entered the portfolio of the hospitality and tourism industry relatively recently, being a trend of outdoor tourism. Due to its environment-friendly nature, this form of tourism contributes significantly to the development of sustainable agritourism in Romania.

Keywords: sustainable agritourism

References

1. Alatovic T.K. (2020). The path to the next normal, <https://www.mckinsey.com/>

SESSION 6: ANIMAL SCIENCE

CHALLENGES OF SEQUENCING TECHNOLOGIES: FROM GENOTYPING THE RS12979860 OF *IL28B* HUMAN GENE TO WHOLE GENOME SEQUENCING OF *DROSOPHILA SUZUKII*

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Introduction: Sequencing technologies shaped the very foundation of Genomics. The first universally utilized sequencing method was developed by Sanger *et al.* (1977), who pioneered the use of chain-terminating dideoxynucleotides. Although Sanger method has a history of over 40 years, is very accurate and was critical for the first whole genome sequencing projects, it has limitations regarding the number of DNA fragments that can be concurrently inferred or read, and comes with a relatively high cost per base. These weaknesses of Sanger method were addressed by highthroughput methods that allow generation of millions of reads in a relative short time, known as Next Generation Sequencing (NGS) and Third-Generation Sequencing (TGS), respectively. Regardless of the sequencing project, arguably the most critical phase is to align or place (assemble) the reads within the correct context, either relative to a reference DNA sequence or relative to each other. These assembly procedures are chanced by read length and quality, as well as by the references' particular genomic artifacts, such as duplications or long repetitive sequences.

Results and Discussions: Herein, I am presenting several challenges encountered whilst handling sequencing projects by making use of the aforementioned technologies. The provided examples are referring to specific issues, such as the impact of duplicated genes and small indels over Sanger and NGS data interpretation in clinical and research contexts. Moreover, the nanopore TGS method reliance on effective IT and laboratory infrastructure is argued. The preliminary sequencing and assembly data generated by the first Romanian genomic project focused on *Drosophila suzukii* are also presented.

Conclusion: Genomics enterprises and sequencing technologies are intimately linked. Nonetheless, sequencing and data analysis methods are still accommodating for the remarkable genome complexity and their own intrinsic flaws. Various fast genome assemblers provided a first glimpse into the genome of a local *D. suzukii* population.

Keywords: *Drosophila suzukii*, sequencing, genome assembly

References

1. Sanger F, Nicklen S, Coulson AR (1977). DNA sequencing with chain-terminating inhibitors. PNAS USA. 74(12):5463-7.

NUTRITIONAL METABOLIC CHALLENGES OF HORSE MANAGEMENT

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Introduction: This presentation provides an overview of the metabolic diseases that are challenging the nutritional management of horses. In 2010, the primary use of horses in Indiana state, United States was 70+% recreation, trail riding, show and racing (Couëtil and Russell, 2013). Most of the equine metabolic diseases including laminitis, developmental joint abnormalities, physitis/epiphysitis, osteochondrosis, acidosis, ketosis, alkali disease, rickets/osteomalacia, rhabdomyolysis, equine metabolic syndrome (EMS), exertional rhabdomyolysis and even colic can be the result of human decisions related to feeding management and exercise, (D. Frape, 2010 and Geor, 2013). Most of the horse owners in the U.S. have non-farm employment, have some discretionary income and little previous knowledge of livestock, agriculture, or horse training & management needs. This presentation will focus on the human horse manager and common trends in feeding as the primary cause of most of the nutritionally-caused metabolic diseases.

Materials and Methods: Most owners have relied on commercial feed supplement companies and their horse nutritionists as well as their veterinarians for advice and guidance in planning their feeding programs. There are many equine neglect situations in the United States which lead to undernourished horses yet most recreational horse owners often overfeed their horses with metabolic consequences. For several years, extension educators and veterinarians have relied on the Henneke Body Condition Scoring system (Brady et. al, 2014) to use both visual appraisal and palpable fat cover of the six major points of the horse that are most responsive to changes in body fat. This method was original designed to measure body condition of brood mares to evaluate reproductive conception efficiency. This presentation will challenge the attendees to consider how they collaborate with horse owners and farmers to defining requirements and absorption of nutrients, improve feeding management and eating behaviors and feed the digestive tract & bacteria – not just the horse and intend to prevent rather than treating clinical problems.

Conclusion: The intended outcome of this abstract is that conference attendees will be more aware of the equine health challenges that are primarily caused by owner/manager decisions and evolving genetic intolerance to horse feeding and exercise management practices.

Keywords: Equine, owners and managers, horse nutrition, metabolic diseases

References

1. Couëtil L. and M. Russell (2013). Economic Impact of the Horse Racing and Breeding Industry to Indiana, Purdue Extension, Product code: #ID-445-W.
2. Brady C., C., J. Sojka & M. Russell (2014). Introduction to Body Scoring of Horses, Purdue Extension, Product code: #AS-552-W.
3. Frape David, (2010). Equine Nutrition and Feeding 4th Edition, Wiley & Blackwell, ISBN: 978-1-405-19546-1.
4. Geor, (2013). Equine Applied & Clinical Nutrition, Elsevier Health Sciences Division, SBN: 9780702034220.
5. Leatherdale Equine Center, College of Veterinary Medicine, University of Minnesota.

ZOOTECNICAL EVALUATION OF A POPULATION OF LACAUNE SHEEP BREED RAISED IN THE NORTHEAST REGION OF ROMANIA

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Introduction: The Lacaune sheep breed is a relatively recently imported breed in our country and flock numbers are small compared to other sheep breeds raised in Romania. This breed is known for its high milk production during the lactation period, as well as for being very well suited to mechanical milking.

Aims: The aim was to obtain data from the work and study carried out on the livestock on the farm, which can be used both by the farmer and by specialists in order to develop methods to improve productive performance, husbandry management and adaptation of animals to the area of rearing.

Materials and Methods: The study was carried out on a flock of 392 mature sheep of the Lacaune breed. Data collection was done by studying the farm's records, those of the zonal veterinarian and those of the association carrying out the COP (Official Performance and recording scheme), determination of milk yield and of body weight by weighing; taking body measurements of the flock: height at the withers, torso length, width of the chest, width of the croup and chest girth. The tools used for measurement were an electronic scale, measuring stick, compass, and tape measure. The descriptive statistic was used for data analysis.

Results: The average milk yield for the flock during the 120-day lactation and control period was 120.86 ± 8.59 kg. Weighing gave an average weight of 69.41 ± 0.80 kg for ewes, For rams, the average weight was 88.8 ± 0.02 kg and for yearling ewes 65.66 ± 0.59 kg. The height at withers for ewes averaged 67.48 ± 1.23 cm, for rams 79.8 ± 0.05 cm and for yearling ewes 65.58 ± 0.44 cm. Measurements of chest width gave an average of 26.18 ± 0.78 cm for ewes; for rams 30.6 ± 0.05 cm and for yearling ewes 23.01 ± 0.38 . For the width of the croup, the average value for the ewes was 28.21 ± 0.78 cm; for rams the average value was 33.2 ± 0.09 cm and for yearling ewes 23.62 ± 0.38 cm. Torso length for ewes had an average value of 71.68 ± 0.46 . For rams, the average torso length was 75.5 ± 0.03 cm and for yearling ewes the average value was 70.62 ± 0.29 cm. The average chest girth of ewes was 101.98 ± 0.50 cm. In rams, the average chest girth value was 119.7 ± 0.02 cm, while in yearling ewes was 96.99 ± 0.29 cm.

Conclusion: The population of the breed under study is within the breed standard and has a good adaptability to the breeding environment, which can lead to increased production traits if efficient management is adopted.

Keywords: Environement, Lacaune breed, morphometric traits

STUDY REGARDING ESTIMATION OF HERITABILITY FOR MILK PRODUCTION TRAITS IN HOLSTEIN CATTLE

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Introduction: The success of animal husbandry breeding programs heavily relies on a comprehensive comprehension of heritability, which enables them to enhance desirable traits expediently. In this particular investigation, the objective is to identify the heritability levels of milk, fat, and protein yields in Holstein cows from a Romanian dairy farm.

Aims: The objective of this study is to ascertain the heritability values pertaining to production traits, which will furnish insights into the genetic regulation of milk, fat, and protein yields. The findings of this study are crucial in formulating breeding strategies and executing genetic selection methodologies to enhance production.

Materials and Methods: In this study, 16 Holstein bulls and their 542 daughters were observed, and their monthly milk samples were carefully analyzed using advanced Combifoss equipment. The 305-day yields were calculated utilizing the Test Interval Method, which excluded cows with less than seven tests from the analysis. To estimate heritability, a thorough analysis of variance (ANOVA) was conducted, and standard deviations and standard errors were then calculated.

Results: The research revealed heritability estimates of 0.15 for milk yield, 0.30 for fat output, and 0.64 for protein yield. The aforementioned figures indicate differing levels of genetic influence on the production parameters, with protein yield exhibiting the most pronounced genetic component.

Conclusion: This study offers valuable insights into the genetic factors influencing milk, fat, and protein yields in Holstein cattle in Romania. The findings suggest that genetic selection may prove more impactful in boosting protein yield than milk yield. However, the study does recognize some limitations in the methodology employed and underscores the importance of continued research to enhance breeding strategies while considering environmental factors.

Keywords: Dairy cattle, improvement, breeding plan

INNOVATIVE FEED PREPARED FOR IMPROVING PRODUCTIVE, REPRODUCTIVE PERFORMANCE, QUALITY ON DAIRY PRODUCTS, REDUCING ENVIRONMENTAL POLLUTION IN COW FARMS

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Introduction: The current project is carried out by the University of Life Sciences "King Mihai I" from Timișoara, with partners Narcisa Bovine Breeders Association, C.S. Canamar SME, and C.S. Rogera Service SME.

Aims: The main objective has been to establish an operational group (OG) comprised of a university, a cow breeding association, and two SMEs, specifically a milk processing enterprise and a feed production company, to jointly develop a product that stimulates innovation in dairy cattle farms by providing nutritional solutions to enhance productive performances, reproductive efficiency, and the final dairy product quality. Secondary objectives were focused on developing and employing an innovative feed preparation for dairy cows within the OG, training farmers, and publishing a brochure.

Materials and Methods: The innovative feed prepared was tested in two dairy farms establishing the effect on the quantity and quality of the milk as well as the reproductive indices.

Results: The project will create benefits for the OG members, such as the adoption of protein raw material production technologies and techniques for fabrication and utilisation of feed preparations via training and workshop held within the project, improvement of milk yield and its quality, followed by reproductive parameters, and reducing environmental pollution by the inclusion of the preparation of the feed in diet of dairy cows.

Conclusion: In the present research work, we demonstrated that innovative feed prepared tested in two dairy farms improved the quantity and quality of the milk as well as the reproductive indices.

Keywords: Operational group, cow breeding, feed prepared

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APPLICATIONS OF VARIOUS NATURAL MINERALS IN LIVESTOCK AND FEED PRODUCTION: A REVIEW

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Introduction: The livestock industry, as an important part of agriculture and the modern food chain, is more and more challenged to address issues regarding animal welfare, environmental impact and sustainability questions on its entire production chain. Hence, the use of natural feed additives with the potential of improving livestock production are of high interest.

Aims: To investigate the inclusion of naturally occurring and commercially available minerals in animal feeds, and their effect on the various zootechnical parameters.

Materials and Methods: Adhering to the PRISMA guidelines for systematic reviews, an extensive literature search was carried out on previously published studies detailing responses of use of bentonite, talc, diatomite, kaolin and zeolite on feed production, farm animal performances and emissions mitigation.

Results: The metamorphic (talc) and sedimentary (bentonite, diatomite, kaolin and zeolite) minerals are classically used as technological additives (anticaking agents, moisture and lipid binders, carriers), improving the flowability, reducing abrasion and costs in premix and feed production. In addition, bentonites are proven to be highly effective as mycotoxin binders, showing an *in vitro* aflatoxin adsorption capacity of >90% (Vekiru et al., 2015), reducing the toxin burden on the gastrointestinal tract and improving production parameters in poultry, swine and ruminants (Di Gregorio et al., 2014). In recent studies, diatomite was found to be effective in ectoparasite control in livestock or as an animal performance enhancer, while kaolin improved intestinal integrity in layers and piglets. The use of zeolite as a natural feed additive in poultry production resulted in increased body weight, decreased mortality, while also lowering volatile N-NH₃ concentrations, demonstrating its potential to improve the housing environment (Prasai et al., 2017).

Conclusion: The naturally occurring minerals highlighted in this study show promising contributions towards improving the livestock industry when considering sustainable production. In the view of generating relevant scientific data, further investigations are recommended on the use of these minerals in poultry, swine and ruminant production systems.

Keywords: Natural minerals, livestock, feed additives

References

1. Di Gregorio MC, Neeff DV de, Jager AV, Corassin CH, Carão AC de P, Albuquerque R et al.(2014). Mineral adsorbents for prevention of mycotoxins in animal feeds. Toxin Reviews. Taylor & Francis; 1;33(3):125–35.
2. Prasai T.P., K.B. Walsh, D.J. Midmore, S.P. Bhattarai (2017). Biochar, zeolite and bentonite feed supplements influence broiler growth and meat yield and excreta properties. Europ. Poult. Sci. Dec;81.
3. Vekiru E, Fruhauf S, Rodrigues I, Ottner F, Krska R, Schatzmayr G, et al. (2015). In vitro binding assessment and in vivo efficacy of several adsorbents against aflatoxin B1. World Mycotoxin Journal. Wageningen Academic Publishers; 8(4):477–88.

SESSION 7: BIOTECHNOLOGY

HEMPSEED (*CANNABIS SATIVA*) AND FUNCTIONAL ANIMAL FOOD PRODUCTION IN POULTRY

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Abstract. The hemp (*Cannabis sativa*) is well known plant for food source from ancient times. Non drug varieties called “industrial hemp” commonly referred as hemp have been studied extensively for their nutritional potential. Hempseed, hempseed meal and hemp oil and other active substances are good source of nutrition for laying hen and meat type birds. Hempseed contain high protein and oil and its oil contain *omega* fatty acids and when fed the birds transferring to eggs and meat. In broiler, layers and other poultry birds it is used in different forms, doses and duration. In this presentation, several aspects of beneficial effects of hempseed in poultry feed on feed intake, weight gain; feed conversion ratio, carcass yield, egg production and quality with possible mechanism of action are discussed.

Key words: Hemp seed, broiler, layer, functional food production.

BIOACTIVE PROPERTIES OF ROYAL JELLY: A COMPREHENSIVE REVIEW WITH A FOCUS ON ITS ANTICANCER, ANTI-INFLAMMATORY, AND ANTIOXIDANT EFFECTS

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Introduction: Since ancient times, mankind has taken advantage of the benefits associated with beehive products. Royal jelly (RJ) is a yellowish-white, creamy substance secreted in the hypopharyngeal and mandibular glands of worker bees. RJ has been one of the most widely used natural products in alternative medicine for centuries, exhibiting an extraordinary complexity in terms of its composition, which includes proteins, lipids, glucids, polyphenols, vitamins and hormones. For humans, RJ represents a very important nutraceutical, functional food and nutritional supplement that can effectively complement a healthy diet. Furthermore, a wide range of studies reported its therapeutic properties, such as anticancer, anti-inflammatory and antioxidant activities, to name a few. In this direction, there is a wide range of health-related problems, like cancer or inflammatory diseases, for which RJ has been proven to be a key player in finding a valuable alternative treatment. Importantly, RJ possesses an impressive array of bioactive compounds: major royal jelly proteins, 10-hydroxy-2-decenoic acid, hormones and phenolic compounds. These biologically active components are thought to be responsible for RJ's beneficial effects.

Aims: The present review aims to highlight the great impact of RJ as an alternative medicine, with a special focus on its anticancer, anti-inflammatory and antioxidant properties, by discussing groundwork in this domain, as well as a wide range of novel studies and by presenting the latest and most significant research work. Moreover, a link was made to its apitherapeutic potential, by discussing its chemical composition and main bioactive compounds.

Conclusion: RJ can be part of a nutritional intervention, complementing a healthy lifestyle. Together with proper medication, it can help relieve the symptoms of different illnesses and improve quality of life, through its powerful antioxidant, anti-inflammatory and anticancer activities.

Keywords: Anticancer, anti-inflammatory, antioxidant, apitherapy, royal jelly

NEW ANTIMICROBIAL PEPTIDES

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Introduction: The emergence of antibiotic resistance poses a substantial risk to public health, necessitating the urgent development of novel antimicrobial drugs as a crucial measure to combat this problem. The process of generating novel antimicrobial peptides (AMPs) entails the alteration of existing natural peptides or the development of wholly new peptides that possess distinct structural attributes and modes of action.

Aims: To design, obtain, and characterize new peptides with antibacterial potential and capability to penetrate human cells.

Materials and Methods: Six peptides were synthesized and analyzed using MALDI-TOF-MS. The broth microdilution method was employed to ascertain the peptides' minimum inhibitory concentration in two bacterial strains (*S. aureus*, *K. pneumoniae*). The peptides' cytotoxicity, cell proliferation, and cellular metabolic activity in MDA-MB-231 and MCF-7 breast cancer cells and mesenchymal stem cells were assessed using microscopy and Alamar Blue assays.

Results: The antibacterial action against the tested bacteria is contingent upon both the sequence of the peptides and their concentration. Most peptides exhibited no toxicity in the breast cancer cell lines, while all six showed no toxicity in the mesenchymal stem cells.

Conclusion: The development of peptide-based therapeutic systems necessitates the design of peptides with various capabilities: to penetrate the cell membrane, exhibit prolonged circulation, and demonstrate non-toxicity and non-immunogenicity in humans.

Keywords: Antimicrobial peptides, cancer, human diseases, toxicity

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MEMBRANE ACTIVE PEPTIDES AND THEIR POTENTIAL BIOMEDICAL APPLICATION – A REVIEW

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Introduction: Peptides play vital roles, including interactions with cell membranes for drug delivery and therapeutics. They disrupt membranes through intricate assemblies, adjusting to changes in the environment. Effective peptide design entails grasping their structure, composition, and environment. Antimicrobial peptides (AMPs) research explores varied environments using mimicked vesicles. Membrane-active peptides (MAPs) include AMPs and cell-penetrating peptides (CPPs), recently seen as interconnected. Some CPPs mimic AMPs, which are vital for host cell entry and antibacterial roles. CPPs surmount membrane challenges for cellular transport with medical potential. Tumor-homing peptides (THPs), a CPP subset, target tumors for therapies, shaping drug development and cellular insights.

Aims: To provide a comprehensive understanding of MAPs and their applications, based on a literature search, merging diverse research into a cohesive overview, which emphasizes their role in cellular behavior, guides future research, and imparts their significance in biotechnology and medicine.

Conclusion: This paper offers a comprehensive view of MAPs, encompassing their versatile roles, synthesis methods, and potential applications in antimicrobial therapy and drug delivery. It highlights their ability to interact with cell membranes and target microbes effectively.

Keywords: Antimicrobial peptides; cancer; cell-penetrating peptides; drug delivery; tumor-homing peptides

References

1. Gostaviceanu A., Gavrilas S., Copolovici L. and Copolovici D.M. (2023). *Pharmaceutics*, 15(8), 2091; <https://doi.org/10.3390/pharmaceutics15082091>

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CYPRINIDAE PROCESSING IN ROMANIA: EXPLOITING HYPOPHthalmichthys nobilis AND HYPOPHthalmichthys MOLITRIX FOR ENHANCED VALUE IN AQUACULTURE

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Introduction: The fishing industry in Romania has a rich tradition of processing fish to maximize the utilization of catch obtained through fishing and aquaculture. By utilizing less valuable fish species in the processing phase, resource utilization can be optimized, and economic benefits can be generated.

Aims: The main goal of this study is to examine the economic and ecological advantages associated with the processing of lower-valued fish species, using a range of processing techniques such as fish paste, smoked goods, and fillets.

Materials and Methods: An investigation was carried out on the *Hypophthalmichthys nobilis* specimens that were bred in the Bârca fish farm in Iasi County. The data collected focused on fish production, processing methods, and the resulting outcomes. The study involved a precise process of selecting, cleaning, and processing the head carp into a variety of value-added products. At every step of the way, a range of quality control techniques and inspections were implemented to ensure the quality of the final products.

Results: According to our research, the Bârca fish farm greatly benefits from the presence of head carp and silver carp. Head carp, in particular, consistently makes up 22% to 27% of the total fish catch, underscoring the value of processing lower-valued species to boost overall yield. Moreover, utilizing these species allows for a diverse range of fish products that cater to various market sectors, resulting in additional revenue.

Conclusion: Research has demonstrated that Romanian aquaculture can benefit both the economy and the environment by processing lower-valued fish species, such as head carp and silver carp. This targeted approach has resulted in a marked increase in the populations of more valuable species, thus promoting sustainable resource management. The study underscores the potential to enhance output, meet consumer needs, and advance sustainability in the fisheries industry.

Keywords: Aquaculture, ecological sustainability, economic benefits, fish processing, lower-valued fish species, resource utilization

MICROBIAL DIVERSITY AND FUNCTIONAL CHARACTERISTICS OF BEE BREAD: A COMPREHENSIVE REVIEW

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Introduction: Bee bread, a vital component of honeybee hives, is a fermented mixture of pollen, nectar, and honey, serving as a primary protein source for honeybee colonies. Understanding the microbiology of bee bread is essential, as it plays a pivotal role in hive nutrition and immunity. **Aims:** This literature review aims to synthesize existing research on bee bread microbiology, shedding light on microbial diversity, functional roles, and their implications for hive health.

The primary objective of this review is to provide a comprehensive overview of studies conducted on bee bread microbiology.

Materials and Methods: A thorough review of the existing literature, spanning multiple studies across various geographical regions and methodologies was conducted.

Results: This review revealed a diverse microbial community within bee bread, consisting of bacteria, yeasts, and molds. Predominant bacterial genera included *Lactobacillus*, *Bifidobacterium*, and *Enterobacteriaceae*, while yeasts such as *Saccharomyces* and *Metschnikowia* were frequently identified. These microorganisms are known to contribute to the fermentation and preservation of bee bread and may play vital roles in nutrient transformation. Furthermore, bee bread's microbiota appears to exhibit variation based on the local environment and floral sources, highlighting the adaptability of these communities.

Conclusion: This literature review consolidates existing knowledge on bee bread microbiology and underscores the diverse microbial communities inhabiting bee bread and their probable roles in nutrient enhancement and pathogen inhibition. The observed variation in bee bread microbiota across studies emphasizes the need for more comprehensive investigations into the factors influencing microbial composition. By synthesizing the findings from multiple sources, this review contributes to a deeper understanding of hive health and the importance of bee bread in sustaining honeybee populations. Future research should aim to unravel the functional significance of specific microbial taxa and their potential applications in hive management and honeybee conservation efforts.

Keywords: Bee bread, microbiology, microbial diversity, honeybee, review

SESSION 8: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

THE ONE HEALTH APPROACH IN THE CONTROL AGAINST ZOO NOTIC DISEASES: ARE SMALL RUMINANTS RELEVANT HOST IN THE EPIDEMIOLOGY OF TUBERCULOSIS IN SPAIN?

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Introduction: Tuberculosis (TB) is a zoonotic infectious disease caused by *Mycobacterium tuberculosis* complex (MTC), which can affect a wide variety of animal species. Driven by scientific evidence, disease control has significantly evolved in the last decades from a close-minded view of disease management to a more holistic approach to the problem. Thus, today it is understood that an effective control of the disease should involve three key issues: 1) domestic hosts, 2) wild hosts, and 3) biosecurity. In the Spanish Mediterranean ecosystems, where multiple TB animal hosts are present, identifying the role of the different species in the epidemiology of MTC is a key point to implement proper control measures. Despite the potential involvement of goats and sheep in TB epidemiology, these species are not always subjected to routine TB testing. Therefore, the epidemiological information on MTC in small ruminants is still very scarce.

Aims: We aimed to determine the seroprevalence, spatial distribution and risk factors associated with MTC exposure in sheep and goats in Andalusia (southern Spain), a region with one of highest occurrence of MTC in both cattle and wild ungulates.

Materials and Methods: A total of 4421 serum samples from small ruminants were collected in 163 flocks between 2015-2017. Sera were analysed by an in-house ELISA using the P22 protein complex as coating antigen.

Results: Antibodies against MTC were detected in 0.7% (16/2266; 95% CI: 0.4-1.1) of sheep and 21.9% (473/2155; 95% CI: 20.2-23.7) of goats. Seropositivity was found in 14.5% (12/83) and 90.0% (72/80) of the sheep and goat herds, respectively. Spatial analysis identified one statistically significant cluster including 21 goat farms (Radius: 138.3 km; Relative Risk: 2.6; $p < 0.001$) in the eastern part of Andalusia. In sheep, semi-extensive management system was identified as risk factor associated with MTC seropositivity. For goats, the main risk factors associated with MTC exposure were: management system (intensive and semi-intensive), the census of the farm (>493) and the presence of hospital pens inside the regular stables.

Conclusion: MTC is widespread in the small ruminant populations in southern Spain. Our results suggest that sheep may play a limited role in the epidemiology of TB, while goats can be relevant in the transmission and maintenance of MTC in this region.

Keywords: Disease control, zoonoses, tuberculosis

THE USE OF MEDIUM-DENSITY SINGLE NUCLEOTIDE POLYMORPHISM (SNPs) GENOTYPING DATA TO IDENTIFY SEX-RELATED CHROMOSOMAL ABNORMALITIES IN PURE SPANISH BREED HORSE (PRE)

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Introduction: Horse is the domestic species known to exhibit the highest rates of chromosomal abnormalities (Bugno et al. 2007) particularly in sexual pair. These chromosomal abnormalities are related with high rates of reproductive alterations and disorders of sexual development (DSD) in general. Chimerism, mosaicism or monosomy are some kinds of alterations frequently found in this specie. its diagnosis is made by direct microscopic observation using classical or molecular (FISH) karyotyping. In this study, we use medium density SNP genotyping data to identify cases of pure Turner's syndrome (63,X0) or mosaicism (63,X0/64,XX).

Aims: The identification of some chromosomal alterations using a Copy Number Aberrations (CNA) approach based on medium density SNP genotyping.

Materials and Methods: In this study, we analysed 3 Pure Spanish Horse Breed (PRE) horses previously diagnosed as carriers of Turner's syndrome (1 pure and 2 mosaic) using a Chromosomal Number Aberrations approach based on medium density SNP data. CNAs were detected based on LRR (Log R Ratio) intensity, BAF (B Allele Frequency) and heterozygosity (HET) values in both regions of the ECAX.

Results: All the control mares showed LRR and HET values close to 0 and 25%, respectively, in both regions (Pseudo-Autosomic Region, PAR, and NON-Pseudo-Autosomic Region, NON-PAR), indicating the presence of two ECAX. Stallions showed the same pattern in PAR, since this chromosome region is present in ECAY and ECAX. However, LRR and HET means decreased to -0.41 and 2% in NON-PAR, a pattern consistent with the presence of only one X chromosome in stallions. Only one 63,X0 individual showed a single chromosome pattern (LRR=-0.42 and HET=1%) in PAR and NON-PAR, indicating absence of ECAY, and thus allowing its detection (63,X0). The other two cases showed 63,X/64,XX chromosomal complement. Their PAR and NON-PAR regions showed intermediate values of LRR (-0.23) and normal values of HET (21%), and a distinctive four band BAF pattern also in PAR and NON-PAR regions, consistent with the coexistence of two cell lines with different chromosomal complements (one 63,X and one 64,XX).

Conclusion: In conclusion, the use of medium density SNP genotyping seems to be a valid methodology for Chromosomal Number Aberrations (CNA) screening in horses.

Keywords: chromosomal abnormalities; horse; genomic; SNP-array; cytogenetics

References:

1. Demyda-Peyrás, S; Laseca, N.; Anaya, G.; Kij-Mitka, B.; Molina, A.; Karlau, A. and Valera, M. 2023. Prevalence of Sex-Related Chromosomal Abnormalities in a Large Cohort of Spanish Purebred Horses. *Animals* 2023, 13, 539. <https://doi.org/10.3390/ani13030539>.

FELINE LOWER URINARY TRACT DISEASE: EPIDEMIOLOGICAL STUDY

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Introduction: The term feline lower urinary tract disease (FLUTD) describes a collection of conditions that can affect the bladder and/or urethra of cats and is a common urinary problem facing small animal veterinarians all over the world. The clinical signs are not specific to a certain condition and are represented by hematuria, stranguria, and disuria. There are few data about the occurrence and prevalence of this condition among domestic cats in Transylvania.

Aims: The objectives of this research were to determine the etiology and risk factors associated with FLUTD and to compare the results with those that were previously published.

Materials and Methods: Between 2019 and 2022, 205 domestic cats accusing signs of FLUTD presented for consultation at the department of Medical Pathology and Semiology, Faculty of Veterinary Medicine, Cluj-Napoca. Age, sex, breed, weight, and the season in which they were brought in for consultation were all evaluated and recorded. After the clinical examination, blood and urine biochemical examinations were performed, as well as ultrasonography as purpose for identifying the cause for FLUTD.

Results: The most common cause for FLUTD was struvite urolithiasis (54%), followed by feline idiopathic cystitis (FIC) (29%). The highest prevalence was in spring (34%) and summer (24%) seasons. Males were well represented (84%) and the most common breed was the European short hair (81%). Most of the patients were aged between 1 and 3 years (43%) and weighting between 3-7kg (85%).

Conclusion: Most patients were mixed breed males, aged between 1-3 years and weighting between 3-5kg. Urolithiasis and FIC were mainly diagnosed in young, overweight males, while bacterial cystitis was mostly identified in elderly overweight females.

Keywords: FLUTD, FIC, urolithiasis, etiology, risk factors

THE USE OF BIOLOGICALLY ACTIVE COMPOUNDS FROM MEDICINAL PLANTS AS ALTERNATIVE REMEDIES IN SKIN INJURY

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Introduction: The skin is an organ-barrier which assures the isolation and the protection of the organism, but in the same time, it is vulnerable because of its continuous exposure to physical, chemical and microbiological factors from the environment. Wounds are skin lesions caused by various vulnerable agents that produce a break in the continuity of the skin. Any disruption of skin integrity has the potential to make an animal more prone to developing a number of pathological conditions such as infection, fluid loss and electrolyte imbalance. Since ancient times, plants have been used to treat and prevent various diseases, studies confirming that 25% of the drugs on the market are produced from plants, trees, shrubs. Medicinal plants and extracts obtained from them are an important source of compounds with beneficial therapeutic effects. Plants have great potential in the management and treatment of skin lesions, the natural compounds that contain promoting healing and regeneration of lost tissue through various mechanisms (Wang și colab., 2021)

Aim: Considering the importance of the skin, this study aims to emphasize the most common types of skin injuries, the mechanism of healing, the most important biologically active compounds from plants and their role in wound healing and the plants that are used the most in this process.

Conclusion: Although there are several drugs available in the market for the therapy of skin lesions, many of these, especially anti-inflammatory agents, come with extensive side effects and have a limited clinical use (Lordani și colab., 2018). The demand for safe and effective drugs that have anti-inflammatory properties is essential for the future of wound healing. Active compounds obtained from medicinal plants are considered to develop new drugs. Studies on the mechanisms of action and effectiveness of these plant compounds have indicate that many are pharmacologically safe, justifying testing further in preclinical and clinical studies (Nagori și Solanki, 2011).

Keywords: skin, medicinal plants, biologically active compounds, wound

References:

1. Lordani TVA et al., 2018, Therapeutic effects of medicinal plants on cutaneous wound healing in humans: a systematic review. *Mediators of inflammation*.
2. Nagori BP, Solanki R, 2011, Role of medicinal plants in wound healing. *Research Journal of Medicinal Plant*, 5(4), 392-405.
3. Wang M et al., 2021, Nanomaterials applied in wound healing: Mechanisms, limitations and perspectives, *Journal of Controlled Release*, 337, 236-247

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SEROLOGICAL DIAGNOSTIC TECHNIQUES USED IN THE DIAGNOSIS OF *ENCEPHALITOZOON CUNICULI* IN DOMESTIC RABBITS (*ORYCTOLAGUS CUNICULUS*)

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Introduction: *Encephalitozoon cuniculi* is an eukaryote, unicellular, spore-forming, obligate intracellular microorganism of the phylum Microsporidia, domestic rabbits being the main host. With both horizontal and vertical transmission pathways, this microorganism is widely found in this species, usually as a subclinical disease. In the case of acute manifestation, clinical signs include neurological, renal and ocular symptoms. Treatment options are limited and usually with unrewarding results, therefore diagnosis and prevention of encephalitozoonosis in rabbits represent the best methods of keeping this disease under control.

Aims: The aim of this study is to test a population of rabbits in the North-Western part of Romania, both pet and meat rabbits, using serological diagnosis, and identify the prevalence of encephalitozoonosis.

Materials and Methods: A total of 88 rabbits were clinically examined and 2 ml of blood was sampled from each. Enzyme-linked immunosorbent assay (ELISA) kit by Medicago (Medicago, Uppsala, Sweden) on resulted blood serum was utilized. Statistical analysis of the results was done using the EpiInfo 2000 software (CDC, Atlanta, GA, SUA).

Results: A total prevalence of 54.55% (48/88) was identified, with no significant statistical differences regarding the rabbits' age, sex, clinical status, breeding system and the county of origin. The seropositivity of pet rabbits was of 69.23% (9/13), while the meat rabbits, all originating from households, had a 52% (39/75) prevalence. Statistical significant differences were noticed only between different households.

Conclusion: The relatively high prevalence of encephalitozoonosis in rabbits, not only gives us a first glance at the spread of this microorganism in the North-Western region of Romania, but also offers a warning sign regarding the risks of rabbit meat consumption and the possibility of transmission of *E. cuniculi* to humans.

Keywords: *Encephalitozoon cuniculi*, encephalitozoonosis, rabbit, serological diagnosis, ELISA

References

1. La'Toya, V. L., Bradley, C. W., & Wyre, N. R. (2014). *Encephalitozoon cuniculi* in pet rabbits: diagnosis and optimal management. *Veterinary medicine: research and reports*, 5, 169.

ENHANCING THE THERAPEUTIC POTENTIAL OF QUERCETIN IN DIABETES – A BIOAVAILABILITY ISSUE?

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Introduction: Phytotherapy has been increasing in popularity in recent years, and the search for plant-based treatments has gained the attention of numerous researchers worldwide. This review will focus on quercetin, a widely distributed flavonoid with many proven properties. Besides the intense antioxidant effect common to all flavonoids, its use in the treatment of diabetes mellitus stands out in both *in vitro* and *in vivo* studies.

Quercetin: Quercetin, a dietary flavonol and type of polyphenol, is present in fruits, flowers, and leaves, lending them vibrant hues. Its antioxidant potential aids in directly counteracting harmful reactive oxygen species while enhancing the body's innate antioxidant defences. When analysing the results of the previously mentioned studies, one can notice a variation in results when considering the form of quercetin administered. One way of justifying the data discrepancy is the reduced bioavailability of flavonoids, molecules with reduced hydro and liposolubility

Techniques: Quercetin faces challenges in bioavailability due to solubility, stability, intestinal permeability, metabolism, and elimination; strategies like improved targeting and solubility-enhancing techniques are being explored for its therapeutic enhancement.

Discussion: The ways of increasing the absorption, distribution, and metabolism are currently under research. The question raised is whether the new techniques are feasible for improving the therapeutic effect of quercetin in the treatment of diabetes mellitus.

Conclusion: Quercetin delivery systems can be lipid-based carriers, polymer nanoparticles, inclusion complexes, micelles, or conjugate-based encapsulations. Each delivery system has specific advantages and limitations. Limitations include physical instability, low loading capacity, storage leakage, complex manufacturing processes, safety concerns, and regulatory acceptance issues.

Keywords: bioavailability, diabetes mellitus, liposomes, quercetin

COMPARATIVE EVALUATION OF MILK HYGIENE PARAMETERS IN ORDER TO ESTABLISH SPECIFIC MARKERS IN OTHER SPECIES

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Introduction: The chemical composition of fresh sheep's milk varies over time and between animals depending on several factors, such as stage of lactation, season, environmental temperature, lactation efficiency, age and nutrition of the animal, genetic factors (species and breed) and diseases of mammary gland.

Discussion: The increase of SCC in milk is considered an indicator of inflammation of the mammary gland. The types of cells presented in the milk of healthy sheep are similar to those seen in the milk of cows. In both cows and sheep, macrophages are the predominant cell type (45-88%) in healthy animals.

The current legal somatic cell count limit for collected sheep milk in the United States is 1000 and respectively 750×10^3 /ml. Macrophage is the predominant cell type in uninfected ewe milk. Milk secretion in sheep is primarily apocrine nature.

One of the significant differences between goat's and cow's milk can be found in the physical-chemical structure and the fat composition of the milk. The average size of fat globules in goat's milk is about 3.5 micrometers, compared to 4.5 micrometers in cow's milk.

Higher SCC values above a typical physiological range indicate microbial inflammation of the mammary gland. On the contrary, goat's milk naturally contains (a type of apocrine milk), which naturally contains higher amounts of epithelial cells and their fragments, resulting from epithelial desquamation and physiological regeneration of mammary cell.

Buffalo milk has a dry substance content of over 18%, mainly represented by casein and fat. The fat globules in buffalo milk are very bulky. The creaming power in the case of buffalo milk is much lower, compared to cow milk, being significantly influenced by temperature. Buffalo milk is characterized by a white-porcelain color, with a pleasant, sweet smell and taste, typical of fatty milk.

Keywords: buffalo milk, goat milk, milk quality, somatic cells, sheep milk

References:

1. Albenzio, M., Figliola, L., Caroprese, M., Marino, R., Sevi, A., & Santillo, A. (2019). Somatic cell count in sheep milk. *Small Ruminant Research*, 176, 24-30
2. Balthazar, C. F., Pimentel, T. C., Ferrão, L. L., Almada, C. N., Santillo, A., Albenzio, M., ... & Cruz, A. G. (2017). Sheep milk: physicochemical characteristics and relevance for functional food development. *Comprehensive reviews in food science and food safety*, 16(2), 247-262.
3. Podhorecká, K., Borková, M., Šulc, M., Seydlová, R., Dragounová, H., Švejcárová, M., ... & Elich, O. (2021). Somatic cell count in goat milk: An indirect quality indicator. *Foods*, 10(5), 1046.

COMPARATIVE METHODS FOR COLLECTION AND CONSERVATION OF BIOLOGICAL SAMPLES FOR SEXING BIRDS THROUGH MOLECULAR GENETIC TECHNIQUES

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Introduction: Most companion birds have no distinct sexual dimorphic traits, therefore early age determinism of sex in case of monomorphic birds can have multiple applications. Molecular genetic sexing is considered one of the most accurate sex determination methods for sexing monomorphic birds.

Aims: The aim of the study was to determine the duration of sample viability at room temperature (20–22 °C) in order to help conditions of sample transportation and conservation.

Materials and methods: Oral swabs and both fresh and heparinized blood, collected on absorbing filter paper (as DBS-dried blood spots), were sampled at the same time from three different companion bird species (*Columba livia domestica*, *Psittacula krameri* and *Psittacus erithacus*). The samples were kept at room temperature for 30 days and molecular sexing was performed at day 0, 1, 2, 4, 7, 14 and 30. PCR, using P2 and NP primers (Ito et al., 2003), was performed for the amplification of the CHD1W and CHD1Z genes in females and the CHD1Z gene in male.

Results: DNA quantification identified the highest amount of DNA in whole blood samples (45.05 ± 0.49 ng/μl; 44.7 - 45.4 ng/μl; A260/A280 ratio 2.14-2.79), followed by dried blood spots of standard 20 μl drop of heparinized blood (25.8 ± 10.02 ng/μl; 12.9 - 29.7 ng/μl; A260/A280 ratio 2.35-9.04), then by dried blood spots of freshly collected blood (16.21 ± 5.40 ng/μl; 8.9 - 29.7 ng/μl; A260/A280 ratio 3.14-10.66), and lastly in oral swabs (12.52 ± 3.07 ng/μl; 8.5 - 17.1 ng/μl; A260/A280 ratio 2.61-20.84). PCR success rate for sex determination was 100% using whole blood and dried blood spots, whereas from oral swabs, only 75%.

Conclusions: After 30 days at room temperature (~20–22 °C) all types of samples included in this study (oral swabs, dried blood spots of freshly collected blood, dried blood spots of standard 20 μl drop of heparinized blood, and whole blood) proved to be reliable for genetic sex determination in all three pet bird species tested in this study (*Columba livia domestica*, *Psittacula krameri* and *Psittacus erithacus*).

Keywords: blood; genetic sexing; oral swabs; PCR; pet birds; room temperature

References:

1. Aslam M. et al., 2023, Effect of storage temperature and duration on direct PCR amplification of various feather types and DBS matrices. *Gene*, 854, 147116.
2. Ito H. et al., 2003, Sex identification by alternative polymerase chain reaction methods in Falconiformes. *Zoological Science*, 20(3), 339-344.

SESSION 9: VETERINARY MEDICINE - CLINICAL SCIENCES

ENDOSCOPY IN REPTILES: CLINICAL CASES APPROACH

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Introduction: Endoscopy in reptiles can be an extremely useful diagnostic technique. For example, biopsies can be performed ultrasound guided, via coeliotomy or endoscopically. When considering an opened surgical approach, the site should be chosen based on the anatomy of the species and using imaging techniques. Biopsies can be taken similar to small animals, using biopsies pistols, punch biopsy devices or guillotine techniques depending on the organ. In some species, like chelonians an opened technique can be very invasive for the patient, thus, endoscopy is more and more recommended as a minimally invasive technique for biopsy especially of the liver, kidneys and splenopancreas.

Aims: The aim of this article is to describe the use of rigid endoscopy in reptiles and emphasise on its importance for clinical diagnostics.

Materials and Methods: In lizards, a paramedian or paralumbar area is used for the insertion of the telescope, this area permitting the examination of most of the coelomic cavity. The entry point is dictated by diagnostic imaging. In snakes, the anatomical features do not allow all organs examination from a single entry point. In chelonians, the most useful approach is through the prefemoral fosa, with the animal placed in lateral recumbency.

Results: Instrumentation for endoscopy in reptiles are similar to those used in small animal laparoscopy, using rigid telescopes of 2.7 or 1.9, or larger, depending on the size of the animal. Biopsies can be performed using cannulas with biopsy ports, thus most of the times, insertion of other ports is not necessary. If this is the case 3 mm or 5 mm trocars can be used. Insufflation is also possible in these species and air is more recommended compared to carbon dioxide, but due to the lack of diaphragm, care should be taken at the end of the procedure to eliminate as much as possible of the gas inserted.

In snakes, the fat bodies make insufflation and navigation difficult, thus a targeted approach is recommended, with the precise entry point being species specific. In lateral recumbency, the telescope can be inserted either in an intercostal space in large individuals or between the first and second row of lateral scales. In these individual a Veres needle can be used to facilitate the insertion of the telescope

Endoscopy can also be used for visualisation of different organs, such as the bladder (in species that have one) and for surgical assisted procedures (like spaying in turtles).

Conclusion: Rigid endoscopy is an extremely valid diagnostic technique, very useful in reptile species.

Keywords: rigid endoscopy, reptile, biopsy

SUPERFICIAL PEMPHIGUS IN CATS

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Introduction: Superficial pemphigus (also known as foliaceus pemphigus) is the most common autoimmune dermatosis in domestic carnivores, although it remains rare, particularly in cats.

Discussion: In the feline species, the dermatosis is primarily crusty and often pruritic, with a predominance of the face (particularly the pinnae), but lesions are also frequently found around the nipples and on the footpads, and paronychia is common (1, 2). General symptoms with lethargy and fever are fairly common. The differential diagnosis is wide-ranging, and sometimes difficult to make in the case of a head and neck pruritus syndrome. The diagnosis is usually confirmed by histopathological examination of carefully selected skin biopsies, ideally pustules (2).

Treatment is based on the administration of immunomodulators, primarily glucocorticoids. Ciclosporin is also useful as an adjuvant treatment, as is chlorambucil. Most cases require long-term treatment (1, 2).

Keywords: cat, pemphigus, skin

References

1. Bizikova P. and Burrows A. (2019). Feline pemphigus foliaceus: original case series and a comprehensive literature review. *BMC Vet Research* 15:22 doi: 10.1186/s12917-018-1739-y.
2. Preziosi DE. (2019). Feline Pemphigus foliaceus. *Vet Clin North Am Small Anim Pract.* 49:95-104. doi: 10.1016/j.cvsm.2018.08.009.

ICEBERG DISEASES IN THE POLISH GOAT POPULATION

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Introduction: Caprine arthritis-encephalitis (CAE), caseous lymphadenitis (CLA), and paratuberculosis (PTB) are three diseases of high importance for small ruminant industry. Despite diverse etiology they share common pathophysiological and epidemiological elements. They take subclinical course, and disseminate slowly that accounts for grouping them together under the name of the iceberg diseases. Our study aimed to determine the herd-level seroprevalence of these diseases in the Polish goat population.

Material and Methods: The cross-sectional study was carried out in years 2014–2022 in Poland using 3 commercial ELISAs. Eighty-six randomly selected goat herds were involved in the study.

Results and Discussion: In total, 226 males and 1057 females were tested. Goats seropositive for CAE were detected in 64/86 herds (74%), goats seropositive for CLA in 74/86 herds (86%), and goats seropositive for PTB in 40/86 herds (47%). The true herd-level seroprevalence was 87% (CI 95%: 78% – 92%) for CLA, 74% (CI 95%: 64% – 82%) for CAE, and 43% (CI 95%: 33% – 53%) for PTB. The individual-level seroprevalence among males was 38% (86/226) for CLA, 37% (83/226) for CAE, and only 4% (8/226) for PTB.

Conclusion and Implications: All three iceberg diseases are widespread in the Polish goat population. CAE and CLA occur in significantly higher proportion of herds than PTB. It must be stressed that the relationship between seropositive status and clinical manifestation is very complex in case of PTB. Therefore, serological results are only one aspect of the comprehensive PTB diagnostics and should never be directly extrapolated to the clinical level.

Keywords: arthritis-encephalitis, caseous lymphadenitis, paratuberculosis, goat

CORPUS LUTEUM CYST AND OVARIAN HYPOTROPHY IN CATTLE (DIAGNOSIS AND TREATMENT)

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Introduction: A corpus luteum cyst arises from a degenerative process, leading to a central cavity filled with cystic fluid. When this central cavity exceeds 1 cm in diameter, it is considered a cyst. These cysts often develop when estrogen, progesterone, and oxytocin are administered. Pathogenesis-wise, it is widely acknowledged that they result from an enhancement in corpus luteum development, with or without deficiencies in LH release.

Aims: The objectives of this study were to detect reproductive disorders in cattle, provide appropriate treatment, and induce ovulation.

Materials and Methods: A study on 51 cows at a Romanian dairy farm aimed to assess their reproductive health using transrectal and ultrasonographic exams. The cows were divided into two groups: 18 had corpus luteum cysts (CL), identified through transrectal exams as large, slightly soft cysts. In advanced cases, a palpable fluctuation was noted. Ultrasonography confirmed CL with a diameter exceeding 1 cm and thin walls. The remaining 33 cows had ovarian hypotrophy degree I, with small ovaries similar in size to ring finger pulps. These cows had irregular estrus cycles, weak fertility, and underdeveloped corpus luteum structures leading to reduced secretion. Data analysis employed the Pearson Chi-square and exact Fisher tests to examine relationships between categorical variables.

Results: 17 cows (11.33%) were diagnosed with reproductive disorders, specifically corpus luteum cysts and ovarian hypotrophy at degree I. Out of the total number of cows, 6 (4%) were found to have corpus luteum cysts and were treated with Prostaglandin F_{2α} (Dinolytic product) through intramuscular injection, along with intrauterine administration of herbal extract suspension (Plantistim). Remarkably, all 6 cows (100%) remained pregnant after the treatment. The conception rates after the first and second insemination were 66.66% and 33.33% respectively ($P < 0.05$). Furthermore, 11 cows (7.33%) were diagnosed with ovarian hypotrophy at degree I and were treated with GnRH (Gonavet product). Among them, 4 cows (36.36%) ($P < 0.05$) achieved pregnancy after the treatment.

Conclusion: this study successfully detected reproductive disorders in cattle, specifically corpus luteum cysts and ovarian hypotrophy degree I. Treatment interventions, including Prostaglandin F_{2α} and GnRH, yielded significant improvements in conception rates, showcasing the effectiveness of these therapeutic approaches for enhancing cattle reproductive health.

Key words: Alcoholic extracts, cattle, Cyst, hypotrophy, Prostaglandin F_{2α}

References

1. Berish B, Scham SD. Ovarian function in ruminants, Domestic Animal Endocrinology. 2005; 29 (2): 305-317.
2. Braw-Tal R, Pen S, Roth Z. Ovarian cysts in high-yielding dairy cows. *Theriogenology*. 2009; (72): 690–698. doi: 10.1016/j.theriogenology.2009.04.027
3. Pemayun TGO. Induction of Oestrus with PMSG and Gn-RH in the Postpartum Anoestrus Dairy Cow. Diakses pada. 2012. [http://www.bulletinveteriner.com/induksi-estrus-denganpmsg-dan-gn-rh-pada-sapi-perah-anestrus-postpartum/tanggal 11 Januari 2012](http://www.bulletinveteriner.com/induksi-estrus-denganpmsg-dan-gn-rh-pada-sapi-perah-anestrus-postpartum/tanggal%2011%20Januari%202012)

THE USE OF INFRARED THERMOGRAPHY IMAGING TECHNOLOGY TO DETECT ESTRUS IN MARES

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Introduction: Body surface temperature is regulated by blood flow and underlying metabolic processes. Thermography (IRT) is a non-invasive, non-contact method of measuring heat emitted by different surfaces as infrared radiation. In veterinary medicine it was initially used in the diagnosis of equine lameness but nowadays its applications are numerous: diagnosis of inflammatory/infectious process such as mastitis, oestrus detection, pregnancy diagnosis, evaluation of stress, efficiency of local anaesthesia. Oestrus was successfully detected by vulvar IRT in cows (1), ewes (2) and gilts (3). To the authors knowledge there are no reports of its use in detection of oestrus of mares.

Aims: The aim of this study was to asses a FLIR ONE Pro IRT camera for smartphone to detect oestrus in mares.

Materials and Methods Ten mares were scanned using an IRT camera at the perineal area followed by a trans rectal ultrasonography of the internal genital apparatus. Highest and lowest temperatures were registered as well as their location. Mares were considered in oestrus when they showed follicles greater than 35 mm and uterine oedema score of 2 (0/3). Behavioural oestrus was assessed by teasing to a stallion.

Results: IRT was successful in detecting mare oestrus but not ovulation in 80% of the mares. False positive results were seen in 2/10 mares.

Conclusion: IRT showed promising results in detecting mare oestrus. Further studies are necessary to detect fluctuations during the oestrus cycle of the same mare.

Keywords: IRT, mare, oestrus, ovulation

References

1. Marquez, H. P., Ambrose, D. J., Schaefer, A. L., Cook, N. J., & Bench, C. J. (2021). Evaluation of infrared thermography combined with behavioral biometrics for estrus detection in naturally cycling dairy cows. *Animal*, 15(7), 100205.
2. de Freitas, A. C. B., Vega, W. H. O., Quirino, C. R., Junior, A. B., David, C. M. G., Geraldo, A. T., ... & Dias, A. J. B. (2018). Surface temperature of ewes during estrous cycle measured by infrared thermography. *Theriogenology*, 119, 245-251.
3. Sykes, D. J., Couvillion, J. S., Cromiak, A., Bowers, S., Schenck, E., Crenshaw, M., & Ryan, P. L. (2012). The use of digital infrared thermal imaging to detect estrus in gilts. *Theriogenology*, 78(1), 147-152.

CHARACTERISTICS OF SRLV GENOTYPES CIRCULATING IN POLISH, LITHUANIAN, AND HUNGARIAN GOAT POPULATIONS

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Introduction: Caprine arthritis-encephalitis (CAE) is caused by small ruminant lentivirus (SRLV). SRLV is classified into 5 genotypes (A-E) of which A and B are widespread. There is limited data on SRLV genotypes circulating in the central Europe.

Aims: To estimate the herd-level prevalence of SRLV genotypes in 3 central-European countries.

Materials and Methods: This multicenter study was carried out in years 2021–2022 in Poland, Lithuania, and Hungary. Goat herds seropositive for SRLV infection were selected: 20 herds in Poland, 10 in Lithuania, and 10 in Hungary. Blood was collected from seropositive goats in these herds, and DNA from leukocyte pellets was tested using a 2-stage real-time nested PCR (RT-nPCR) which distinguishes between genotype A and B.

Results: Both SRLV genotypes were identified in 3 countries.

In Poland, SRLV infection was confirmed in 20 herds: genotype A was found in 18/20 herds (90%; CI 95%: 70%–97%), genotype B in 8/20 herds (40%; CI 95%: 22%–61%). Concomitant infection was detected in 6/20 herds (30%; CI 95%: 15%–52%).

In Lithuania, SRLV infection was confirmed in 9/10 herds: genotype A was found in 5/9 herds (56%; CI 95%: 27%–81%) and genotype B in 5/9 herds (56%; CI 95%: 27%–81%). Concomitant infection was not detected in any herd.

In Hungary, SRLV infection was confirmed in 10 herds: genotype A was found in 7/10 herds (70%; CI 95%: 40%–89%) and genotype B in 7/10 herds (70%; CI 95%: 40%–89%). Concomitant infection was detected in 4/10 herds (40%; CI 95%: 17%–69%).

Conclusion: Both SRLV genotypes are responsible for CAE in Polish, Lithuanian, and Hungarian goats.

Keywords: CAE, PCR, SRLV

Funding: The study was financed by the grant no. ICRAD/I/CAE-RAPID/02/2021.

TOXICITY TESTING OF SEMI-ARTIFICIAL MOLECULAR OXYGEN CARRIERS IN RABBITS

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Introduction: Semi-artificial molecular oxygen carriers (HBOC) have emerged as innovative alternatives for oxygen delivery in medical scenarios. This study investigates the potential toxicity of HBOCs using New Zealand White rabbits as experimental models. The objective is to comprehensively assess hematological, physiological, and biochemical parameters, aiming to determine the safety and potential adverse effects associated with HBOC administration.

Aims: This study aims to systematically evaluate the toxicological implications of HBOC administration in rabbit models, analyzing a spectrum of hematological, physiological, and biochemical markers over specific monitoring periods.

Materials and Methods: Six young female New Zealand White rabbits, weighing between 3.5 to 4.5 kg, were employed in this study. The rabbits were categorized into different groups, each exposed to various durations of HBOC infusion and subject to distinct monitoring intervals. Blood sampling was conducted for hematological evaluations employed EDTA tubes, while heparin tubes were used for biochemistry assessments.

Results: The study revealed significant fluctuations in hematological parameters, encompassing red and white blood cell counts, hemoglobin levels, and platelet counts. Noteworthy shifts were observed in liver enzymes ALT and PAL, indicating potential hepatotoxic effects. Renal indicators, including creatinine and urea levels, exhibited dynamic changes, but not indicating renal involvement. Glucose levels reflected metabolic discrete perturbations. Temperature monitoring illustrated transient post-HBOC infusion elevations, gradually subsiding to baseline levels.

Conclusion: The comprehensive evaluation of HBOC toxicity in rabbit models underscores the intricate physiological responses triggered by HBOC administration. Hematological, liver, kidney, and glucose parameter variations underscore potential toxic outcomes, warranting further investigation.

Keywords: HBOCs, hematological parameters, liver enzymes, physiological monitoring, rabbit toxicity, renal markers, Semi-Artificial Molecular Oxygen Carriers, temperature response

LEARNING CURVE IN ULTRASOUND GUIDED REGIONAL ANAESTHESIA USING A HOMEMADE SIMULATOR FOR VETERINARY MEDICAL STUDENTS

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Introduction. Ultrasound-guided regional anaesthesia has gained popularity and expanded its utility due to the demonstrated ability to enhance the effectiveness of traditional methods. Nonetheless, its use necessitates acquiring new skills and specialised training to develop good hand-eye coordination for inexperienced practitioners.

Aims. The study aimed to observe students' progression through a sequence of repetitions, beginning with a homemade simulator and progressing to a cadaver, and to determine whether using a model was beneficial before practising on a more advanced simulator.

Materials and method. Six final-year students were prospectively enrolled. A homemade gelatine-based simulator was utilised. The participants were instructed to conduct five consecutive attempts using the model and place the needle as close to the target as possible. Subsequently, they were tasked with performing the same technique two times on dog cadavers, targeting the sciatic nerve. Evaluation of the trials included assessing task performance, considering both speed and accuracy, as well as the quality of injection in the case of the cadavers.

Results. While the time it took to visualise the target using the simulator was halved for three students during their second and third attempts, the time from needle insertion to retraction and the number of needle passes improved for most participants by the final attempt. Half of the students enhanced their ability to visualise and reach the cadaver's target by the second attempt, while all students showed improved performance in the number of needle passes. The most common difficulty was the inability to image the needle during its advancement. This led to a low quality of injections in most of the attempts.

Conclusions. The model proved suitable for training inexperienced students. However, its properties changed after multiple attempts, leading to a decrease in the quality of the ultrasound image. Transitioning to a high-fidelity simulator was found to be more challenging, and conducting five subsequent trials proved insufficient to achieve a high-quality injection.

Keywords: ultrasound, regional anesthesia, simulator

BENZIMIDAZOLE RESISTANCE IN GASTROINTESTINAL NEMATODES IN GOAT HERDS FROM TRANSYLVANIA

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Introduction: Parasitic infections, in particular those caused by gastrointestinal nematodes (GIN), are one of the main factors responsible for economic losses in goat production around the world. Nowadays GIN control becomes increasingly problematic due to the emergence of nematodes resistant to one or more classes of anthelmintics (Coles et al., 2006). Goat farmers often use drugs from the benzimidazoles (BZs) class to control GIN infections, because they are cheap, easy to administrate and the withdrawal period is reduced. Presently, the resistance of BZs has been reported worldwide.

Aims: The aim of the study was to evaluate the efficacy of the BZ treatment in goat herds originating from Transylvania.

Materials and Methods: The study was carried out in 2022 in four goat herds from Transylvania. Two types of diagnostic methods were used to confirm anthelmintic resistance (AR). First, the faecal egg count reduction test (FECRT), an *in vivo* diagnostic method was used to evaluate the efficacy of BZs treatment. Furthermore, egg hatch test (EHT), an *in vitro* method was used for the detection of resistance to BZs.

Results: BZs resistance in GIN was confirmed in all four goat herds investigated. After treatment, FECR% ranged from -25 to 31. The ED₅₀ values were 137.3 µg/ml, 2.81 µg/ml, 0.6 µg/ml, 0.5 µg/ml respectively for farms A, B, C and D that are significantly higher than the threshold value of the discriminating dose which indicates resistance to BZs. Main species present in the faecal samples after treatment was *Haemonchus contortus*.

Conclusion: We can affirm that resistance to BZs is present in the goat herds from Transylvania and we believe that these findings do not represent a singular event and could hence be just the evidence of a much larger problem.

Keywords: anthelmintic resistance, goats, benzimidazoles

References

1. Coles, G.C.; Jackson, F.; Pomroy, W. E.; Prichard, R.K.; von Samson-Himmelstjerna, G.; Silvestre, A.; Taylor, M.A.; Vercruysse, J.2006. The detection of anthelmintic resistance in nematodes of veterinary importance. *Veterinary Parasitology*. 136 (167-185).

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MADIGAN FOAL SQUEEZE TECHNIQUE AS A METHOD OF RESTRAINING FOALS DURING ABDOMINAL ULTRASONOGRAPHY. A PRELIMINARY STUDY

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Introduction: Foals become alert and agile very soon after parturition and show avoidance behavior towards human. This raises concerns in clinical settings when neonatal foals have to be restrained for medical purposes both for the safety of the human handling the foal and the foal itself. Madigan foal squeeze technique was used initially to treat foals for Neonatal maladjustment syndrome and it involves the use of looped ropes around the chest of the foal that mimic birth canal pressure. This technique reduces the production of sedative neurosteroids, decreases heart rate, respiratory rate, body temperature, induces recumbence and slow wave sleep

Aims: The aim of this study was to assess the Madigan foal squeeze technique as a method of restraining older foals in order to perform routine abdominal ultrasonography.

Materials and Methods: In this preliminary study we tested 3 foals age 7 to 21 days. First we assessed the level of reactivity of each foal during manual restrain and ventral abdominal palpation on a scale of 0-10 followed by placing the rope, reassessment of reactivity and abdominal ultrasound in lateral recumbency.

Results: One foal (7 days old) responded positively to the squeeze. In this case the foal became decubital and his reactivity level decreased from 8 to 0. Abdominal ultrasound was successfully performed by a single person in lateral decubitus. The other two foals did not become decubital and their reactivity level increased from 4-5 to 7-8 during the squeeze.

Conclusion: Madigan foal squeeze technique is a valuable restraining technique in neonatal foals up to the age of 7 days. Older foals do not react positively to the technique.

Keywords: abdominal ultrasonography, foal, Madigan squeeze, neonatology, restrain

UNUSUAL SPONTANEOUS LONGITUDINAL SCAPULAR BODY FRACTURE IN A DOG: CASE REPORT

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Introduction: The scapular fractures described so far are classified into three types: type I includes body or spine fractures, whereas type II fractures involve the scapular neck, and type III consists of glenoid fractures. All type I fractures described were either transversal or comminutive, and there is no report of mixed-type scapular fractures (Johnston and Tobias, 2018).

Aims: The objective of this case study is to present a previously unreported type of fracture in a dog, and to describe the surgical treatment and short-term outcome.

Materials and Methods: A 9-years-old Vizsla was presented with an acute nonweight bearing of the left thoracic limb after a hunting episode. An owner interview, physical examination, and radiographs of the left shoulder joint were performed to diagnose the condition. The orthogonal radiographs showed a longitudinal fracture of the distal half of the left scapular body cranial to the scapular spine, involving the articular surface. The treatment plan consisted of 2,7 mm lag screw fixations, a 3-week Velpeau sling immobilization of the limb, and physiotherapy for one month. Postoperative follow-up radiographs and clinical outcome of the dog were assessed after 6 weeks.

Results: The fracture reported in this study is both a type I longitudinal, and a type III. Follow-up radiographs demonstrated excellent bone healing and alignment. No postoperative signs of left shoulder joint osteoarthritis were noticed after 6 weeks. The dog was free of lameness after this interval and the owner was very satisfied with the outcome.

Conclusion: According to our knowledge, this is an unexpected and rare longitudinal scapular body fracture in a dog. Surgical treatment and physiotherapy regained the full function of the limb in this dog.

Keywords: longitudinal scapular fracture, lag screw, physiotherapy

References

1. Johnston S.A. and Tobias K.M. (2018). Veterinary surgery: small animal. 2nd ed. St. Louis Missouri: Elsevier. Vol. 1; p. 795-800.

SESSION 10: GEODESY, FORESTRY AND APPLIED EXACT SCIENCES

WATER AND SOIL: CHALLENGES FOR SUSTAINABLE AGRICULTURE UNDER CLIMATE CHANGE

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Sustainable soil and water management are essential for sustainable agriculture. Soils are the foundation of our food security, providing 95% of the food we eat. Water is also a critical input for agricultural production, and contributes to 40% of the food produced worldwide. There are significant interactions between healthy soils and optimal water use, as a good soil structure infiltrates and holds more water, leading to better water use efficiency. The EU Soil Strategy for 2030 adopted on 17 November 2021, sets the vision to have all soils in healthy condition by 2050 and to make protection, sustainable use and restoration of soils the norm. It also announces that the Commission will table a new legislative proposal on soil health providing a comprehensive legal framework for soil protection granting it the same level of protection that exists for water, the marine environment and air in the EU.

However, some 60-70% of EU soil ecosystems are unhealthy and suffering from degradation. Soil degradation is thought to cost the EU around 50 billion euro per year. Halting and reversing current trends of soil degradation could generate up to EUR 1.2 trillion per year in economic benefits globally. In addition, future climate change will lead to increased water scarcity and droughts. Southern Europe will be especially affected, although EU countries that are currently not water-limited will also become increasingly vulnerable, as recent droughts in 2022 and 2023 have shown.

In conclusion, conventional agricultural practices and future climate change impose threats on our agricultural system and on food security. This presentation will cover some issues related to soil and water management in Mediterranean farming systems and present possible solutions:

- We propose **new indicators for drought detection and monitoring**, and present results that show how these drought indices can be used for **yield prediction**.
- We show results from a rainfall exclusion experiment on developing and testing novel **drought-resistant grass species** to mitigate the effects of climate change in Mediterranean grasslands.
- Finally, we show how to measure and control soil erosion in olive orchards. We have developed new analytical methods for determining ²³⁹+²⁴⁰Pu activities in soils, that can be used as **radioisotopic tracer to measure soil erosion**. This allows comparing and benchmarking different soil management systems.

Sustainable soil and water management are essential for sustainable agriculture. Soils are the foundation of our food security, providing 95% of the food we eat. Water is also a critical input for agricultural production, and contributes to 40% of the food produced worldwide. There are significant interactions between healthy soils and optimal water use, as a good soil structure infiltrates and holds more water, leading to better water use efficiency.

DEVELOPING A GEOGRAPHIC INFORMATION SYSTEM FOR MONITORING MOUNTAIN BIKING ROUTES IN THE FELEACU AREA CLUJ COUNTY

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Introduction: Mountain biking represents one of the newest and popular way of spending time outside by the high tech young adult generation. This practice bring together important aspects for health, develop a new kind of tourism and demand a new type of infrastructure for the counties administrations for sustainable development of managed area, Stavi et al. (2020). The areas loved by the mountain bike enthusiasts are near the place of residence during the working week or by picturesque areas located at great distances for the week-ends or holyday.

Aims: The mentioned topic was chosen because this extreme sport is continuously evolving, and the sources of information about the routes in the selected area are limited. The main aim of this paper consists of developing a geographic information system for monitoring mountain biking routes in the Feleacu area, Cluj County.

Materials and Methods: The methods used combining photogrammetry, satellite geodesy, digital cartography, and GIS. The design of the GIS is followed by the acquisition of data from various sources and their processing to be implemented in the designed GIS in order to be analyzed. Creating the ortophotomap based on photogrammetric measurements, capturing the routes, correcting capture errors, and implementing and sharing the geographic information system represent the most important steps in the research.

Results: A detailed map of the area was created and can be used by everyone that is interested to practice mountain bike in the Feleacu area. The designed GIS realize statistical and spatial analysis for the mountain bike routes.

Conclusion: Monitoring the interest area through a GIS gives the opportunity to update information in real time for all users.

Keywords: GIS, GPSLogger, Mountain bike routes, photogrammetry

References:

1. Stavi I. and Yizhaq H., (2020). Applying Geomorphic Principles in the Design of Mountain Biking Singletracks: Conceptual Analysis and Mathematical Modeling. Land. 9(11): 442-432.

IDENTIFICATION OF BIOTIC FACTORS PRESENT ON WOODY ORNAMENTAL PLANTS

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Introduction: The demand for arborescent and shrubby ornamental plants has increased a lot in recent years, therefore, both forestry and private nurseries have recorded increases in the production of these plants. Due to the increase in production, much of the planting material was imported, and with it, various diseases and pests were propagated.

Aims: In the present work, a spectrum of diseases and pests was identified both in ornamental plant cultures and within some alignments, and the optimal solutions that were imposed at those times were established.

Materials and Methods: Field trips were made both to nurseries and to alignments of ornamental plants, observations were made in the field and samples were taken for laboratory analysis. In order to identify pathogenic agents, the analyzes carried out consisted of taking samples from the infested material on CGA (potato-glucose-agar) culture medium by the method of direct isolation in the case of seedlings. In order to stimulate the development and sporulation of phytopathogenic agents, to identify them, the laboratory works were carried out in a room with optimal temperature and humidity conditions. The vessels in which the isolations were made were followed daily, in order to capture the evolution and development of the mycelia.

Results: Within nurseries, the biotic agents identified are from both the disease and pest spectrums. Thus, the pathogen *Kabatina thujae* and the pest *Ovalisia festiva* were identified in the thuja crops, and the pathogen *Phoma dura* was identified in the fir crop. Within the alignments studied, the pests *Cydalima perspectalis* were identified in buxus, and in the case of thuja alignments, the pathogens *Seimatosporium berckmansii* and *Kabatina thujae* were identified.

Conclusion: The identified biotic agents cause significant damage, especially in plantations on green spaces, and combating them is quite difficult due to the regulations in force, especially those of civil protection.

Keywords: *ornamental plant, pathogens, pests*

3D MODELING OF THE CAMPUS OF THE UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE CLUJ-NAPOCA USING ARCGIS PRO

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Introduction: The 3D modeling process involves creating a three-dimensional representation of an object or a surface using specialized software. The 3D modeling was performed using a point cloud generated from a drone flight. GIS applications facilitate the analysis of spatial locations by creating and layering information through maps or 3D scenes.

Aims: In order to create the 3D model of the land, the orthophotoplan resulting from a photogrammetric drone flight was used. The generation of the orthophotoplan and the dense point cloud offers the possibility of making digital measurements, exporting data, and establishing a database for creating applications and generating interactive maps according to user preferences. The purpose of this work is to use the latest methods of obtaining photogrammetric data using drones, but also to create interactive maps that facilitate spatial studies and analysis.

Materials and Methods: The case study was carried out on the campus of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca using the technique of photogrammetry and GIS analysis. The orthophotomap and photogrammetric data were obtained using the DJI Phantom 4 RTK drone.

Results: The analysis of the orthophotomap of the campus and the dense point cloud enabled the graphical representation of cartographic elements in the ArcGIS Pro application and ArcGIS Online. This provides the possibility to access these elements in real time, representing a current and valuable process to consider for conducting spatial studies and analyses.

Conclusion: The maps created, in both 2D and 3D formats, along with the web applications, aim to furnish users with data about the shape, location, nature, and layout of the most significant buildings within the campus of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, considering their characteristics.

Keywords: 3D modeling, databases, GIS, Photogrammetry, Web map

PAST, PRESENT AND FUTURE PREMISES ON TECHNICAL APPROACHES REGARDING THE AFORESTATION OF LANDS OUTSIDE THE FOREST FUND IN THE APUSENI MOUNTAINS

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Introduction: The lands outside the forest fund on which afforestation has been applied are, mostly, degraded lands or in the process of degradation, and to a small extent they are abandoned agricultural lands or on which shelter-belts are installed.

Aims: In the present paper, researches developed since the 50s until the 90s were analyzed and compared with the current works, establishing the main differences between them, and based on the differences, the directions of future technologies were established.

Materials and Methods: A series of studies and technical guidelines elaborated for the afforestation of some areas in Romania, which include mountain and hilly areas from the period 1950-1990, were analyzed, in parallel with those drawn up today.

Site-mapping methodology refers to the sampling of climatic factors from nearby weather stations, the characterization of existing soils and vegetation.

Results: The afforestation of degraded lands in the Apuseni Mountains began towards the end of the 19th century (probably after 1890). Regarding the orientation and conception of work, three periods can be distinguished: 1890 - 1918; 1918 - 1944 and 1944 - 1989. As species used, priority was given to softwoods: Scots pine, Black pine, Larch, Strobe pine, Jack pine and Spruce. After 1989, with the retrocession of the lands, afforestation was carried out with difficulty, they were carried out according to a technical project drawn up by specialists in the field. If in the past all site-mapping works were carried out with a high consumption of human resources, nowadays, through the digitization of various databases as well as access to multispectral imaging and lidar, site-mapping works will be easier to carry out.

Conclusion: The main element of novelty is represented by access to new imaging technologies, with the help of which determinations can be made both regarding the shape of the relief, as well as vegetation and soils.

Keywords: afforestation, degraded land, new technologies

STATISTICAL ANALYSES OF THE EXPLOITED WOOD IN ROMANIA IN ARCGIS PRO

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Introduction: Forests have been increasingly exploited due to the growing demand for wood, expansion of agricultural land, and urbanization. Sustainable forest management is necessary to prevent significant environmental changes, as the pressure on forest resources has an adverse effect on multiple ecosystem components. Romania is a major wood producer in the European market, accounting for a quarter of European hardwood lumber production due to its lowest selling prices on the continent.

Aims: Monitoring the lands within the forest fund is of paramount importance to highlight surface changes and develop a strategic plan for the sustainable exploitation of forests. For this purpose, the areas where various categories of logging were conducted, the volume of wood exploited by species, and by regions across the entire surface of Romania were analyzed.

Materials and Methods: The data related to the case study were obtained from the National Institute of Statistics website and processed using the ArcGIS Pro software. This resulted in the creation of a database that provides the capability to conduct various statistical analyses and update the data as needed. For a more precise data interpretation, the Getis-Ord Gi* statistic was applied. This statistic identifies statistically significant spatial clusters of high values (hot spots) and low values (cold spots).

Results: Starting from the created database, maps were generated to highlight the evolution of logging activities and the quantities of exploited wood over the past 20 years. The volume of wood exploited by economic operators engaged in forestry activities, broken down by component elements, was 19.446 million m³ in the year 2021, with an average of 15.494 million m³ over the last 20 years, out of this total 90.15% represents roundwood. The largest volume of wood is being exploited in Suceava County, while the smallest volume is in Ilfov County.

Conclusion: In recent decades, the deforestation rate in Romania has intensified due to increased demand from the wood industry, growth in timber exports and wood production. Urbanization and the conversion of rural areas into urban zones have led to significant changes in land use.

Keywords: Arcgis Pro, Getis-Ord Gi* statistic, wood exploitation

References:

1. Andronache I., Fensholt R., Ahammer H., Ciobotaru, A.-M., Pintilii R.-D., Peptenatu D., Drăghici C.-C., Diaconu D.C., Radulović M., Pulighe G.,..., Sinsin B. (2017). Assessment of Textural Differentiations in Forest Resources in Romania Using Fractal Analysis. *Forests*. 8(3): 54-74.
2. National Institute of Statistics. Available online: <http://statistici.INSSE.ro:8077/tempo-online/#/pages/tables/insse-table> (accessed on 5 July 2023).

STUDY OF THE LAND FRAGMENTATION USING GIS IN BOTIZA VILLAGE, MARAMUREŞ COUNTY

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Introduction: Land fragmentation is one of the most important problems over the past years, identified in Romania. During the land analysis where is discovered that more land surfaces are defined by the division of land areas smaller than ½ ha. Approaching the side of NW of Romania as proofed by Leventon *et al* (2017) the issue of land ownership is judge as an agricultural vulnerability.

Aims: The current research consists in the design and implementation of a GIS that allow to monitor the fragmentation of lands from two perspectives. The first consists in analysing the GIS and study the fragmentation of the land. The other consist in implementation of a web map that can be accessed by the owner to visualize the real situation regarding the status of theirs properties and the neighbour properties respecting the GDPR.

Materials and Methods: In order to obtain valuable data for the designed GIS all the systematic cadastre data were update by the measurements related to the studied area, as well as about their legal owners. Topographical and photogrammetric methods are used to collect complex data followed by the scientific analysis of the area involved in study.

Results: The Botiza village that is a disadvantaged area. Excessive subdivision of agricultural land owned by one or more owners over a large area of land has been observed, leading in the present case to inefficient land use. Although there are owners with large areas of land in the studied area, these properties are not adjacent. Other analysis emphasise the random afforestation of agricultural land due to the lack of interest of the owners.

Conclusion: Using of the valuable data obtained by modern topographical and photogrammetric analysed into a GIS offer a new perspective on the influence of fragmentation in the efficient management of farms and of biodiversity.

Keywords: GIS, land fragmentation, sustainable development.

References:

1. Leventon J., Schaal T., Velten S., Dänhardt J., Fischer J., Abson D. J., Newig J. (2017). Collaboration or fragmentation? Biodiversity management through the common agricultural policy. Land Use Policy. 64: 1-12.

THE RESPONSE OF TURF SPECIES TO VARIOUS ENVIRONMENTAL FACTORS

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Introduction: Lawns play a vital role in modern society, serving diverse functions such as erosion control, aesthetics, recreation, and environmental benefits. However, their management raises concerns about water consumption, pollution, health risks, and ecological impacts. Simultaneously, research on turfgrass species' responses to environmental stressors has rapidly advanced, with a focus on stress-tolerant cultivars and physiological mechanisms. This study aims to explore the multifaceted roles of lawns and understand the environmental stress responses of turfgrass species, contributing to sustainable land management and ecosystem resilience.

Aims: This study aims to investigate the significance of lawns in modern society, highlighting their roles and benefits, analyze the environmental stress responses of turfgrass species, focusing on physiological mechanisms, and explore the implications of these findings for resilient turfgrass management under changing environmental conditions.

Materials and Methods: Specialized articles regarding turfgrass response to stress factors were searched for in search engines such as Google Scholar and Web of Science. These articles were found through searches using specific keywords such as turfgrass, stress, salinity and resistance. As a result of the material found, a review has been elaborated to observe the methods through which we can contribute to the formation of a healthy ecosystem both for the turfgrass and the surrounding environment.

Results: To achieve these aims, a comprehensive literature review was conducted to gather information on the multifaceted roles and benefits of lawns in modern society. Additionally, peer-reviewed studies on turfgrass species' responses to environmental stressors were reviewed, focusing on physiological investigations, gene identification, and stress tolerance enhancement methods. The interplay between climate change, microclimates, and turfgrass management was examined to understand the challenges posed by evolving conditions.

Conclusion: In the present research work, the abstract highlights both the significance of lawns in modern society and the complexities of managing turfgrass under changing environmental conditions. It underscores the importance of research for both fields and their broader implications for sustainable land management and environmental resilience.

Keywords: abiotic stress, environment, resistance, turfgrass

IoT SENSORS FOR EFFECTIVE FOREST ECOSYSTEM PROBLEM SOLVING

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Introduction: Modifying forest ecosystems significantly amplifies the effects of climate change. Researchers have calculated that deforestation and alterations in land use are responsible for approximately 23% of the total CO₂ emissions generated by human activities today. This corresponds to a 17% share of the overall warming influence of all current greenhouse gas emissions when considering their impact over a century.

Aims: The primary scientific goal is to acquire immediate, on-the-ground data by deploying sensors within forest ecosystems, enabling us to monitor and understand the characteristics, occurrence, and progression of various stress factors that detrimentally impact the entire ecosystem.

Materials and Methods: The project's implementation approach is structured as a streamlined sequence of actions, facilitating the effective deployment of a technical solution to address the challenges faced by forest ecosystems with clearly defined practical applications. These activities encompass the following steps: identifying the most suitable technical solution, procuring the necessary equipment, installing the technical solutions on-site, utilizing the acquired data, and continuously monitoring the effectiveness of the technical solution.

Results: By centralizing outcomes, we establish a functional sensor network within the forest ecosystem. This network gathers data encompassing temperature, humidity, pH levels, as well as measurements of tree growth, wind intensity, and direction. It also incorporates a cost-benefit analysis, including the examination of specific indicators.

Conclusion: Emerging IoT technology is enhancing our comprehension of the consequences of climate change on our forests, ultimately aiding in the development of more effective public policies. Given the magnitude and immediacy of the issue, it is imperative to actively promote efforts to combat the deterioration of forest ecosystems, bridging the gaps between policies aimed at forest preservation and those aimed at achieving robust environmental protection. This includes measures to address climate change and halt the loss of biodiversity.

Keywords: climate change, forest, IoT technology, sensors

References

1. Commission Delegated Regulation (EU) No. 363/2012 of 23 Febr./2012 on rules of procedure for the recognition and withdrawal of monitoring organizations, as provided for in Regulation (EU) No. 995/2010 of the European Parliament and of the Council laying the obligations of operators who place timber on the market and wood products, published in the EU Official Journal, L 115/12;
2. S. H. Im, T. Herricks, Y. T. Lee, Y. Xia: Synthesis and characterization of monodisperse silica colloids loaded with superparamagnetic iron oxide nanoparticles, Chem. Phys. Lett. 401 (2005) 19; doi: 10.1016/j.cplett. 2004. 11. 028;

APPLICATION OF UAS TECHNOLOGY FOR THE DEVELOPMENT OF PRECISION AGRICULTURE

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Introduction: Precision agriculture often uses digital techniques such as satellites, UAS (unmanned aerial systems) and sensors to optimize agricultural production processes while reducing negative environmental impacts (Ezenne *et al.*, 2019). Smart agriculture is data-driven, so a UAS can accurately receive and fairly distribute this information, allowing producers to take action based on individual soil circumstances (Rahman *et al.*, 2021).

Aims: The paper aims to highlight the main advantages of UAS used in agriculture, depending on the type of wing (single-rotor, multi-rotor, fixed-wing and VTOL) and the sensors used. Also, within the work, the stages of making the digital orthophoto map at the Hoia farm, belonging to USAMV Cluj-Napoca, were analysed, with a view to further analyses on the state of the vegetation.

Materials and Methods: To highlight the technological flow of obtaining digital orthophoto map, the photogrammetric flight method was used, using a DJI Phantom 4 Pro UAS model.

Results: Vegetation status can be assessed and quantified by different vegetation indices from images acquired in the visible, red and near-infrared spectral bands. Depending on their formulation, they can show a strong correlation with land cover and leaf and green area index (LAI and GAI), crop nitrogen uptake (QN), chlorophyll content, water stress detection, plant structure, photosynthesis, yield and growing conditions.

Conclusion: Modern agricultural technology plays a vital role in increasing productivity to meet the demand for food for a growing global population, conservation and management of agricultural resources.

Keywords: orthophoto map, precision agriculture, vegetation indices, UAS

References

1. Ezenne G. I., Jupp, L., Mantel S. K., & Tanner J. L. (2019). Current and potential capabilities of UAS for crop water productivity in precision agriculture. *Agricultural Water Management*, 218, 158-164.
2. Rahman M. F. F., Fan S., Zhang Y., & Chen L. (2021). A comparative study on application of unmanned aerial vehicle systems in agriculture. *Agriculture*, 11(1), 22.

EVOLUTION OF SPONTANEOUS FOREST VEGETATION ESTABLISHED OUTSIDE THE FOREST FUND IN THE APUSENI MOUNTAINS

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Introduction The Apuseni Mountains are a mountain group that is part of the Western Carpathians and is found in the central-western part of Romania. This mountain range being densely forested, during the 8th and 19th centuries the forests were cleared to create conditions for agricultural crops and pastures. Lately, part of these lands were no longer used for agricultural purposes, becoming forested naturally.

Aims: In the present work, naturally wooded areas outside the forest fund were identified and the main tree growth parameters were determined through repeated measurements, thus determining the evolution of these formations with forest vegetation.

Materials and Methods: The data were taken within the National Forest Inventory (IFN), the sample areas being materialized in the field during 2008-2011, when the first measurements were made. It returned with measurements in the same areas in the period 2014-2017, the last determinations being made in the period 2020-2024.

Results: Most of the surfaces were identified and materialized within the borders of the national forest fund, but some of them are found along some valleys, and few of them are within some lands where, in the past, agriculture or grazing was practiced. The main species identified were the pioneer ones: silver birch, trembling poplar, goat willow, common hornbeam, which created specific conditions to the forests, over time the spruce and the beech settled in, having similar or even better growth compared to the forest fund.

Conclusion: The agricultural lands that, in the past, served the needs of agricultural crops and grazing and are currently uncultivated, are naturally afforested, in the first stage, with pioneer species (silver birch, poplars, willows), thus creating the microclimate specific to the forest, respectively the conditions for the valuable species such as spruce, beech, etc. These extensions of the vegetation outside the forest area have an important role in the future increase of the forest fund and preventing the occurrence of soil degradation phenomena.

Keywords: Apuseni Mountains, forest fund, forest inventory, pioneer species

USE OF GEOMATIC TECHNIQUES (GIS) IN FOREST MANAGEMENT. CASE STUDY: DUMITRELU FORESTRY BASIN, ȘARU DORNEI, SUCEAVA COUNTY

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Introduction: The main idea is to establish the ways in which geomatic techniques can be used to complete and update the information on the classic topographic planes with the data obtained from aerial and satellite space high resolution digital images and also from field measurements done with modern equipment used in forest management. The object of the study is Dumitreleu forestry basin, an area situated, from administrative point of view, in Șaru Dornei commune and belonging to Vatra Dornei Forest District.

Aims: Creation of thematic forestry management maps, editing and updating GIS data to create forest management data bases.

Materials and Methods: The maps have been done based on the digital model of the terrain, through specific operations, using as primary working material the classic topographic plans, orthophotoplans, satellite images, elevation digital model and forest management descriptive data. The softs used for mapping and the creation and interrogation of the database were AUTODESK, ESRI (AUTOCAD, ARCGIS, ARCSCEAN, ARCVIEW, ARCREADER, ChangeMatters)

Results: We obtained forestry management maps, which allow: printing any area of the map at any scale, adding new elements, identification and search of the elements in the map, distances measurement, data base interrogation, the update of forestry stock area and statistic data attainment.

Conclusion: The information storage in digital databases allows operations which were not possible in classical cartographic technologies, such as: verifications, interrogations, updates, multiple and distant accessing.

Keywords: Forest management, forestry stock, GIS, thematic maps

References

1. Petrila M., Apostol, B., Gancz V., Lorent A. (2010). Aplicații ale tehnologiilor geomatice în silvicultură. Editura Silvică.
2. *** Administrația Parcului Național Călimani. (2000). Planul de management al Parcului Național Călimani.
3. *** (2000). *Norme Tehnice pentru amenajarea pădurilor*, MAPPM

POSTER PRESENTATIONS

SESSION 1: AGRICULTURE

BEE FORAGE PLANTS OF ARABIA

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Introduction: As a part of studying "Bee Botany" or "Bee Forage" in Arab Countries, depending on my working and visits to Arabian Peninsula and using available literature, a list of cultivated and wild plants which considered to be forage plants for honeybee colonies in Arabia, was prepared.

Aims: One hundred and twenty-five plant species, belonging to 79 plant genera, and 31 plant families, their scientific and "vernacular" names, were surveyed from El-Taef (Sarwat Mountains), Central, Northern and Eastern regions of Saudi Arabia.

Materials and Methods: During the same flowering period, pollen grains reference slides were prepared by collecting pollen grains directly from the nearby opened flowers of the coincided flowering plants around the apiary and compared the morphology of each species of pollen grains with those of pollen pellets obtained from pollen trap using a light microscope (LM) provided with camera (Axiocam 512 color).

Results: The role and bio diversity of drought and salt tolerant honey trees: *Acacia*, *Prosopis*, *Ziziphus* and *Cassia*, in this ecosystem, was discussed. Another drought tolerant honey plants can be recommended, if possible, for plantation in Saudi Arabia, to increase honey production. A floral calendar of honey bees forage plants in Saudi Arabia, Oman and Yemen were prepared. Maximum biodiversity of flowering plant species (66 sources) is found in September, while minimum biodiversity (31 sources) was noticed during January in Saudi Arabia.

Conclusion: 148 cultivated plant species belonging to 52 plant families, and 46 wild species belonging to 32 plant families were surveyed in Oman. Sixty-three plant species, mostly wild, were foraged by honey bees in Yemen.

Keywords: honey bee, forage plants, *Acacia*, *Prosopis*, *Ziziphus*

EFFECT OF POULTRY MANURE-BASED COMPOST TEAS ON THE GROWTH OF *ASPERGILLUS NIGER*

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Introduction: Compost teas (CT's) are liquid solutions derived from composted materials, known for their capacity to reduce plant diseases (Souleymane et al 2010).

Aims: In this study, we investigated the different parameters of poultry manure-based compost teas and their inhibitory effect on the plant pathogenic filamentous fungus *Aspergillus niger* growth.

Materials and Methods: Three poultry manure-based CT's (A,B,C) were tested. The physicochemical parameters of the solutions were determined by spectrophotometric method. The microbiological characteristics of CT's were determined by different culture mediums. For the stress sensitivity tests, the 1:10 solutions were prepared by shaking at 220 rpm for 24 h at 25°C. PDA medium was supplemented with the CT's at different concentrations (5% 10% 15% 20%) and after incubation at 25°C for 5 days, the colony diameters were measured.

Results: It was found that CT's have a microbial composition capable of phosphate solubilization. The results obtained from the stress sensitivity assays indicate that CT's had an inhibitory effect on the mycelial growth of *A. niger*. Tea A and B applied at 5% resulted in growth inhibition of *A. niger* of around 50%. "C" tea applied at the same concentration resulted in an inhibition of only 20%. The same trend was in PDA medium supplemented at 15% for teas A and B, where 90% inhibition was observed, while it was 20% in tea "C".

Conclusion: It can be concluded that the CT's possess suitable parameters regarding their applicability. Their feature is the presence of a microbial composition capable of phosphate solubilization. Overall, CT's were shown to be effective against *A.niger* under in vitro conditions.

Keywords: compost teas, plant pathogens, filamentous fungus, inhibitory effect

References

1. Souleymane B. Koné; Antoine Dionne; Russell J. Tweddell; Hani Antoun; Tyler J. Avis (2010). Suppressive effect of non-aerated compost teas on foliar fungal pathogens of tomato. , 52(2), 167–173. Morales M. (1998). All about *Catharanthus roseus*. Journal of Plant Biotechnology. 53: 179-187.

MAPPING SPRING CROPS IN ROMANIA USING PHENOLOGY INFORMATION AND SATELLITE IMAGERY

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Introduction: Spring crops are of particular importance both worldwide and in Romania, a country where these crops occupy the largest share of arable land. Therefore, timely and accurate mapping of spring crops is essential for effective agricultural planning (Liu et al., 2018), especially given the prevailing concern of climate change.

Aims: The aim of our study is to provide a classification of the major spring crops grown in Romania (maize, sun-flower, and soybean), based on phenology information and satellite imagery.

Materials and Methods: The method used for mapping the three spring crops, consists in the combined use of vegetation indices (NDVI, NDWI, EVI, MCARI, ARI2, PSRI, obtained through the spatial resolution optical imagery acquired by ESA (European Space Agency) and the key phenological parameters of the three spring crops (sowing, stem elongation, inflorescence emergence, and harvesting). The performance of the classification was evaluated through field data acquired from farms located in various geographical regions from Romania.

Results: Classification results demonstrated that the proposed method can achieve good performance, with an overall accuracy of 80-90%.

Conclusion: The proposed method showed to deliver an accurate discrimination of the three major spring crops included in this study, contributing to an effective agricultural planning in support of precision agriculture.

Keywords: soybean, maize, sun-flower, vegetation indices

References

1. Liu J., Feng Q., Gong J., Zhou J., Liang J. and Li Yi (2018). Winter wheat mapping using a random forest classifier combined with multi-temporal and multi-sensor data. *International Journal of Digital Earth*. 11(8):783-802.

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AUTOMATIC IDENTIFICATION OF LAND USE/ LAND COVER CLASSES BASED ON SATELLITE DATA: A PRACTICAL ASSESSMENT IN CENTRAL AND NORTHWESTERN ROMANIA

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Introduction: In recent decades, a sequence of rapid changes has occurred on the Earth's surface (Zhang et al., 2021), underscoring the pressing need for precise and dependable data regarding global land use and land cover (LULC). Initiating this endeavor, the classification of LULC through satellite data, stands as a crucial starting point (Abdi, 2020).

Aims: This study aims to develop novel algorithms able to process and analyse satellite data, with the final goal in providing an automatic and accurate LULC classification into five major categories: forests, marshes, water bodies, herbaceous vegetation, and agricultural land (including a detailed classification of agricultural crops).

Materials and Methods: The algorithms were developed at the pixel level, based on the analysis of the vegetation indices (NDVI, NDII, EVI, PSRI, MCARI and ARI2) obtained through the satellite imagery data provided by ESA (European Space Agency). The algorithms were developed on several landscapes located in central and northwestern Romania and tested at the parcel-level.

Results: The validation results indicated that the algorithms developed achieved an overall accuracy of 80-90%.

Conclusion: The automatic identification of LULC classes developed in this research could provide data critical to the understanding of environmental changes, and thus contributing to food security and biodiversity conservation efforts.

Keywords: LULC classification, remote sensing, vegetation indices, software algorithms

References

1. Zhang X., Liu L., Chen X., Gao Y., Xie S. and Mi, J. (2021). GLC_FCS30: global land-cover product with fine classification system at 30 m using time-series Landsat imagery. *Earth Syst. Sci. Data*. 13:2753–2776.
2. Abdi A.M. (2020). Land cover and land use classification performance of machine learning algorithms in a boreal landscape using Sentinel-2 data. *GIScience & Remote Sensing*. 57(1): 1-20.

Acknowledgement: This research was funded by the research project GREENTOP - Agro-Biodiversity, Financing contract no.381/390057/01.10.2021.

PRE-HARVEST MANAGEMENT AND PRECISION FARMING- INTEGRATION OF DIGITAL MANAGEMENT IN BERRY CULTIVARS

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Introduction: This study employs pre-harvest management techniques and precision farming technologies, incorporating proximal and aerial data alongside vegetation indices to monitor seasonal crop dynamics in berry cultivation.

Aims: The primary goal was to consistently monitor the evolving condition of three raspberry varieties during critical growth phases to ultimately generate a yield prediction model.

Materials and Methods: The study encompassed agronomic assessments, UAV data collection, yield and canopy measurements (SPAD and Φ PSII). It focused on three distinct raspberry varieties (WENGI, KWELI, and IMARA), subdivided into five groups, each replicated five times. Statistical analysis unveiled relationships among variables and cultivar characteristics.

Results: Agronomic and yield measurements indicated that KWELI consistently had higher berry yields and lower variability compared to IMARA and WENGI. KWELI also had the highest sucker count, indicating robust vegetative growth and regenerative potential. One significant outcome was the establishment of robust correlations between vegetation indices, specifically the Green Normalized Difference Vegetation Index (GNDVI) and the Normalized Difference Vegetation Index (NDVI), and essential berry-related parameters such as berry count and weight.

Conclusion: The study highlights UAV-based multispectral data's potential for crop management and yield prediction, driven by positive correlations between vegetation indices and berry-related parameters. It also underscores the significance of different growth stages and environmental factors in influencing these correlations.

Keywords: berry yield, NDVI, pre-harvest management, precision farming

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THE INFLUENCE OF SOWING DATE ON DEVELOPMENT OF MAIZE IN THE CONDITIONS OF CENTRAL ROMANIA

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Introduction: Bruns and Abbas reported technological improvements in maize hybrids such as better early season vigor and tolerance to germination in cool wet soils, better seed treatments to guard against damping off diseases and seedling insect pests, or the advent of herbicides. These factors have contributed to planting maize earlier than it was 30 years ago (Abendroth et al., 2017).

Aims: The studies focused on the influence of date of sowing on development of maize in the area of influence of the Research and Development Station for Cattle Breeding -Targu Mures. We found that, according to the data recorded in the 2018-2021 the studied hybrids responded well to early sowing.

Materials and Methods: Between 2018 and 2021, three-factorial experiments were carried out, such as the subdivided plots with 3 different sowing dates (early, optimal and late sowing) and 6 maize hybrids (T 332, T248, KWS 2370, KWS 4484, P 9900 and P 9903).

Results: From the obtained results we consider that, sowing maize at temperatures below the minimum germination threshold can be a method of removing the critical phases of the plant from the stressful influence of climate changes during the summer, provided that the seed has superior quality indices.

There were situations where the temperature remained below the germination threshold for several days, the hybrids studied emerged after 20-23 days without germination being affected. No differences were found between germplasm sources either, but there were differences between years. The coldest year was 2021 when plants emerged after 22-24 days without germination being affected.

Conclusion: The results of the research demonstrate that the earlier sowing increased the period from sowing to plant emergence, but didn't reduced the germination and the population density of the crop. Alternatively, late sowing reduced the number of days to physiological maturity producing higher humidity content in grain at harvest and taller plants.

Keywords: germination, growing cycle, maize, plant height, sowing date

THE GROWTH AND DEVELOPMENT OF THE POTATO ACCORDING TO THE VARIETY IN SIBIU COUNTY, ROMANIA

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Introduction: In Europe, the potato (*Solanum tuberosum* L.) was first cultivated in botanical gardens. Currently, in our country, special emphasis is placed on potato cultivation, especially in the central area of the country. In Romania, potato consumption is high, being considered “the second bread” (Nagy *et al.*, 2023) by the entire population.

Aims: In this study, the capacity of growth and development for some potato varieties (Productiv, Alouette, Salad Blue and Paradiso) was observed, to highlight their suitability in the central area of Romania.

Materials and Methods: Four varieties of potatoes as certified seed tubers were used in this study. Varieties were provided by the Potato Research - Development Stations from Romania. During the vegetation period, the following criterias: the height of the main stem, the number of stems, the number of leaves on the main stem, the length of the median leaf on the main stem and the chlorophyll content of the leaves.

Results: The three potato varieties (Alouette, Salad Blue and Paradiso), were grown under the same conditions as the control (Productiv), in Sibiu county, Romania. Following the measurements and their interpretation from a statistical point of view, it was demonstrated that the Alouette variety had the best growth and development.

Conclusion: We demonstrated that of the three foreign potato varieties cultivated, the best growth and development had the variety Alouette, having an almost identical development to the Romanian variety, Productiv.

Keywords: development, growth, *Solanum tuberosum* L., variety

References

1. Nagy, A. M., Oros, P., Cătană, C., Antofie, M. M., & Sand, C. S. (2023). In Vitro Cultivation of Purple-Fleshed Potato Varieties: Insights into Their Growth and Development. *Horticulturae*, 9(4), 425.

THE INFLUENCE OF CLIMATE CONDITIONS ON SOYBEAN CROP DEVELOPMENT

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Introduction: In Romania, the drought affects almost half of the country's agricultural area. Changes in characteristics of rainfall have a great influence on crop yield (Challinor, 2014; Gornall, 2010). Also, climate changes characterized by an increase in air temperature and an uneven distribution of precipitation during the soybean growing season represent a problem of general interest and one of the great challenges of our century.

Aims: In order to evaluate the influence of temperature and rainfall, on stages of soybean development, a field experiment was conducted at Agricultural Research and Development Station in Turda (ARDS Turda), in 2022.

Materials and Methods: The experiment was based on a linear design, using plots of 12 m². As biological material, 140 soybean genotypes, from seven maturity groups were experimented. The studied genotypes were sown mechanized with the WINTERSTEIGER Plotseed + autopilot at a distance of 50 cm between the rows, on a length of 12 m each. With Asian or European origin, soybean varieties were developed in breeding programs from different countries such as Serbia, France, Germany, Switzerland, Austria, Italy and Romania.

Results: The atypical climatic conditions in this agricultural year had a negative impact on the evolution of the soybean crop. After the first three months of the year with a moisture deficit, during the sowing period and in the immediately following period, lower temperatures were recorded compared to the multi-year average, which determined a delayed but uniform emergence of soybeans. The very high temperatures in June and the lack of precipitation made the flowering of plants to be between 37 and 56 days after emergence.

Conclusion: Depending on the maturity group to which they belong, differences between soybean genotypes growth and development stages were identified.

Keywords: development, emergence, rainfall, soybean, temperature

References

1. Challinor, A. J., et al., 2014. A meta-analysis of crop yield under climate change and adaptation. *Nat. Clim. Change*.
2. Gornall, J., et al., 2010. Implications of climate change for agricultural productivity in the early twenty-first century. *Philos. Trans. R. Soci. London B: Biol. Sci*.

DETERMINATION OF SOME POTATO CLONES WITH RELATIVE RESISTANCE TO LATE BLIGHT (*PHYTOPHTHORA INFESTANS*) IN CENTRAL PART OF ROMANIA

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Introduction: Late blight outbreaks have become more difficult to manage in recent years due to the increased genetic diversity of the pathogen in many parts of the world. Late blight management strategies and forecasting systems depend on understanding of its population genetics because of the relationship of genotypes to epidemiologically important characteristics such as host specificity, cultivar response, and fungicide sensitivity (Maurice et al., 2019).

Aims: potato clones were evaluated to find the relative resistant one to late blight and thereby diminish the number of fungicide sprays required.

Materials and Methods: Experiments were conducted to NIRPSB Brasov. Clones were planted manually on 3 May 2021 and tubers were harvested on 4 October 2021. Observations were performed in 30 June, 12 July, 23 July and 3 August. Disease development on foliage was assessed as percentage of foliage area damaged (Malcolmson, 1976). Has not been interfered with artificial *Phytophthora infestans* inoculum sprayers, using only the natural pressure of infection.

Results: From 26 clones studied, 1951/1 and 1927/1 showed the lowest level of resistance on the foliage, followed by 1901/1, 1901/7 and 1948/2. Instead, the clones 1901/6, 1930/3, 1959/8 and 1982 were located towards the upper limit of resistance on the foliage during the entire vegetation period.

Conclusion: In the present work, we observed the presence of clones relatively resistant, which allows the development of an adequate protection strategy and the possibility to reduce the number of treatments. Based on field information more resistant and suitable potato varieties could be recommended.

Keywords: foliage, late blight (*Phytophthora infestans*), potato clones, resistance

References

1. Malcolmson J.F. (1976). Assessment of field resistance to blight (*Phytophthora infestans*) in potatoes. Trans. Br. Mycological Society 67: 321-325
2. Maurice S, Montes MS, Nielsen BJ, Bødker L, Martin MD, Jønck CG, Kjølner R, Rosendahl S. (2019). Population genomics of an outbreak of the potato late blight pathogen, *Phytophthora infestans*, reveals both clonality and high genotypic diversity. Mol Plant Pathol. 20(8):1134-1146. doi: 10.1111/mpp.12819.

POTENTIAL CONTRIBUTIONS OF BREEDING THE GALLOWAY AND HIGHLAND CATTLE IN TRANSYLVANIA, FOR ENHANCED EFFICIENCY AND SUSTAINABILITY OF CATTLE REARING

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Introduction: Romania possesses expansive grassland regions that are yet to be fully utilized. Engaging in the rearing of certain cattle breeds that are well-suited for extensive grazing systems, like the Galloway and Highland beef cattle breeds, could emerge as a highly favourable strategy for harnessing the potential of these grasslands.

Aims: Our study aims to assess the viability of raising Galloway and Highland beef cattle in the Transylvanian Plateau area, Romania.

Materials and Methods: This research relies on an extensive review of specialized literature focusing on: 1) characterizing the quality of a grassland located within the Transylvanian Plateau region (belonging to "Ferma Cojocna", UASVM Cluj-Napoca); and 2) identifying the essential prerequisites for successfully raising Galloway and Highland breeds, while ensuring their welfare and productive effectiveness.

Results: The research area is characterized by vegetation with limited forage value and moderate yield potential (Plesa, 2012). The two beef cattle breeds hold notable recognition both due to their heightened resilience to diverse weather conditions, as well as due to their potential contribution to grassland restoration (Pauler et al., 2019).

Conclusion: Rearing Galloway and Highland beef cattle within the study area could bolster the efficiency of the beef cattle industry in Romania and enhance grassland biodiversity, due to their ability to consume a broader range of plant species compared to local breeds.

Keywords: grassland restoration, beef cattle, sustainability

References

1. Plesa D.-B. (2012). Researches concerning the behaviour of some complex forage mixtures formed by Poaceae and Fabaceae in the ecological conditions found in the grassland ecosystem from Jucu and Cojocna, Cluj County. PhD thesis, UASVM Cluj-Napoca, Romania.
2. Pauler C.M., Isselstein J., Braunbeck T., Schneider M.K. (2019). Influence of Highland and production-oriented cattle breeds on pasture vegetation: A pairwise assessment across broad environmental gradients. *Agriculture, Ecosystems & Environment*. 284:106585.

Acknowledgement: This research was funded by the research project „Breeding technologies, cattle finishing and meat maturation at USAMV Cluj-Napoca for Galloway and Highland breeds”, Project Soluții USAMV CN.

ECOLOGICAL FUTURE: UNITING AI, EARTH OBSERVATION, AND NATURE'S WISDOM FOR SUSTAINABLE DEVELOPMENT

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Introduction: In the age where technological advancements intersect with the pressing need for environmental rejuvenation, innovative solutions play a pivotal role in shaping a sustainable trajectory for both urban and rural landscapes. This synthesis is vital in the context of rehabilitating areas which have endured various anthropogenic challenges.

Aims: This article seeks to elucidate the transformative role of cutting-edge technologies, notably GIS, EO and AI, in fostering community resilience, bolstering sustainability, driving adaptability, and streamlining local resource management. The overarching theme emphasizes nature-based solutions as pivotal for sustainable trajectories in both rural and urban settings.

Materials and Methods: The discourse draws from four exemplary R&D&I projects: Urban Innovative Action SPIRE (Smart Post-Industrial Regenerative Ecosystem), GREENTOP Agro-Biodiversity, INTEGRATE, (enhancING qualiTy of liFe throuGh uRban heAT island assessment) and AGROCLIMRO (Redefining agro-climatic suitability zones for maize and winter wheat crops towards a smart climate change-oriented agriculture in Romania).

Results: The combined findings from these projects reveal that nature-based solutions, backed by cutting-edge technology, not only have the potential to address immediate environmental concerns but also to forge a path towards sustainable rural and urban development. The utilization of Indeco Soft's GIS platform showcases the possibilities of converging traditional geographic data with innovative AI methodologies, enabling precise monitoring and actionable insights.

Conclusion: The triad of GIS, EO, and AI stands poised as pivotal tools for future sustainable development endeavours. With nature-based solutions rooted in this technological framework, a brighter, more sustainable future beckons for communities navigating the challenges and opportunities of modern ecological landscapes.

Keywords: AI, Earth Observation, sustainable development, innovation

References

1. www.greentop.space
2. www.spire.city
3. integrate.indecsoft.ro

MORPHO-PHYSIOLOGICAL CHARACTERISTICS UNDER SALINITY STRESS OF *TRITICUM AESTIVUM* L. VAR. ALEX

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Introduction: In 2021, wheat, *Triticum aestivum* L., played a key role in global food security and ranked third in the world's cereal production (FAO, 2023). Soil salinization is a crucial factor in cultivable land degradation worldwide (Xie et al., 2020) and represents a threat to crop yield.

Aims: The aim of the study was to highlight morpho-physiological changes in wheat induced by salt stress through six treatment doses.

Materials and Methods: Seeds of wheat var. Alex were sown on October 15, 2022, in mezo-phyto-cosmos, in five repetitions, under six saline doses, 0, 15, 30, 45, 60, and 75 mM NaCl. The experiment was conducted under field conditions. The assessments including plant height, arista, and spike length were taken and evaluated at the end of the experiment. Adaxial stomatal imprints have been sampled and assessed under the microscope to determine the stomata density (number of stomata/mm²) and their dimensions.

Results: Wheat morphological parameters were affected by the highest salinity dose. Plant height was significantly reduced in the 60 and 75 mM NaCl doses by 16% and 20%. The spike length showed a significant reduction in only the highest saline dose. Arista length registered the highest value in the 15 mM NaCl treatment by 23% more compared to the control. Stomata density reported the highest value in the 15 NaCl dose, significantly higher compared to the 0 mM NaCl dose.

Conclusion: The highest salinity doses significantly reduced plant height and spike length. Arista length and stomata density showed similar patterns. Testing salinity stress in the field, in mezo-phyto-cosmos presents several disadvantages, including reduced sowing area.

Keywords: adaxial leaf surface, arista, salinization, spike, stomatal density

References

1. FAO, <https://www.fao.org/faostat/en/#data/QCL>, accessed on June 28th, 2023.
2. Xie, H., Zhang, Y., Wu, Z., & Lv, T. (2020). A bibliometric analysis on land degradation: Current status, development, and future directions. *Land*, 9(1), 28.

BIODIVERSITY MAPPING TROUGH IDENTIFICATION AND VALIDATION FOR USE IN AUTOMATIC ALGORITHM RECOGNITION OF VEGETATION IN SATELLITE IMAGES. CASE STUDY: BAIA MARE AREA

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Introduction: In recent years, the classification of plant communities through satellite data trough infield observations for algorithm classification validation is a seldom effort (Kluczek *et al.*, 2022). Also, the plant phenology annual variations will make this process difficult as yearly variations will provide different results (Madonsela *et.al.*, 2021).

Aims: This study aims to identify the best methods for biodiversity mapping, in order to be used for automatic algorithm recognition of vegetation in satellite images. This activity was included in a larger goal, that aimed to provide an automatic and accurate land use and land cover LULC classification into five major categories: forests, marshes, water bodies, herbaceous vegetation, and agricultural land (including a detailed classification of biodiversity).

Materials and Methods: The biodiversity mapping followed at first the main European protected habitats, including forests, wetlands and herbaceous meadows and pastures. After the algorithm classification results, the field research focused on larger area habitats with prevalence of the determinant species. For this, the transects method proved to be the best method, with the quadrant method being useful for areas larger than 20x20m.

Results: The best results were obtained in large homogenous areas, with one ore few prevalent species. The validation of the algorithm classification shows consistent results when compared with field investigations.

Conclusion: The homogeneity of the vegetation, regarding both the prevalence of the determinant species and the size of the area are crucial for obtaining high accuracy algorithm classification. Also, the plant phenology annual variations play a decisive role for multiannual algorithm classifications.

Keywords: biodiversity, remote sensing, vegetation indices, software algorithms, plant phenology

References

1. Kluczek, M.; Zagajewski, B.; Kycko, M. Airborne HySpex Hyperspectral Versus Multitemporal Sentinel-2 Images for Mountain Plant Communities Mapping. *Remote Sens.* 2022, 14, 1209. <https://doi.org/10.3390/rs14051209>.
2. Madonsela, S.; Cho, M.A.; Ramoelo, A.; Mutanga, O. Investigating the Relationship between Tree Species Diversity and Landsat-8 Spectral Heterogeneity across Multiple Phenological Stages. *Remote Sens.* 2021,13, 2467. <https://doi.org/10.3390/rs13132467>

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IMPACTS OF CLIMATE CHANGE ON AGRICULTURAL TECHNOLOGY MANAGEMENT IN THE TRANSYLVANIAN PLAIN

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Introduction: The ecological frame from the Transylvanian Plain is given by the existence of interaction among a great number of factors, of which two are very important for the agro-ecosystem: the first is the thermal background with high temperature variations and low rainfall, characteristics which impose significant restrictions for crop plants and secondly it is the hill orography, with slope land. The condition of land degradation in Transylvanian Plain and its effects, being the result of local extreme physical-geographical conditions, susceptible to degradation (evidenced by the erodibility index), which overlap the extreme climatic conditions.

Aims: Thermal and hydric regime monitoring is necessary in order to identify and implement measures of adaptation to the impacts of climate change.

Materials and Methods: Soil moisture and temperature regimes were evaluated using a set of 10 data logging stations (HOBO) positioned throughout the plain. Each station stores electronic data of ground temperature at 3 depths (10, 30, 50 cm), the humidity at the depth of 10 cm, the air temperature (at 1 m) and precipitations.

Results: Climate change in the past few years have significantly altered the climatic indicators of the Transylvanian Plain. Precipitations, although deficient in terms of annual amounts, through their regime, have a negative influence on the plant carpet. Pluvial aggressiveness index reveals, for the research period, a first peak of pluvial aggressiveness during the months of February-April, then in July and in autumn, the months of October-November. This requires special measures for soil conservation, both in autumn and early spring, soil tillage measures being recommended which ensure the presence of plant debris and vegetation in early spring but especially in summer and autumn. Climatic indicators determined for the period 2009-2022 point out, in Transylvanian Plain, a semi-arid and mediterranean climate through the rain factor Lang, respectively semi-arid (in the South), semi-humid (in the North) according to the De Martonne index.

Conclusion: This climatic characterization requires special technological measures for soil conservation.

Keywords: Transylvanian Plain, thermal and hydric regime, climatic indicators

Acknowledgement: This research was funded by Ministry of Agriculture and Rural Development, Project ADER no. 123/2023: Conservation of soil resources through the use of technological components of regenerative agriculture in order to obtain economic and sustainable harvests of straw cereals in the Transylvanian Plateau.

IRRIGATION DEVELOPMENT IN UGANDA: OPPORTUNITIES, APPROACHES AND CHALLENGES

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Introduction: Uganda agricultural production relies heavily on rain-fed agriculture. Consequently, Uganda is prone to food insecurity during years of erratic and poor rainfall. This has been exacerbated by climate change increasing the frequency of dry spells and droughts. The 2020 Uganda Growth and Development Strategy, a national development framework, prioritized irrigation development and set a smallholder irrigation target of 2% hectare growth annually. The smallholder irrigation sector has since 2004 grown at a rate of 1% per annum which is below the desired increase of 2% per annum.

Aims: To analyse irrigation system potential in Uganda.

Materials and Methods: An analysis was carried out to investigate the reasons for low irrigation development in Uganda despite Uganda having a high irrigation potential of 407,862 hectares.

Results: The study has determined that the major factors that have led to slow development of irrigation in Uganda are inadequate financial resources, inadequate institutional capacity and poor marketing linkages in the irrigated agriculture value chains. Land, water and availability of irrigation technology are not constraints as of now. It has further been observed that there is a mismatch of government and farmers' objectives for promoting irrigation farming in Uganda. Farmers are going into irrigation to generate household income, address food insecurity and improve household nutrition while government is promoting irrigation primarily as a food security measure given climate change. The goals of the farmers are more encompassing and ensure sustainability whilst policy makers' agenda has been confined to irrigation for food security with less emphasis on market-driven approaches.

Conclusion: There is need for policy makers to expand the objectives and scope of irrigation development in Uganda. The expanded scope should include wealth and employment creation, irrigation for exports and economic growth.

Keywords: climate change, food security, irrigation development, value chains

CHALLENGES OF WOMEN IN AGRICULTURE IN UGANDA

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Introduction: Agriculture can be an important engine of growth and poverty reduction. But the sector is underperforming in many countries in part because women, who are often a crucial resource in agriculture and the rural economy, face constraints that reduce their productivity.

Aims: In this paper we draw on the available empirical evidence to study in which areas and to what degree women participate in agriculture.

Results: Aggregate data shows that women comprise about 43 percent of the agricultural labour force globally and in developing countries. But this figure masks considerable variation across regions and within countries according to age and social class. Time use surveys, which are more comprehensive but typically not nationally representative, add further insight into the substantial heterogeneity among countries and within countries in women's contribution to agriculture. They show that female time-use in agriculture varies also by crop, production cycle, age and ethnic group. A few time-use surveys have data by activity and these show that in general weeding and harvesting were predominantly female activities. Overall the labour burden of rural women exceeds that of men, and includes a higher proportion of unpaid household responsibilities related to preparing food and collecting fuel and water. The contribution of women to agricultural and food production is significant but it is impossible to verify empirically the share produced by women. Women's participation in rural labour markets varies considerably across regions, but invariably women are over represented in unpaid, seasonal and part-time work, and the available evidence suggests that women are often paid less than men, for the same work. Available data on rural and agricultural feminization shows that this is not a general trend but mainly a sub-Saharan Africa phenomena, as well as observed in some sectors such as unskilled labour in the fruit, vegetable and cut-flower export sector.

Conclusion: This paper re-affirms that women make essential contributions to agriculture and rural enterprises across the developing world. But there is much diversity in women's roles and over-generalization undermines policy relevance and planning. The context is important and policies must be based on sound data and gender analysis.

Keywords: women, agriculture, labour force, production

THE EFFECT OF LONG-TERM FERTILIZATION ON SOIL RESPIRATION POTENTIAL

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Introduction: Soil respiration represents the process of releasing carbon dioxide into the atmosphere, resulting from the decomposition of organic matter by microorganisms and the respiration of plant roots. Microbial communities in the soil play a central role in biogeochemical cycling of nutrients and soil health.

Aims: The research aim to identify in the international literature how soil respiration is influenced by the application of agrochemical inputs.

Materials and Methods: Data and information were extracted from articles on the Web of Science, a platform based on keyword-structured workflows. For this study, only articles that have shown a particular interest for and used the following as key words were considered for the metanalysis: ‘soil respiration’, ‘microorganisms’, ‘mineral fertilisers’, ‘liming’, ‘microorganisms interactions’, ‘soil microbial communities’, and ‘carbon dioxide emissions’.

Results: To increase soil productivity, mineral fertilizers have been used, with global usage exceeding 200 million tons in 2018. Soil respiration rates are also dependent on dynamic soil factors, including soil organic matter content, temperature, moisture, salinity, pH, and aeration. The impact of fertilizer application can profoundly affect soil microbiota, which have varying responses to fertilization and liming: nitrogen can stimulate short-term soil respiration, while phosphorus or potassium have more modest effects on microbial activity. In general, the application of amendments lead to an intensification of soil respiration. The influence of mineral fertilization with nitrogen (N), phosphorus (P), and potassium (K) on soil respiration is not clearly defined and is uniform across different soil types, climates, and agricultural practices.

Conclusion: The application of chemical fertilizers can have both positive and negative direct effects on soil respiration rates. A challenge for modern agriculture is to achieve optimal yields with minimal negative impact on the environment.

Keywords: soil respiration, microorganisms, mineral fertilizers, microorganism interactions, soil microbial communities, carbon dioxide emissions

References

1. Duan, L., Liu, T., Ma, H. L., & Singh, P. V. (2021). Analysis of soil respiration and influencing factors in a semiarid dune-meadow cascade ecosystem. *Science of the total environment*.

QUALITY IN SOYBEAN SEEDS DEPENDING ON SOWING DATE

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Introduction: Farmers are becoming increasingly interested in identifying agronomic practices that could improve soybean seed quality while reducing costs. Environment, genetics and the interactions between them are the main factors that limit the yield quality of soybean crop (SOUTHWORTH et al, 2002). The sowing date of the soybean crop has a great influence on the growth and development of the plants and, of course, on the production and quality of the harvest.

Aims: In order to evaluate the seed quality (protein content, oil content, stearic acid, oleic acid, linoleic acid and linolenic acid), a laboratory experiment was conducted at Research and Development Station for Agriculture (RDSA) Turda, in 2021.

Materials and Methods: Unground seeds of ten soybean genotypes were analysed using NIR spectrophotometry. Protein content, oil content and four fatty acids: oleic, linoleic, linolenic and stearic were obtained. The soybean samples came from 10 genotypes belonging to three different maturity groups, which were sown in the soybean breeding field at Research and Development Station for Agriculture (RDSA) Turda, on two different dates.

Results: Compared to the first sowing date, the protein content of the studied genotypes was higher in the second period. The negative correlation between protein and oil content is also confirmed by the experimental data from this study, the genotypes sown at the optimal date being oily. With the exception of stearic acid, the fatty acid profile was not greatly influenced by sowing time.

Conclusion: The results obtained revealed that yield, sowing date and genetic factor have a great influence on soybean seed quality.

Keywords: fatty acids, oil, protein, soybean, sowing date

References

1. Southworth J, RA Pfeiffer, M Habeck, JC Randolph, OC Doering, JJ Johnston, DG Rao. 2002. Changes in soybean yields in the Midwestern United States as a result of future changes in climate variability and CO₂ fertilization. *Clim Change*, 53:447–475.

COPPER BASIC CARBONATE PREPARATION FROM COPPER WASTES, AS POTENTIAL PESTICIDE

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Introduction: Some inorganic copper compounds, including carbonates, are widely used as fungicides in agriculture, antimicrobial agents for cattle foot-rot control, food additives for animals etc.^[1] Copper basic carbonates are known in two stoichiometric forms: malachite (green) and azurite (blue). They can be prepared directly by precipitation from copper salts solutions, or indirectly from copper metal, copper oxides etc. In all cases, wastes can be used for copper recovery.^[2]

Aims: The aim of this study is to establish the optimal parameters for malachite and azurite preparation and to identify the final products.^[3]

Materials and Methods: All reagents were purchased from commercial sources and used with no further purification. Waste solutions, free of heavy metals, were collected selectively from chemistry laboratories. Syntheses and analyses were performed on usual laboratory equipment. No animals or biological samples were used in research.

Results: Malachite and azurite were prepared by precipitation from waste copper sulfate solution. It was observed that the reaction temperature influences significantly the identity of the products as well as the sedimentation time. Thus, azurite forms at 20-40°C and turns into malachite by heating above 60°C. The identity of the products was confirmed by thermogravimetric methods.

Conclusion: Cobalt basic carbonates can be obtained in different stoichiometries and in good yields, according to the reaction temperature. The temperature is also decisive for sedimentation and easy filtration.

Keywords: basic copper carbonate, preparation, pesticide

References

1. Copper carbonate, European public MRI assessment report, European Medicines Agency, (2016), www.ema.europa.eu.
2. Al-Saydeh S.A., El-Naas M.H., Zaidi S.J., 2017, Copper removal from industrial wastewater: A comprehensive review, J. Ind. Eng. Chem. 56:35-44.
3. Budiu C.O. , 2022, Studiul fabricarii azuritului și malachitului din soluții reziduale de sulfat de cupru, Proiect de Licență, Universitatea Babes-Bolyai Cluj-Napoca.

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SESSION 2: ENVIRONMENTAL PROTECTION

BIOCHAR APPLICATION FOR THE TARTRAZINE REMOVAL FROM AQUEOUS SOLUTION: ISOTHERM AND KINETIC STUDIES

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Introduction: Biochar is a material abundant in carbon and commonly collected via thermal treatment of biomass (e.g., wood, manure, leaves) under an oxygen-free environment. This material gained attention due to its definite physio-chemical characteristics and diverse applications in multiple fields, such as agriculture, climate change mitigation, environmental remediation, and energy production. The physio-chemical characteristics of biochar, such as large surface area, three-dimensional reticulated and porous structure, and presence of various surface functionalities, could serve as a lasting storage solution for carbon while adsorbing and degrading pollutants. The tartrazine is one of the most common dyes used in a variety of food products as a coloring agent with potential health impacts. Thus, it is very important to determine and remove it from food products and water. The scientific community has developed different decontamination protocols (e.g., adsorption, coagulation, flocculation, ozonation, photocatalysis) to reduce negative impacts on the environment.

Aims: The aim of this study was focused on the characterization and application of biochar for the removal of tartrazine dye from aqueous solutions.

Materials and Methods: For establishing the conditions for the optimal retention of tartrazine, the influence of several physicochemical parameters (initial pH, temperature, adsorbent dose, contact time, and initial concentration of the dye solution) on the adsorption process was evaluated. The isotherm and kinetic models were used to analyze the experimental data. The concentration of tartrazine dye used in all experiments was determined using UV-Vis spectrophotometry.

Results: The best experimental results were obtained at pH 2 and 30°C for 0.9 mg/mL adsorbent dose.

Conclusion: The research brings information regarding the efficient adsorption of tartrazine dye on biochar, which can be employed for practical engineering applications on an industrial scale as an efficient and cost-effective material.

Keywords: adsorption, biochar, isotherm, kinetic studies, tartrazine

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DESASTER MANAGEMENT FOR DIMINISHING ENVIRONMENTAL CHALLENGES

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Introduction: By embracing a comprehensive and forward-thinking strategy, disaster management aimed at reducing environmental impacts can play a substantial role in safeguarding ecosystems, preserving biodiversity, and securing the long-term sustainability of natural resources for generations to come. Prioritizing the protection of vulnerable ecosystems and biodiversity within disaster management efforts can bolster both the resilience of nature and human communities.

Aims: The aim of the research is to emphasize specific issues connected to developments of disaster management performed to diminishing environmental challenges, using case study examples.

Materials and Methods: Exemplifying case studies related to disasters involves a systematic and multidisciplinary approach to understand, evaluate and analyze the impact of these natural phenomena on specific areas and consists of presenting three case studies related to the manifestation of different types of natural disasters.

Results: The case studies complex issues are emphasized using the disaster management matrix includes a series of particularities depending on the specific situations that can be encountered in practice, but a general matrix structure includes reference to the following main aspects: prevention, preparation, response, recovery, and reconstruction. However, if three particular cases are considered, matrix of disasters are proposed.

Conclusion: It is important to note that disaster management is an ever-evolving field that integrates notions of risk reduction, sustainability, climate change adaptation and environmental impact management. Disaster management approaches and strategies evolve based on new discoveries, technological innovations, and lessons learned from past disasters.

Keywords: developments, implementation, risk matrix, vulnerable ecosystems

TESTING THE INFLUENCE OF CLIMATIC FACTORS FROM DIFFERENT ROMANIAN AREAS ON DRY MATTER CONTENT OF RASPBERRY POPULATIONS

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Introduction: The potential benefits of fruit consumption in general and berries in particular are traditionally recognized throughout the world. Studies over time have shown that many species of berries are valuable sources of phytonutrients that are believed to have preventive effects against a wide range of chronic diseases, many of which are age-related.

Aims: The aim of the present study is to test the influence of climatic factors from different Romanian areas on dry matter content of raspberry populations.

Materials and Methods: Meteorological data were collected using a specialized database (<https://www.meteoblue.com/>). Highlighting the cumulative effect of environmental factors on the dry matter content of raspberries was achieved with the help of multivariate analysis.

Results: Medium multiple correlations were identified between the dry matter content of raspberries, atmospheric temperature and precipitation, respectively $R = 0.471$ (with a representativeness equal to 22.10%), for Cluj County, $R = 0.730$ with a representativeness equal to 53.30%, for Prahova County, $R = 0.635$ (with a representativeness equal to 40.30%), for Mureș County.

Conclusion: The research emphasized the different intensities influence of climatic factors from different Romanian areas (Transylvania and Muntenia) on dry matter content of raspberry populations.

Keywords: berry, precipitations, research, temperature

Acknowledgement: this study is funded by the Ministry of Research, Innovation and Digitalization through Operational Program for Competitiveness 2014 – 2020, Axe 1 - Research, technological development, and innovation (RDI) in support of economic competitiveness and business development, Action 1.2.3. Section G - Partnerships for Knowledge Transfer, Contract no. 2/AXE 1/1.2.3.G/30.05.2018, ID: P_40_378, COD MySMIS. Title of the project: "Obtaining a supplement-type food product, on the natural substrate of *Apium graveolens* L. nutritionally optimized by enrichment with selenium and vitamins, for the purpose of improving the quality of life".

HIGH CO₂ AND *EURYDEMA VENTRALIS* IMPACT ON *BRASSICA OLERACEA* VAR. *BOTRYTIS* PLANTS

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Introduction: In the atmosphere, carbon dioxide is a natural gas and a part of the carbon cycle. High CO₂ levels are advantageous for plants because they promote photosynthetic carbon fixation and increase biomass production. However, in nature, the rise in carbon dioxide concentration is accompanied sometimes by the attacks of insects, which influence plant growth parameters and secondary metabolites. *Brassica oleracea* is one variety of the highly polymorphic species, that also includes brussels sprouts, cabbage, kale, broccoli, cauliflower, and kohlrabi. Is an important source of vegetable plants used for food and feed also.

Aims: In order to determine plant signaling for both elevated carbon dioxide levels and the feeding of *Eurydome ventralis*, this study aims to determine the photosynthetic parameters, volatile organic compound emission, chlorophylls, polyphenol, and flavonoid concentrations.

Materials and Methods: Different concentrations of carbon dioxide (400, 800, and 1200 ppm) were used to cultivate *Brassica oleracea* var. *botrytis*. Plants cultivated at various CO₂ concentrations were subjected to the attacks *Eurydema ventralis* bugs for 4 days.

Results: The cabbage bug infestation has a negative impact on the cauliflower plants, regarding the photosynthetic parameters, chlorophyll *a* and *b*, zeaxanthin, and β-carotene content. The monoterpenes, sesquiterpenes, 2-hexenyl acetate emissions, and the polyphenol and flavonoid content are increasing after the cabbage bug infestation for all plants grown at different CO₂ concentrations.

Conclusion: Because the cycle of secondary metabolites is disrupted, plants grown in high carbon dioxide concentrations are more susceptible to the effects of biotic stresses.

Keywords: increase CO₂, *Brassicaceae* family, *Eurydema ventralis*, secondary metabolites

Acknowledgment: This work was supported by a grant from the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2020-0410.

MONITORING RUMINANT EMISSIONS IN SPECIFIC ENVIRONMENT

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Introduction: The release of methane (CH₄), ammonium (NH₃), and nitrogen dioxide (NO₂) from ruminants poses significant environmental challenges with regard to its effects on both climate change and air quality. Methane is an exceedingly potent greenhouse gas, exhibiting a global warming potential roughly 28 times greater than that of carbon dioxide when considered over a 100-year span. Ruminants substantially add to methane emissions as they undergo the digestive process called enteric fermentation, involving the breakdown of feed in their stomachs.

Aims: The aim of our study is to emphasize the CH₄, NH₃, NO₂ emissions from ruminants maintained in tightened stabulation.

Materials and Methods: An effective of 385 Romanian Spotted Cattle individuals maintained in 5 shelters, was studied from the point of view of CH₄, NH₃, NO₂ emissions using a mobile equipment.

Results: The highest daily average of CH₄ emissions is equal to 73.12 ppm/animal·day·m³, and the lowest equal to 42.15 ppm/animal·day·m³. Regarding the daily average of NH₃ emissions, it is found that the highest value is equal to 28.36 ppm/animal·day·m³, and the lowest equal to 23.78 ppm/animal·day·m³. The highest daily average of NO₂ emissions is equal to 0.13 ppm/animal·day·m³ and the lowest equal to 0.06 ppm/animal·day·m³. On the whole farm, the following emission averages are reported: 54.76 ppm/animal·day·m³ for CH₄ (which represents 1533.28 CO₂ eq./animal/day), 22.33 ppm/animal·day·m³ for NH₃ and 0.85 ppm/animal·day·m³ for NO₂ (which is 225.25 CO₂ eq./animal/day). The results obtained in the present study show lower emissions than those reported by other studies.

Conclusion: The interrelationships between the CH₄, NH₃, NO₂ emissions recorded by the whole farm are described by the recording of a strong and positive dependence between the emissions of CH₄ and NH₃ (R = 0.885) and a negative, weak one between the emissions of CH₄ and NO₂ (R = -0.122) and, respectively, strong between NH₃ and NO₂ emissions (RS = -0.623). A weak to medium positive multiple correlation (R = 0.239) is reported between CH₄, NH₃, NO₂ emissions.

Keywords: ammonium, cattle farm, methane, nitrogen dioxide

FINDING MICROPLASTICS IN THE ENVIRONMENTAL SAMPLES (BOTTOM SEDIMENTS AND SEWAGE SLUDGE): PRELIMINARY RESULTS

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Introduction: Microplastics (MPs) are small fragments of plastics with dimensions not exceeding 5 mm, which have been one of the hot topics in recent years (Chen *et al.* 2023). Due to their low density and small size, they are easily discharged into the sewage system, and wastewater treatment plants are listed as one of the main point sources introducing MPs into the environment (Bodzek and Pohl, 2022).

Aims: The aim of the research was to monitor MPs contamination in various environmental matrices.

Materials and Methods: Bottom sediments from an anthropogenic lake and municipal sewage sludge from southern Poland were tested. Samples were analyzed using Fourier infrared spectroscopy (FTIR) and digital microscopy.

Results: Microplastic-like particles were found in all tested samples. Most of them were fiber-shaped and a higher number were found in the municipal sewage sludge samples. A qualitative analysis was also performed. Comparing the spectra of the studied samples with the spectra of the selected polymers (polyethylene (PE), polystyrene (PS), polyethylene terephthalate (PET)), it was found that the sewage sludge samples contain peaks characteristic for PE, however, it was not possible to estimate its content due to the heterogeneity of the samples. In the bottom sediments, practically no peaks of the mentioned polymers were found.

Conclusion: Qualitatively and quantitatively determining microplastic contamination of environmental samples requires a larger sample volume and application of more efficient separation of the organic matter from plastic.

Keywords: bottom sediments, microplastics, municipal sewage sludge

References

1. Bodzek M. and Pohl A. (2022). Removal of microplastics in unit processes used in water and wastewater treatment: a review. *Archives of Environmental Protection*. 48(4):102–128.
2. Chen Y. Y., Cheng X. T. and Zeng Y. Q. (2023). The occurrence of microplastic in aquatic environment and toxic effects for organisms. *International Journal of Environmental Science and Technology*. 20:10477–10490.

DESIGNING THE FRAMEWORK FOR THE ENVIRONMENTAL ANALYSIS OF THE ADDITION OF NATURAL ANTIMICROBIAL AND ANTIOXIDANT AGENTS TO THE FEED PRODUCTION LINE

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Introduction: Analyzing the environmental impact of adding natural antimicrobial and antioxidant agents to conventional feed production is crucial for sustainability, resource efficiency, reduced chemical use, emissions reduction, biodiversity preservation, meeting consumer demands, complying with regulations, ensuring long-term viability, driving innovation, and promoting transparency in the industry.

Aims: Creating a robust framework for the environmental analysis of integrating natural antimicrobial and antioxidant agents into conventional feed production is a vital step towards understanding the holistic impact of this innovation. Our objective is to establish a comprehensive methodology that allows us to assess the ecological implications and sustainability of this process.

Materials and Methods: ISO 14040, OpenLCA software, EcoInvent, Agribalyse databases, and the EF 3.1 methodology, will be used. The first phase involves detailed planning of processes, including preparation and defining inputs and outputs related to water, energy, materials, and emissions. In the next phase, a baseline scenario is created using fish feed as a model for future evaluations. The final phase involves selecting the best blends with desired attributes, followed by a thorough assessment and comparison with the baseline scenario.

Results: Identify the key environmental variables and parameters to be measured. Ensure data collection methods are precise, consistent, and reliable. Establish a baseline for comparison.

Conclusion: The meticulous design and implementation of this environmental analysis framework will offer valuable insights for integrating natural antimicrobial and antioxidant agents into conventional feed production. This approach supports informed decision-making, sustainability, and responsible practices in the agricultural industry.

Keywords: Life Cycle Analysis, environmental footprint, process design

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ENVIRONMENTAL RISKS FROM SANITATION ACTIVITIES

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Introduction: Disaster management is a continuously developing area that incorporates concepts related to minimizing risks, promoting sustainability, adapting to climate change, and handling environmental impacts. The methods and plans for disaster management progress as new findings, technological advancements, and insights from previous catastrophes emerge.

Aims: The aim of this current study is to provide an overview of the key elements associated with disaster management in the sanitation sector, with the goal of mitigating their environmental impacts, alongside the inclusion of three specific case studies.

Materials and Methods: The approach employed to evaluate environmental risks in the sanitation industry involves an analysis of both hazards and vulnerabilities. This process entails the identification and evaluation of potential risk sources and adverse events (hazards) as well as the assessment of the extent of exposure and sensitivity to these risks (vulnerabilities).

Results: To draw up the risk matrix, the eight types of identified risks are taken into account. In the creation of the risk matrix for the sector of sanitation activities, the descriptors of the consequences of the manifestation of risks were nominated, corresponding to the probability of their manifestation. Also, for the simultaneous highlighting of the probability of their occurrence and the severity of their manifestation, the risk severity/probability of manifestation matrix was drawn up for the sector of sanitation activities, in which representations were used both by numerical symbols and of color, for each of the descriptors considered.

Conclusion: The environmental risks associated with the sector of sanitation activities, identified in the present study refer to: pollution of air, water, soil, flora and fauna, volume of waste generated, energy consumption, noise, and visual impact. It is recommended that responsible organizations and authorities identify, assess, and implement appropriate measures to manage these risks to minimize the impact on the environment and to protect public health.

Keywords: energy consumption, noise, volume of waste generation, water pollution

EVALUATION OF THE BIOACTIVE COMPOUNDS CONTENT IN *LACTUCA SATIVA* L. GROWN IN ABIOTIC STRESS CONDITIONS INDUCED BY ANTIBIOTICS

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Introduction: The extensive worldwide use of antibiotics leads to significant diffuse environmental pollution, but understanding the effects of many important antibiotics on plants is still limited. Antibiotics by their multiple applications (human and veterinary medicine, animal husbandry) can reach different environmental compartments (surface waters, groundwaters, soil). From soil, antibiotics can be taken up by plants with an impact on human health.

Aims: The aim of the present work consists of the evaluation of the antibiotic's (ampicillin and ciprofloxacin) impact on bioactive compounds (e.g. assimilating pigments, polyphenols) and antioxidant capacity of lettuce (*Lactuca sativa* L.).

Materials and Methods: Lettuce (*Lactuca sativa* L.) seeds were sown in plastic pots filled with commercial garden soil mixed with three different concentrations of antibiotics (7.5, 15, 30 mg kg⁻¹ ampicillin, of 5, 10, and 20 mg kg⁻¹ ciprofloxacin). The plants were grown in a Memmert growth chamber under controlled light conditions (for 12 h from 24 h) and a day/night temperature cycle of 25/18 °C. The growth of plants in the presence of different concentrations of antibiotics was compared with control plants grown in the absence of antibiotics. The investigation of chlorophylls, total polyphenols, and antioxidant capacity in the selected plants exposed to abiotic stress induced by antibiotics was performed using UV-Vis spectrophotometry.

Results: The amount of bioactive compounds and antioxidant capacity depends on antibiotics from soil and their concentration.

Conclusion: The results obtained in this study can be used to better estimate the impact of drugs on the environment and to improve awareness of the importance of responsible use of drugs.

Keywords: abiotic stress, antibiotics, antioxidant capacity, bioactive compounds, chlorophylls

Acknowledgment: This work was carried out through the National Research and Development System, Subprogramme 1.2-Institutional Performance-Funding Projects for Excellence in RDI, Contract No. 37PFE/30.12.2021.

MICROBIAL DIVERSITY OF AQUATIC ENVIRONMENT AS SOURCE OF ENZYMES

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Introduction: Bacterial and fungal enzymes are widely used in the food industry (i.e. amylase, protease, lipase, glucose oxidase, pectinase, tannase etc.). Microalgae and cyanobacteria in turn have interesting metabolic pathways related to the biogeochemical cycles of nitrogen, phosphorus and carbon, which could serve as sources of enzymes with industrial, biomonitoring and bioremediation applications. In addition, seven algal enzyme complexes are described: carbonic anhydrase, hydrogenase, lipoxxygenase, nitrilase, nitrogenase, phosphatase, and thiolase (Karigar and Rao 2011).

From the mentioned, it can be said that microorganisms are important biomass factories that can grow in various environments and have enzyme-mediated metabolisms, which makes them good candidates for the production of enzymes with industrial applications.

Aims: The aim of the constant research is to determine the ability of new strains of microorganisms isolated from the aquatic environment of the "La izvor" lake system (Chisinau municipality) to degrade organic compounds through the secretion of enzymes such as amylase, cellulase, catalase, and lipase.

Materials and Methods: The iodine test method was used to determine amylase. For preliminary screening of catalase enzyme activity – slide-drop. Congo red dye was used for the preliminary screening of cellulase enzyme activity. For preliminary screening of lipase enzyme activity, strains were grown on media supplemented with Tween 80.

Results: As a result of the study of the enzymatic capacity of microorganisms (amylase, catalase, cellulose, and lipase) it was established that they exhibit different enzymatic activities. Thus, out of 25 actinobacteria strains, 16 strains possess weak amylolytic activity. High catalase activity showed only one strain from the genus *Rhodococcus*. In bacteria from 25 strains, the evidence of amylase was established in 19 strains, catalase in 21 strains, cellulase in 16 strains, and lipase in 2 strains. Out of 8 strains of microalgae and cyanobacteria, *Nostoc verrucosum* showed activity against all four enzymes. Out of 35 strains of fungi, in 12 strains the activity of catalase was at an average level. Amylase, lipase and cellulase activity was weak in most strains tested. Enzymatic activity of amylase, lipase, and cellulase at a medium level was recorded only in 4 strains.

Conclusion: According to the obtained results, we can conclude that the microorganisms isolated from the water of the "La izvor" complex possess significant enzymatic properties and can be studied as potential producers of enzymes of industrial interest.

Keywords: amylase, catalase, cellulase, lipase

References

1. Karigar C.S. and Rao S.S. (2011). Role of microbial enzymes in the bioremediation of pollutants: A review. *Enzyme Research*. 2011: 1-11.

SESSION 3: FOOD SCIENCE AND TECHNOLOGY

PRACTICES AND MODELS FOR MONITORING AND CONTROL OF MICROBIAL RESIDUE IN PIGS AND POULTRY APLIED IN ROMANIA

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Introduction: Withdrawal periods after antimicrobial treatment have been defined as preventing in meat the presence of residues above the maximum residue limits (MRLs). However, errors can lead to residues above MRLs (Alban et al., 2023). The aim of the study was to perform a microbial risk assessment on pork and broiler carcasses. In the European Union (EU), the antimicrobial is prescribed by a veterinarian and the prescription contains information about the withdrawal period needed before the animal can be sent for slaughter (EU Parliament and Council, 2019).

Aims: Study wants to investigate the best practices applied in our country for monitoring microbial residues in pork and broiler carcasses. Procedures are in place to help avoid delivery of milk to the dairy processor or animals to the abattoir prior to the end of the withdrawal period. Still, residues can occasionally be present in animals sent for slaughter, with potential consequences along the whole meat chain (Arsène et al., 2022).

Materials and Methods: Research was based on a qualitative analysis based on two questionnaires, one for business operators, other to competent authority distributed to pigs and poultry abattoirs and competent authority. A statistical method was carried out for questionnaires analysis.

Results: The results showed a variation in small or big facilities, abattoirs placing meat on national markets or to be traded and exported.

Conclusion: In the present there are a diversity of ways to monitor and control residues in pigs and chickens based on approach using EC Regulation on microbiological criteria for food stuff. Best practices should focus on consumer safety, consumer satisfaction and a sustainable environment.

Keywords: consumer safety, microbial residues, sustainable environment

References

1. Alban, L. et al., (2023) "Development of Best Practice Models for Monitoring and Control of Residues of Antimicrobial Origin in Pigs Delivered to an Abattoir", SafePork 14(1). doi: <https://doi.org/10.31274/safepork.16309>
2. Arsène, M.M.J. et al., (2022). The public health issue of antibiotic residues in food and feed: Causes, consequences, and potential solutions. Vet. World, 15, 3, 662-671
3. EU Commission (2019). EU Regulation 2019/2090. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R2090&from=EN>

EFFECTS OF HOT AIR- AND FREEZE-DRYING ON THE COLOUR AND CAROTENOID CONTENT OF POWDERS OBTAINED FROM DIFFERENT ROSEHIP WASTE

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Introduction: Rosehip fruits come in various shapes and hues, ranging from yellow-orange to dark red and occasionally even black, depending on the distribution of pigments like carotenoids, flavonoids, or anthocyanins (Bhave *et al.*, 2017). Carotenoids are the principal pigments responsible for the colour of rosehips (Alp *et al.*, 2016).

Aims: This study aimed to determine the effects of hot air- and freeze-drying on the colour and carotenoid content of powders obtained from waste from rosehip puree preparation by boiling (traditional processing) and cold pressing, respectively.

Materials and Methods: The current study was designed to determine the colour attributes of rosehip fruits (the raw material used to make rosehip puree), paste, juice, waste (resulting from fruits processing by boiling and cold pressing), and powders (obtained by hot air- and freeze-drying of waste). L^* , a^* , and b^* values were measured using an NH300 portable colorimeter (3NH, Shenzhen, China), while those of h^* , C^* , and ΔE^* attributes were calculated. To determine the polar and nonpolar carotenoid content, ethanolic and ethereal (with petroleum ether) extracts were prepared for all rosehip samples, which were subsequently read to a UV-VIS spectrophotometer at 450 nm.

Results: The total colour difference (ΔE^*) between waste from fruits processing by boiling and cold pressing also between resulting juice and paste was large. Hot air drying determined a large ΔE^* between powders obtained from the boiled and raw waste. Freeze-drying caused an intensification of colour in the powder obtained from boiled waste but a reduction of colour intensity (C^*) in the powder from raw waste. These results corroborate those regarding the content of polar carotenoids.

Conclusion: Fruits processing by boiling affected the carotenoid content of the resulting waste to a greater extent than cold pressing, as did hot air drying the waste compared to lyophilization in terms of carotenoids in the corresponding powders.

Keywords: Colour, carotenoids, drying, rosehip powders, waste

References

1. Bhave A., Schulzova V., Chmelarova, H., Mrnka, L. and Hajslova J. (2017). Assessment of rosehips based on the content of their biologically active compounds. *Journal of Food and Drug Analysis*. 25(3):681–690.
2. Alp S., Ercisli S., Jurikova T., Cakir O., Gozlekci S. (2016). Bioactive content of rose hips of different wildy grown *Rosa dumalis* genotypes. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. 44(2):472-476.

PERSPECTIVES ON THE VALUING OF VEGETAL RESIDUES IN BAKERY PRODUCTS. EFFECTS OF TOMATO MARC ON BAKING PROPERTIES OF WHEAT FLOUR AND BREAD QUALTY

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Introduction: Current trends in food industry and food sciences is to implement a zero-waste policy. Studies in the field highlight that plant residues generated by the canned vegetable industry have great potential in terms of their valorization. (Mateos-Aparicio and Matias, 2019, Zarzycki, et al., 2022). Part of by-products (tomato marc) can be used to obtain flour or bakery products.

Aims: Which most consumers choose healthy food products, for most of them bread constituting the basis of the nutritional pyramid, the present study highlights the opportunity of developing new bakery products to value on the functional properties of tomato marc.

Materials and Methods: White wheat flour type 550 (F550) and tomato marc flour (TMF) were used for the research in different proportions: 5, 10, 15, 25 g/100g resulting in 5 bread recipes TMF5, TMF10, TMF15, TMF25. The research consisted in determining the baking properties of the flours obtained and the physico-chemical and sensory quality of the resulting bread.

Results: Research indicates variations in the ability to form dough and retain gases depending on the amount of TMF added. In terms of protein, lipid and fiber content, theoretical and experimental results indicate an increase in their TMF function. The overall acceptability of bread with TMF has varied according to consumer preferences.

Conclusion: The positive results recorded from the study highlight the potential capitalization of tomato marc in bakery products with functional potential. The consumption of such products can improve the health of consumers through the intake of dietary fiber, vitamins and carotenoids.

Keywords: bread, Food waste, tomato marc

References

1. Mateos-Aparicio, I., & Matias, A. (2019). Chapter 9 – food industry processing by-products in foods. The role of alternative and innovative food ingredients and products in consumer wellness (pp.239-281). Academic Press.
2. Zarzycki, Wirkijowska et al., (2022). Effect of Moldavian dragonhead seed residue on baking proprieties of wheat flour and bread quality. LWT-Food Science and Technology.

THE IMPACT OF CO-INOCULATION *SACCHAROMYCES* AND NON-*SACCHAROMYCES* YEASTS, AND NUTRIENTS ADDITION DURING FERMENTATION ON THE COMPOSITION OF CIDER

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Introduction: Cider is defined as an alcoholic drink, with an alcohol content ranging between 1.2-8.5% ABV. *Saccharomyces cerevisiae* and *Saccharomyces bayanus* are recommended to be used as starters in cider production (Bedriñana et al., 2017). *Torulaspora delbrueckii* stood out for its positive impact on sensory characteristics of apple cider, such as increased complexity of aromas and volatile substances both in co-fermentations and in pure cultures (Wei et al., 2019).

Aims: In order to enhance the volatile and sensory profile of apple cider, this study attempts to optimize the fermentation processes using *Saccharomyces* and non-*Saccharomyces* yeasts and lactic acid bacteria. The chemical compounds of interest were evaluated from the raw material to the final product.

Materials and Methods: The apple juice (Rozela) was subjected to fermentation processes to obtain cider using four yeast strains and one LAB.

Results: Co-inoculated *Saccharomyces* and *T. delbrueckii* ciders had the floral odor and some aroma and flavor attributes (floral, fruity) due to higher alcohols and volatile contents.

Conclusion: Our study highlights the importance of yeast selection and nutrient supplementation during apple cider production. By carefully choosing yeast strains cider makers can enhance the sensory attributes, flavor complexity, and overall consumer appeal of their products.

Keywords: apple cider, co-inoculation, malolactic fermentation, nutrient supplementation

References

1. Pando Bedriñana, R., Mangas Alonso, J. J., & Suárez Valles, B. (2017). Evaluation of autochthonous *Saccharomyces bayanus* strains under stress conditions for making ice ciders. *LWT - Food Science and Technology*, 81, 217–225
2. Way, M. L., Jones, J. E., Nichols, D. S., Damberg, R. G., & Swarts, N. D. (2020). A Comparison of Laboratory Analysis Methods for Total Phenolic Content of Cider. *Beverages*, 6(3), 55.

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ENHANCEMENT OF AMYLOLYTIC ACTIVITY IN FUNGI *Aspergillus niger* CNMN FD 06 USING COORDINATION COMPOUNDS OF Ba AND Sr IN A LAB-SCALE FERMENTER

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Introduction: Fungal amylases have a broad spectrum of utilization in different industries, one of the most important fields of application being food industry. They are used in baking, viticulture and juice processing for improve the structure and volume of baking, preparation of sweet syrups, modification of baby food ingredients etc. It is known that amylases are metal ion-dependent enzymes and some metals may stimulate the enzyme activity.

Aims: In present research the influence of coordination compounds of barium and strontium with polydentate ligand (dimethyl ester of 2,6-pyridinedicarboxylic acid) on the amylolytic activity of fungi *Aspergillus niger* CNMN FD 06 under submerged cultivation in a lab-scale fermenter was studied.

Materials and Methods: The producer was cultivated during 5-6 days in BIOSTAT® A plus Sartorius fermenter. Metalocomplexes $[\text{BaL}_3-\mu-(\text{NCS})_2\text{Co}(\text{NCS})_2]$ and $[\text{SrL}_3][\text{Co}(\text{NCS})_4]$, where L is 2,6-pyridinedicarboxylic acid dimethyl ester, were included into nutritive medium, in the concentration of 1,0 and 5,0 mg/L. Studies were carried out at two regimes of cultivation: nutrient medium volume 2 L, aeration 2.0 L/L medium / min, agitation 100 (I) and 180 (II) rpm.

Results: The second regime of cultivation ensures the maximum synthesis of amylases. Thus, the activity ranged from 73.85 to 84.33 u/mL (I regime) and from 113.55 to 136.08 u/mL (II) for samples with Ba and, respectively, between 61.33-71.22 u/mL and 79.51-93.90 u/mL for those with Sr. The amylolytic activity was significantly higher in the samples cultivated in the presence of Ba compound, showing an increase of 53.9% and 84.4% on 5th and 6th day, respectively, compared to the maximal level of the control (at the 6th day).

Cultivation of the producer in the medium containing the compound of Sr ensures the intensification of amylase biosynthesis, on the 4th day the activity being practically equivalent with the maximum level of the control.

Conclusion: Both coordination compounds showed a positive effect on amylolytic activity, expressed in the significantly increase of activity and the reduction of the technological cycle by 24-48 h.

Keywords: amylases, fungi, metalocomplex

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NEW METHOD OF OBTAINING PROTEOLYTIC ENZYMATIC PREPARATION FROM FUNGAL STRAIN *Fusarium gibbosum* CNMN FD 12

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Introduction: Proteases, that are able to hydrolyze the peptide bonds in proteins and polypeptides, occupy a key position in diverse industries, such as food, leather, textiles, agriculture, animal feed. Considering the increasing demand for microbial proteases, identification of new way for improving the productivity of producers is of great importance.

Aims: to evaluate the effect of a new coordination compound 2,6-diacetylpyridine-bis(picolinoyl-hydrazone)-bis(aqua)iron(III)-hydrate(1/2.5) nitrate on the activity of the proteolytic complex synthesized by the micromycete *Fusarium gibbosum* CNMN FD 12 under the submerged fermentations in shake flask, as well as in lab-scale fermenter.

Materials and Methods: The micromycete was cultivated in Erlenmeyer flasks and in the BIOSTAT® A plus fermenter during 4-6 days. In the fermenter two regimes of cultivation were set up: volume of nutrient medium - 2 L, volume of forced aeration - 2 L /L medium / min, stirring – 100 (Ist regime) and 180 rpm (IInd). The metalocomplex was added to the nutritive medium in the concentrations of 5.0-20.0 mg/L. Activity of neutral (pH-7.4), acid (pH-3.6) and alkaline (pH-9,0) proteases was assayed.

Results: It is found that by varying the concentration of the coordination compound and duration of cultivation in the flask, it is possible to obtain proteolytic preparations enriched with different types of proteases. The cultivation for 4 days on media containing 10-15 mg/l of metalocomplex ensures the preferential synthesis of acid and neutral proteases, while in the case of cultivation for 5 days in the presence of 15 mg/l of compound, the activity of alkaline proteases increased by 83%. The increase of proteases activity in bioreactor was much higher than in the flasks. At the 5th day of cultivation, the activity was 146.2, 58.5 and 56.9% higher, compared to the maximal value of control (II regime).

Conclusion: Using the coordination compound of Fe with polydentate ligand can ensure the obtaining of proteolytic preparations with desired composition in short period of time. The stimulatory effect of metalocomplex is preserved under lab-fermenter scale cultivation.

Keywords: fungi, metalocomplex, proteases

Acknowledgments: This study was supported by the research project 20.80009.5007.28, ANCD. The coordinating compounds were synthesized and offered for investigations, according to the project's objectives, by the partner team from the Institute of Chemistry, MSU.

APPROACHES TO ALTERNATIVE TECHNOLOGY FOR MAKING GRAPE JUICE FROM BLACK BERRY VARIETIES

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Introduction: The production of grape beverages, especially juices, predominantly consists of using white grape varieties. The problem of producing juice from black-berry grapes is related to primary processing, because in the absence of fermentation, the extraction of the phenolic complex and biologically active substances is difficult.

Aims: The proposal of an optimal juice production technology by increasing the technological performance of grape processing, ensuring the traceability of the technological process, applying innovative, competitive and efficient juice production technologies will ensure the development trend and the diversification of the industry.

Materials and Methods: The research of juice production technologies and the study of variable factors in the absence of crushing the grapes: temperature (t), duration, the process of diffusion were the experimental variants. Whole grapes were thermally treated for 20 minutes with hot must, from white varieties, with t 80°C, hydraulically pressed and filtered juice pasteurized.

Results: Processing black-berry grapes according to the optimized scheme, stimulates cell plasmolysis of the berry skin, diffusion and extraction of phenolic compounds, fine pressing and higher yield. When treating whole grapes, the temperature of the skin increases where up to 85% of vitamins, coloring and aromatic substances are concentrated, protecting the pulp of the solid phase from high t (>+50°C). The skin's thermoplasmolysis ensures the dissolution of pigments, intensification of diffusion and the increase of must yield.

Conclusion: The prospect of applying an economical, accelerated process with a decontaminating effect attests to the quality of the obtained juice, the diversification of the assortment and the obtaining of other juice-based drinks.

Keywords: Processing technology, quality parameters

References

1. Ampelografia României. Vol I-IX. București, 2018
2. Cristina Santini Sustainability in the wine industry: key questions and research trends. Santini et al. Agricultural and Food Economics, 2013
3. Silva, S.B Development of probiotic grape juice and Lactobacillus paracasei viability under cold storage. XXV Congresso Brasileiro de Ciência e Tecnologia de Alimentos, Gramado, Brazil, 2016

IMMUNOSTIMULANT EVALUATION OF NATURAL EXTRACTS IN *SPARUS AURATA*

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Introduction: Teleost is esteemed as a useful animal model to assess the toxicity and pathological effects of several substances and pathogens. They can be easily used to emulate human and fish diseases and its application in aquaculture research investigations.

Natural feeds are nowadays even more used in aquaculture production to increase animal welfare and health. Natural extract such as (*Uncaria tomentosa*), shiitake (*Lentinula edodes*), beta-glucan and black-currant (*Ribes nigrum*), have already been reported to have immunostimulant and analgesic properties.

Aims: The present work aims to evaluate the effects of a commercial supplement based on natural extracts above mentioned in *Sparus aurata*, carried out at the Sicilian Centre for Fish Pathology of the University of Messina.

Materials and Methods: An acute phase response (APR) was experimentally induced in *Sparus aurata* by intraperitoneal injection of *Vibrio anguillarum*, through the study of the expression of genes involved in the APR. One hundred specimens 12.96 ± 0.93 grams in weight, obtained from a fish farm, were used, and divided into 5 experimental groups. After the feeding period, an experimental intraperitoneal (IP) infection with *V. anguillarum* was performed and the APR evaluated at different time points i.e., 1, 24, 72 and 168 hours post infection (hpf).

Results: The investigation of *IL-1β*, *TNF-α*, *defensin*, and *hepcidin* gene expression was evaluated through RT-qPCR and compared to control groups. Fish that were fed a diet supplemented with the natural complex showed a significant, different gene expression than the control group.

Conclusion: Our finding suggests that a diet supplemented with natural complex might provide some immunomodulatory support in fish allowing them to have a faster response when challenged with a bacterial pathogen, highlighting the modulatory role of these functional feeds in the acute phase immune response. These natural extracts added to commercial feed, could be a valuable aid to other teleost species farmed in aquaculture facilities.

Keywords: Gilthead seabream; Immunostimulant; *Vibrio anguillarum*

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EFFECTS OF INFUSION METHOD OF CHOKEBERRY POWDER IN WHITE TEA ON THE PHYSICAL PROPERTIES AND POLYPHENOLS CONTENT

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Introduction: The most commonly consumed teas (white, green, oolong, black), come from the leaves and buds of the *Camellia sinensis* (L.) (family *Theaceae*) plant and are categorized by variations in harvesting, processing, and associated degree of oxidation of polyphenols in fresh tea leaves (Sharangi, 2009; Unachukwu et al., 2010). Aronia berries contain high levels of anthocyanin and polyphenols that may help reduce the risk of cardiovascular disease, gastrointestinal disease, diabetes, and cancer. (Burdejova et al., 2019).

Aims: The aim of this study was to valorise the chokeberry powder in the white tea industry by developing a new product in order to improve the white tea biologically active compounds.

Materials and Methods: In the experimental research, two infusion methods were used: hot infusion and cold infusion. Hot tea infusions were prepared by adding 100 mL of water at 70° C to 2.5 g of tea and leaving to infuse for 7 min. The cold infusion was prepared by adding 100 mL of water at room temperature to 2.5 g of tea and leaving the infusions to stand at room temperature (20–25 °C) for 2 h, agitating continuously. For both types of infusions, the same recipes were used with the same chokeberry powder concentrations: 0%; 0.6%; 0.8% and 1%. The analysis methods followed in the experimental research were pH, acidity, viscosity and total polyphenol content.

Results: Following the analyzes obtained during the experimental research, a linear and very obvious increase was observed in terms of the total content of polyphenols. The highest amount of polyphenols was obtained by the cold extraction method, obtaining values from 8.25 mg GAE/L to 33.4 mg GAE/L. The pH in both methods had values between 6.74 and 7.08, and the acidity varied between 4g/l and 8 g/l. In the case of viscosity, it was found that, as the concentration of chokeberry powder increases, the higher is the viscosity of the tea for both infusion methods.

Conclusion: The use of chokeberry powder has a good beneficial effect on the properties of white tea, considerably increasing the amount of polyphenols and at the same time increasing the benefits that it has on the organism.

Keywords: acidity, *Aronia melanocarpa*, total polyphenolic compound, viscosity, White tea

EFFECT OF HIGH-POWER ULTRASOUND TREATMENT ON BIOACTIVE COMPOUND CONTENT AND CHROMATIC CHARACTERISTICS OF RED WINES

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Introduction: A good diffusion of phenolic compounds from the grapes to the must is necessary to produce wines with a high chromatic quality. The extraction process takes place during the maceration process, so the length of the maceration process affects the quality of the wine. The extraction efficiency of high-power ultrasound is greatly influenced by a number of parameters, including process frequency, treatment intensity, and duration.

Aims: The objective of this work was to investigate, at laboratory scale, the effect of ultrasonic treatment applied to crushed grapes on the extraction kinetics of phenolic compounds, antioxidant activity and chromatic characteristics during the maceration process of red grapes. In addition, the aim was to identify the possible reduction of the maceration time.

Materials and Methods: Merlot red grape samples, 2019 vintage, were destemmed, hand-crushed and then treated with a probe-type ultrasonic instrument. After destemming and crushing, microvinification was performed on the untreated and sonicated samples. The maceration operation was carried out with sequential extraction (after 3, 5 and 7 days) to evaluate the effect of two factors: amplitude (A), 70 and 90% and treatment time (t), 3, 4 and 5 minutes on the extraction kinetics of bioactive compounds and chromatic characteristics of the samples.

Results: At the beginning of the maceration, the sonicated samples had higher levels of bioactive compounds and chromatic characteristics compared to the untreated sample, a difference that was also found at the end of the maceration, correlating with maceration time, treatment time and % amplitude.

Conclusion: Regarding the duration of maceration, the advance, even 4 days of maceration, is evident, both for the bioactive compounds and chromatic characteristics, compared to the untreated sample.

Keywords: bioactive compounds, chromatic characteristics, high-power ultrasound treatment, maceration, red wines

EVALUATION OF DRYING AND EXTRACTION PROCESSES FOR RECOVERY OF BIOACTIVE COMPOUNDS FROM OLIVE LEAVES USING LIFE CYCLE ANALYSIS

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Introduction: The leaves of the olive tree (*Olea europaea*) contain significant amounts of bioactive compounds and antioxidants that have been recognized for their potential health benefits, like polyphenols, flavonoids, triterpenoids, and secoiridoids. However, the recovery of these valuable compounds requires several processes, like drying and extraction, creating significant costs and environmental footprints to the procedure. In this work, several such processes were evaluated for their costs and environmental impacts through Life Cycle Costing (LCC) and Life Cycle Analysis (LCA), in order to improve the efficiency and sustainability of the recovery procedure.

Aims: The aim of this study was to evaluate the costs and environmental footprints of drying and extraction processes for the recovery of bioactive compounds from olive trees, in order to optimise the procedure.

Materials and Methods: Drying process (freeze-drying) and extraction processes (Ultrasound and/or Microwave assisted extraction) using three solvents (water, acetone and acetone/water 70:30 mix) were examined. Analysis was based on the achieved yields and the Total Phenolic Contents, using the Folin-Ciocalteu and the DPPH radical scavenging methods. The LCA was applied according to the ISO14040/44:2006 standard. Data for LCC and LCA were collected by developed questionnaires and simulations were conducted through SimaPRO 9.1.17, using the characterization factors from ecoinvent 3.0 database.

Results: LCC and LCA pointed several advantages of the Ultrasound-assisted extraction. This process achieved higher Total Phenolic Contents in all solvents examined, using both methods, while also being more environmentally friendly (on average 40% lower total impact than Soxhlet) and more affordable (esp. regarding energy costs). In all studied cases, the most affected impact categories were the climate change, fresh water eutrophication, the use of fossil resources and acidification.

Conclusion: The present work highlighted the advantages of ultrasound-assisted extraction, both in terms of cost and environmental impacts, for the recovery of bioactive compounds from dried olive leaves.

Keywords: Life Cycle Analysis, olive leaves, ultrasound and/or microwave assisted extraction

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ENCAPSULATION OF BIOACTIVE INGREDIENTS WITH ANTIMICROBIAL AND ANTIOXIDANT ACTION IN ORDER TO INTEGRATE THEM INTO FEED SUPPLEMENTS

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Introduction: Encapsulation techniques revolutionize nutrition by adding powerful bioactives to animal feed, enhancing livestock health. This work presents the two most prominent encapsulation technologies i.e. spray drying and electrohydrodynamic process for the effective incorporation of bioactive compounds into feed additives, creating healthier and more resilient animal populations.

Aims: Encapsulation in fish feed aims to preserve nutrient integrity, improve absorption, enhance palatability, and boost fish health by protecting against pathogens and oxidative stress. This technology also promotes sustainable aquaculture and economic efficiency while contributing to environmental conservation.

Materials and Methods: Spray drying is a technique to protect and preserve ingredients by turning them into fine powder particles through spray drying, while the electrohydrodynamic process is a precise method that uses electric fields to create tiny encapsulated droplets for ingredient protection and controlled release.

Results: The produced nanostructures will be characterized in terms of shape, size and size distribution, in order to achieve and optimize their processing capacity. For this purpose scanning electron microscopy (SEM) and laser diffraction method will be used.

Conclusion: Encapsulation of bioactive compounds in order to increase their bioactivity and their controlled release. Encapsulation efficiency higher than 85% and control of the release of the desired bioactive agents in water during the feeding and digestion processes.

Keywords: bioactive compounds, control release, encapsulation, functional products

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ALTERNATIVE OSMOTIC DEHYDRATION PROCEDURE & HIGH-END TECHNOLOGY FREEZE AND MW VACUUM DRYING PROCESS OF BERRIES

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Introduction: A food preservation technique known as osmotic dehydration involves removing water from food goods by submerging them in a concentrated solution, usually sugar or salt, in order to increase shelf life while preserving their flavor and nutritional value. Freeze-drying, also known as lyophilization, is a process used to remove water from various substances, including fruits while preserving their shape, texture, flavour, and nutritional value.

Aims: The primary goal of this work was an alternative osmotic dehydration procedure & high-end technology freeze drying process of berries. This involves optimization of the osmotic dehydration process with alternative solutions, regarding time of osmotic dehydration, the concentration of osmotic solutions, and temperature and optimization of freeze-drying.

Materials and Methods: Alternative osmotic solutions were tested in order to create products with low moisture. Also, various conditions regarding osmotic dehydration and freeze drying were tested, so the processes were optimized.

Results: The optimum conditions and solutions were found for each method and each berry leading to high quality products with a long shelf-life.

Conclusion: The process optimization has led to valuable insights and innovative approaches, resulting in enhanced drying protocols.

Keywords: Alternative drying methods, berries, freeze drying, osmotic dehydration

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EVALUATION OF THE EFFECT OF BIOACTIVE INGREDIENTS AND NEW ENRICHED FISH FEED AGAINST COMMON BACTERIAL FISH PATHOGENS

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Introduction: The FEEDACTIV project focuses on the development of innovative aquaculture feed based on natural bioactive compounds that boost the immune system of farmed fish. Various species of marine microalgae as well as seaweed and land based herbal plants will be used as enrichment of the fish feed and hopefully as partial fishmeal substitution with low-cost ingredients.

Aims: The work package 7 (WP7) aims to evaluate on a large scale the potential effects of the proposed feeds that will be provided to the most common farmed fish such as sea bass, sea bream fry and *Cyprinus carpio*. Growth rate differences and disease resistance will be evaluated in the WP7.

Materials and Methods: During the first 6 month of the project health monitoring of farmed fish has been performed prior to the experimental phase with enriched feed. The health monitoring has been performed to *C. carpio* specimens coming from PISCICOLA SA aquaculture farm. Environmental parameters and commercial feed parameters have been monitored. Several fish from each pond have been sampled for histopathology. Necropsy have been performed immediately after sampling and target tissue samples have been fixed in 10% formalin solution and shipped to the University of Messina for histopathology. For virological analysis samples of gills and skin have been stored in TRIzol and RNAlater solutions for further investigation.

Results: At gross analysis fish showed any sign of disease, the few external lesions found were attributed to traumatic events due to the sampling. Histopathology showed any presence lesions or pathogens that potentially affect the farmed fish health. Any external sign of viral disease has been found, however virological examination is currently on going.

Conclusion: During the first six month of the project, health monitoring of fish has been performed, Fish were found in good health and nutrition status. After virological examination fish will be selected for the experimental phase with enriched feed.

Keywords: Feedactiv, aquaculture, technology, natural feed

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EXTRACTION AND CHARACTERIZATION OF BIOACTIVE COMPOUNDS FROM *PRUNUS SPINOSA* L. FRUITS WITH POTENTIAL IN THE DEVELOPMENT OF EDIBLE FILMS

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Introduction: The blackthorn fruit (*Prunus spinosa* L.) is a rich source of bioactive compounds like flavonoids, anthocyanins, phenolic acids, vitamins, and minerals, known for their antioxidant and antibacterial powers.

Aims: This study aimed to evaluate bioactive compounds in fresh and freeze-dried blackthorn fruits, analyze ethanol extracts for phenolic content, antioxidant activity, and antimicrobial effects. The main goal was to create a chitosan-based biofilm with antimicrobial and antioxidant qualities for improved food packaging.

Materials and Methods: Ethanol was used to extract compounds from fresh and freeze-dried blackthorn fruits, which were then analyzed for phenolic content and antioxidant capacity. Minimum inhibitory and bactericidal concentrations were determined, and biofilms containing ethanolic extracts were tested on cheese contaminated with *S. aureus* and *E. coli* to evaluate their antimicrobial efficacy.

Results: The analysis of total phenols revealed that extracts made with 50% and 80% ethanol: water contain 1716.99 mg and 1962.64 mg GAE/100g dw, respectively. Also, the 80% ethanolic extract exhibited a high value of 73.07% for radical scavenging activity. Notably, susceptibility towards *S. aureus* and *E. coli* strains was demonstrated through MIC and MBC testing of the extracts. Biofilms had 8.35 - 8.53 cm diameter, 0.93 - 1.29 g weight, and 0.15 - 0.19 mm thickness. Only *S. aureus* was affected by the film solution. The 80% extract film significantly curbed *S. aureus* growth on cheese, bacterial count dropped from 4.61 to 1.38 log₁₀ CFU/g over 28 days.

Conclusion: Blackthorn extracts possessed strong antioxidant and antimicrobial properties. When added to chitosan-based biofilms, they effectively inhibited the growth of harmful bacteria like *S. aureus*, suggesting their potential in food industry applications.

Keywords: antioxidant; antibacterial properties; bioactivities; blackthorn; *Prunus spinosa* L

THE INFLUENCE OF ACID PRETREATMENT ON PHENOLIC COMPOUNDS DURING SOLID-STATE FERMENTATION OF OAT BRAN

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Introduction: Solid-state fermentation (SSF) offers promise for the synthesis of bioactive compounds from cereal bran. Nevertheless, the presence of lignocellulose and limited bioactive compound concentrations poses challenges to efficient cereal bran utilization.

Aims: This study explores the efficacy of acid pretreatment applied to cereal bran to supplement the production of bioactive compounds via SSF.

Materials and Methods: Acid-pretreated bran was inoculated with *Aspergillus niger* fungus and incubated at 30°C for 6 days. Bioactive compounds, encompassing phenolic compounds and antioxidants, were quantified using high-performance liquid chromatography (HPLC) and spectrophotometry.

Results: Acid pretreatment significantly elevated the bioactive compound concentrations. The maximum total phenolic compound concentration was attained on the 6th day of fermentation, while antioxidants peaked on days 2 and 6.

Conclusion: Acid pretreatment effectively diminished the lignocellulosic content of cereal bran, enhancing microbial accessibility to the substrate. This underscores the effectiveness of acid pretreatment as a strategy to amplify the production of bioactive compounds through SSF using cereal bran. This study offers valuable insights towards the development of sustainable methodologies for connecting cereal bran's potential in generating bioactive compounds with potential health advantages.

Keywords: cereal bran, bioactive compounds, acid pretreatment, *Aspergillus niger*, antioxidant activity

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QUANTITATIVE AND QUALITATIVE POTENTIAL OF WASTE IN THE SUSTAINABILITY OF THE CIRCULAR ECONOMY

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Introduction: The present review is based on a bibliographic study of 70 articles published between 2001-2023 and promotes the circular and sustainable economy by implementing innovative methods and strategic approaches to minimize the waste cascade. The recovery and use of waste in new food matrices is the main objective of the sustainability circular bioeconomy. The vegetable waste resulting from different stages of technological processing contain nutrients and bioactive substances such as vitamins, mineral substances, free amino acids, polyunsaturated fatty acids, which can be to obtain new products and open new research horizons.

Aims: Information on the current state of knowledge regarding the main directions of valorization and research of vegetablewaste.

Materials and Methods: Vegetable waste can be the materials used to obtain value-added products. The main pre-treatment methods are classified into three groups: mechanical, chemical and biological.

Results: Obtaining a new product that will support environmental sustainability and new research directions.

Conclusion: The concept regarding the valorization of waste from the food industry is based on the realization of a circular bioeconomy, starting from the valorization of food by-products in new matrices, continuing with continuous research in the development of innovative technologies, etc.

Keywords: circular bioeconomy, processing methods, sustainability, vegetable waste

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SENSORY, PHISICOCHEMICAL AND RHEOLOGICAL EFFECTS OF WHITE BREAD FORTIFICATION WITH A COMERCIAL MIXTURE OF VITAMINS AND MINERALS

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Introduction: Modern milling removed the vitamins and minerals from refined flours, but the technological characteristics and sensory appearance is improved. Because of that the white bread becomes the favourite choice of consumers but brings little nutrients to them. Bread could be used a vector for delivery of several nutrient to the population.

Aims: We conducted this experiment to find how the addition of a commercial mixture of vitamins and minerals could influence the dough's rheology, bread characteristics and sensorial acceptance.

Materials and Methods: Vitamin Calcium Premix FA11095 from DSM Nutritional Products Sp. was used in 2 different dosages for fortification, 1.33 and 2.66 baker's percent. Wheat fibres (JELUCCELL WF300) were added too, 0.67 baker's percent. Bread characteristics and nutritional content were analysed according to national standards. Rheological evaluation of dough was done using Mixolab according to method AACC 54-60.01.

Results: The addition of fibres, vitamins and minerals slightly decreased the dough's consistency, had no effects on dough elasticity but increase the stability of dough. Minor rheological effects were observed on C3, C4 and C5. The nutrients were determined in the final products and the lowest dose assured a level of vitamins and mineral at least equivalent to 30% of DZR.

Conclusion: Addition of Vitamin Calcium Premix in 1,3 and 2,6% on flour basis did not affect the bread characteristics, the effects on dough rheology were small and ensured, t lower dosage, at least 30% of DZR.

Keywords: breadmaking, Mixolab, nutrition

References

1. Cardoso, R.V.C., et all, (2019). Flour fortification for nutritional and health improvement: A review. Food Research International. 125:108576.
2. Cauvain, S.P., Clark. R.H. (2019) Baking Technology and Nutrition Towards a Healthier World, John Wiley & Sons Ltd.
3. Collar, C., Bollain, C., Rosell, C.M. (2007). Rheological Behaviour of Formulated Bread Doughs During Mixing and Heating. Food Science Technology International. 13: 99–107.

RESEARCHES REGARDING OBTAINING BISCUITS WITH IMPROVED NUTRITIONAL CHARACTERISTICS

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Introduction: The modern consumers demand high quality products, accessible prices but also are looking for products with improved nutritional characteristics. Some of these nutritional demand are increased fibres content, increased protein content, low sugar and fat content.

Aims: This study focused on the effects of adding fibres and replacing sugar with inulin in the recipe of regular biscuits. Protein fortification of biscuit was also investigated.

Materials and Methods: Dough biscuits was prepared at lab scale and worked and baked on industrial scale production line. Inulin and pea proteins were added to the dough. Sensory characteristics, specific volume, dimensional analysis, colour, pH, reducing and total sugar were performed on the obtained samples. Nutritional value was calculated based on the biscuit' recipe.

Results: Replacing sugar with inulin fibres and addition of pea proteins negatively affected al sensory characteristics but the overall aspect. The colour of biscuits become lighter because sugar replacement. The length, width, height and specific volume of biscuits with modified recipe were smaller than the control. Replacement of sugar with inulin fibres allowed us to obtain biscuits with reduced content of sugar and rich in fibres.

Conclusion: Addition/replacement of sugar with inulin fibres increased the fibres content and reduced the sugar content but the sensory characteristics and physicochemical were reduced. Pea proteins reduced even more the sensorial score of biscuits but the workability of the doughs was not effected very much.

Keywords: fibres, reduced sugar, sensorial

References

1. Mieszkowska, A., Marzec, A. (2016). Effect of polydextrose and inulin on texture and consumer preference of short-dough biscuits with chickpea flour. LWT. 73:60-66
2. Rodriguez-Garcia, J. et al. (2022) Soluble fibres as sucrose replacers: Effects on physical and sensory properties of sugar-reduced short-dough biscuits. LWT. 167:113837
3. Sahagún, M. Gómez, M. (2018). Influence of protein source on characteristics and quality of gluten-free cookies. J Food Sci Technol. 55(10):4131-4138.

ANTIBACTERIAL ACTIVITY OF *ULVA LACTUCA* AGAINST IMPORTANT AQUACULTURE BACTERIAL STRAINS

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Introduction: Efforts are continuously made to produce novel functional aquaculture diets capable of promoting both fish growth and health while being sustainable at social, economic and environmental levels. One of the most serious emerging threats in aquaculture has become the antibiotic resistance phenomena due to antimicrobial drugs. Therefore, functional feed additives of marine origin have been introduced globally as an alternative to fish antibiotics and chemotherapeutics.

Aims: Towards the selection of natural and sustainable resources of bioactive compounds, seaweed has been proven to be a potential source of valuable substances that exhibit antibacterial activity. Aim of this study is to evaluate the inhibition of bacterial growth caused by an ethanolic extract of the macroalgae *Ulva lactuca* against important aquaculture bacterial strains.

Materials and Methods: *Vibrio anguillarum* O1 (VAO1), *Photobacterium damsela* sub. *piscicida* (PHDP) and *Tenacibaculum maritimum* (TMAR), were grown for 48 hours in sterile Brain Heart Infusion Broth (BHIB) and then tested for resistance or sensitivity to the ethanolic extract of *U. lactuca*. Different dilutions of the extract were added to BHIB at a 1:4 v/v ratio. 50µl of each bacterial culture were then added to each sample and incubated for 5 days. During the incubation period the optical density of each sample was measured every 24hours.

Results: The *U. lactuca* extract successfully inhibited the growth of VAO1, PHDP and TMAR throughout the 5 days of incubation. The optimum inhibition was achieved in VAO1 and PHDP by the undiluted and 1:1 diluted extract, while in TMAR, by the 1:2 dilution as well.

Conclusion: The antibacterial activity that our extract provided is considered to be the result of the bioactive compounds contained in the algal strain, such as polysaccharides, carotenoids and phenolic compounds, but further research is required in order to understand the mechanisms by which these macroalgal substances affect the bacterial cells.

Keywords: algal extracts, antibacterial activity, aquaculture

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SUPPLEMENTATION OF A COMMERCIAL DIET OF EUROPEAN SEABASS BY AN ALGAL ETHANOLIC EXTRACT OF *ULVA LACTUCA*

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Introduction: Using natural plant products in fish diets as a source of antioxidants in order to enhance health and growth performance has increased due to the fact that phytobiotics have been proven to act as immune stimulators, antibiotics and appetite inducers. *Ulva* spp. crude biomass has been widely investigated as a fish feed additive in a variety of commercially important fish species whereas literature concerning the use of *Ulva* spp. extracts is scarce.

Aims: Aim of this study is to evaluate the dietary supplementation of a specific ethanolic extract of high antioxidant activity on the growth performance of important fish species of the Mediterranean aquaculture.

Materials and Methods: Three batches of fish feed were designed containing an ethanolic extract of *Ulva lactuca* characterized by high antioxidant activity. The control diet (CD) had no addition of the extract, 1D contained 1% w/w and 3D contained 3% w/w of the extract respectively. Juvenile *Dicentrarchus labrax* fish (N=450) were allocated randomly into 9 plastic 1000L tanks (triplicate groups for each diet) and fed daily for 56 days (at 1,5% BW). Fish collection was performed under light anesthesia with the use of 0.2% 2-phenoxyethanol. Measurements of total length TL (cm), total weight TW (g) and visceral fat weight VF (g) were taken and the Specific Growth Rate (SGR%) and Visceral Fat Index (VFI%) were calculated. Proximate analysis was conducted using the muscle tissue of fish and consisted of moisture/water content (%WC), mineral ash content (%Ash), total protein content (%TP) and total fat content (%TF).

Results: The three diets tested within this study were equally accepted by the fish and no significant mortality increase was observed for any supplemented treatment. By the end of the trial, fish fed 3D had the highest SGR and Ash content, while VFI values were 14% lower compared to the CD. TP content was found to be significantly lower for fish fed 1D.

Conclusion: The positive effects of the tested extract on growth further indicate the importance of process optimization on extraction techniques towards the establishment of algae as a sustainable next generation ingredient in the aquaculture industry

Keywords: algae extracts, European seabass, fishfeeds

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ALFALFA SPROUTS INFLUENCE ON WHEAT SOURDOUGH FERMENTED WITH *LACTOBACILLUS PLANTARUM* AND/OR *SACCHAROMYCES CEREVISIAE*

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Introduction. Alfalfa sprouts (AS) possess a variety of bioactive compounds with potential health benefits, hence the great interest in introducing them into the diet.

Aims. The purpose of the study was to assess the AS influence on sourdough fermented with *Lactobacillus plantarum* and *Saccharomyces cerevisiae*, single or mixt cultures.

Materials and Methods. The raw materials used were wheat flour (WF) type 480, AS, *Lactobacillus plantarum* ATCC 8014 (Lp) and *Saccharomyces cerevisiae* (Sc) baker's yeast. In sourdough, AS substituted WF in ratios of 5, 10, 15%. Sourdough was obtained by fermenting the mixtures of WF:AG and water with Lp, Sc and a co-culture of Lp and Sc. Samples taken at 0 and 24 h of fermentation were analysed for microbial cell growth dynamics, pH, carbohydrate, organic acid (OA) and ethanol contents, total amino acids (TAA), antioxidant activity (AA), total polyphenols (TP) and rheological properties.

Results. Significant bacterial growth after 24h were recorded, with values between 2.61×10^9 – 5.47×10^9 ufc/g for Lp and 2.55×10^8 – 3.67×10^9 ufc/g for Lp and Sc, cocultivation. Also, the yeasts reached values between 0.18 – 3.82×10^7 ufc/g for sourdough with Lp and Sc and 1.16 – 3.77×10^9 ufc/g in the case of single inoculation Sc. After 24 h, pH was in the range of 3.17–5.29. Maltose was converted into glucose and fructose and sustained the metabolic activity of the microorganisms. OA contents increased with the fermentation time, the highest values being recorded in samples with Lp and Sc; also increased TAA values were found. The AA and TP values after 24 h were 0.065 – 0.202 μ M TE/mg, respectively 0.79 – 1.83 mg GAE/g. G' modulus was higher than G'' for all samples after 24 hours of fermentation, indicating the increment of the viscous properties of sourdoughs, while the elasticity decreases with the fermentation time.

Conclusion. Results indicate no negative influence when adding up to 15% AG in wheat flour sourdough fermented with Lp and Sc.

Keywords: alfalfa sprouts, *Lactobacillus plantarum*, *Saccharomyces cerevisiae*, sourdough

EXPLORING PLANT-BASED DAIRY ALTERNATIVES - A FUTURE DIRECTION TO THE MILKY WAY

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Introduction: Dairy's significance persists, yet demand for plant-based dairy alternatives (PBDAs) is rising, projecting a 2023 production surge of over 18.5% from 7.4%. Sourced from cereals, legumes, and nuts, PBDAs imitate dairy nutrition.

Aims: This study aims to comprehensively outline available PBDAs, utilizing recent studies from databases like PubMed, Web of Science, and Scopus. It delves into the nutritional, technological, and health aspects, clarifying the role of PBDAs in the human diet.

Materials and Methods: The review compiles and analyzes 148 relevant publications from diverse sources, illuminating PBDAs' nutritional, technological, and health aspects.

Results: The wide array of plant sources utilized in the production of these alternatives, ranging from cereals to legumes, allows for the creation of an assortment of dairy-like products. Despite the positive trajectory of PBDAs, certain challenges emerge during their development, particularly pertaining to processing techniques and preservation methods.

Conclusion: In conclusion, these alternatives mirror the nutritional composition of traditional dairy products, drawing the interest of those with distinct dietary inclinations and health requirements. However, despite the favorable growth of PBDAs, the journey is not without hurdles, particularly in terms of refining processing methodologies and preserving quality.

Keywords: dairy; fermentation; food processing; legume; milk

APPLICATION OF GREEN EXTRACTION TECHNIQUES FOR THE RECOVERY OF BIOACTIVE COMPOUNDS FROM CITRUS PEELS

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Introduction: The green extraction process is a sustainable and environmentally friendly approach to obtaining valuable compounds from natural sources. It prioritizes methods that reduce waste, energy consumption, and the use of hazardous chemicals, making it a responsible choice for industries and researchers alike. This study focuses on using citrus peels, an agrifood residue, as a rich source of added-value bioactive components.

Aims: This study investigates the potential of orange and lemon peels to provide bioactive chemicals while minimising ecological footprint by implementing environmentally friendly and effective extraction technologies.

Materials and Methods: Pressurized liquid extraction (PLE), a cutting-edge extraction method that utilizes high pressure and temperature to efficiently extract target compounds from solid or liquid samples, was applied. Moreover, the combination of ultrasound and microwaves was applied as an innovative and high yielding technique. Food grade and ecofriendly solvents i.e. water and ethyl acetate were used. The extracts were evaluated regarding the total solids content, the antioxidant activity (DPPH assay), the total phenolic and total flavonoid content using proper analytical methods.

Results: The extraction of citrus peel bioactive compounds using PLE consistently yielded higher extraction efficiencies compared to ultrasound and microwave-assisted extraction (UMAE) when employing both water and ethyl acetate as solvent systems. PLE's elevated pressure and temperature provided high selectivity. However, UMAE exhibited notable advantages, including reduced extraction times and energy consumption, making them more time-efficient and environmentally friendly options. Ethyl acetate, as a solvent, consistently outperformed water, offering a broader range of bioactive compound extraction, with PLE demonstrating better selectivity in targeting specific compounds.

Conclusion: These findings emphasize the importance of selecting the appropriate extraction method and solvent system to optimize citrus peel extract quality and efficiency for various research and industrial applications.

Keywords: Flavonoids, phenolics, pressurized liquid extraction, ultrasound and microwave assisted ext

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EXTRACTION AND SACCHARIFICATION OF STARCH FROM FOREST RESOURCES, IN ORDER TO DEVELOPMENT A GLUTEN-FREE FERMENTED BEVERAGES

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Introduction: Foods free of gluten serve as a necessity for those suffering of celiac disease, an autoimmune condition that affects the small intestine, provoked by gluten. Furthermore, there is a growing trend among healthy people to follow a gluten-free diet on their own choice, which highlights the need for a wider range of gluten-free food options

Aims: Through the optimisation of an effective starch breakdown process, this work aims to valorise a forest resource with sustainable potential (acorns from the *Quercus rubra* and *Quercus robur* species) with the objective of obtaining a fermentable substrate that may be used to brew gluten-free fermented beverages.

Materials and Methods: The acorns from the two species were described from a physico-chemical point of view by determining moisture, ash, total protein, lipids, starch and pH. Polarized light microscopy was used to detect and measure the starch granules (50 granules for each sample), and high performance liquid chromatography was used to track the starch breakdown in fermentable sugars.

Results: *Quercus robur* showing 33.09% moisture, 3.12% ash, 3.59% protein, 38.05% starch and 29.115 mg/ml maltose at the final of saccharification while *Quercus rubra* showing 10.24% moisture, 2.37% ash, 6.12% protein, 47.96% starch and 24.503 mg/ml maltose at the final of saccharification. The dimensions of starch granules were 17.26 – 159.54 μm^2 for the area, 4.04 – 21.04 μm for the length and 3.57 – 11.76 for the width.

Conclusion: The saccharification was accomplished successfully. The findings demonstrate the feasibility of using acorn flour mash as the fermentable substrate necessary for the digestion of *Saccharomyces* yeast cells.

Keywords: acorn, gluten-free, fermented beverage, starch breakdown

References

1. Belorio, M. and M. Gómez, Gluten-free muffins versus gluten containing muffins: Ingredients and nutritional differences. Trends in Food Science & Technology, 2020. 102: p. 249-253.
2. Castro, L.M.G., et al., Unraveling the effect of dehulling methods on the nutritional composition of acorn *Quercus* spp. Journal of Food Composition and Analysis, 2022.

STUDIES RELATED TO DIETARY FIBER CONSUMPTION ON THE MICROBIOME AND METABOLIC SYNDROME – AN OVERVIEW

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Introduction: Research interest is growing in the connection between dietary fiber, the gut microbiome, and metabolic syndrome. As metabolic disorders rise, understanding how dietary habits impact the microbiome and metabolism is crucial. This research sets the stage for studying how dietary fiber can influence metabolic syndrome through the microbiota. Insights gained could shape dietary recommendations for improved metabolic health.

Aims: The aim of this study is to investigate the impact of dietary fiber consumption on the human microbiome and its potential role in mitigating the development or progression of metabolic syndrome. This research aims to provide a comprehensive understanding of the interactions between dietary fiber, gut microbiota composition, and metabolic syndrome markers, contributing to the advancement of evidence-based dietary recommendations for the promotion of metabolic health.

Materials and Methods: A clearly outlined protocol was established to direct the study, encompassing search methods, criteria for inclusion and exclusion, and procedures for data extraction. The research encompassed databases like PubMed, Scopus, and Web of Science.

Results: Reviewed studies show varied fiber intake patterns, with increased fiber-enriched processed foods. Such fiber intake improves the microbiome, benefiting metabolic health by enhancing short-chain fatty acid production and lowering blood glucose. Individual responses vary based on genetics and environment, underlining the importance of personalized dietary recommendations.

Conclusion: The findings emphasize how dietary fiber can potentially impact gut microbial composition and metabolic syndrome markers.

Keywords: diet, fiber, metabolic syndrome, microbiome

SUSTAINABILITY OPTIMISATION OF PRE-HARVESTING PROCESSES FOR THE PRODUCTION OF HIGH-QUALITY BERRIES THROUGH LIFE CYCLE ANALYSIS

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Introduction: Berries are a popular and versatile category of fruits, known for their vibrant colours, distinctive flavours, and numerous health benefits. However, their cultivation requires large areas of land and a significant amount of resources, creating significant environmental footprints. In this work, the sustainability of the cultivation of high-quality berries was examined through Life Cycle Analysis (LCA) and socio-techno-economic analysis. Several pre-harvest parameters were evaluated to minimize impacts and ensure a sustainable production.

Aims: The aim of this study was to optimise pre-harvest management practices for the cultivation of high-quality berries, enabling a sustainable and feasible production for use in healthy food snacks. Two scenarios were investigated: an open-field cultivation and a greenhouse one.

Materials and Methods: For the pre-harvesting, the boundaries of the system have been defined and an online questionnaire was developed, which was filled by Mountain Berries Pitsilia, in order to populate the Life Cycle Inventory. The LCA was applied according to the ISO14040/44:2006 standard. Data for LCA and socio-techno-economic analysis were collected by developed questionnaires and simulations were conducted through SimaPRO 9.2, using the characterization factors from latest version of ecoinvent database.

Results: The boundaries of the systems have been defined and the two scenarios were examined for kg of berries produced and hectares used. The greenhouse cultivation was found to be environmentally friendlier in both cases (up to ~68% for kg of berries produced and ~10% for hectares), with reduced footprints regarding water use, eutrophication and minerals use.

Conclusion: In the present work, it was shown that for the cultivation of high-quality berries the greenhouse scenario was favoured in both economic and environmental aspects.

Keywords: Agriculture production, berries, Life Cycle Analysis

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WATER SOLUBLITY STUDIES OF ICARISIDE II COMPLEXES

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Introduction:

In Epimedii, a traditional Chinese medicine, Icariside II (ICS) is one of the main active ingredients. A number of health disorders, such as cardiovascular diseases, osteoporosis, or sexual dysfunction, were treated and prevented with this, according to He et al. (2020). Recently, several studies investigated their potential as drugs against many common health issues. It is unfortunate that flavonoids' low bioavailability is one of the major obstacles to their effective use. There are several factors that contribute to its poor oral bioavailability, such as a weak water solubility and membrane permeability, a slow dissolution rate in biological fluids, etc. (Vazhappilly, 2021).

Aims: Motivated by all those factors above, bioavailability improvement strategies for ICS are in high demand. Among many other methods in our previous studies complex formation proved to have a high efficiency. Thus, to further increase the water solubility of the ICS – Whey Protein Concentrate (WPC) complexes the addition of surfactants such as Tween 80 and Lecithin were studied.

Materials and Methods: The Icarin II was purchased from Xi'an Day Natural Inc (China), and the whey protein mixture from Koliba Trade (Slo.).

Results: The ICS-WPC-Tween80-Lecithin complexes were successfully achieved. The characterization shows that the water solubility of icaraside II increased. The greatest results were at ICS-WPC-Tween80-Lecith 2:1:12:3 mole rates were observed.

Conclusion: In the present research work, we demonstrated that this is an innovative method focusing on the water solubility improvement of the icaraside II. The complex formation was successful.

Keywords: bioavailability, icaraside II, Lecithin, Tween80, water solubility, whey protein

References

1. He, Chunyang, Ze Wang, and Jingshan Shi. (2020). Pharmacological effects of icariin. *Advances in pharmacology*. 87:179-203.
2. Vazhappilly, Cijo George. (2021). Current methodologies to refine bioavailability, delivery, and therapeutic efficacy of plant flavonoids in cancer treatment. *The Journal of Nutritional Biochemistry*. 94:108623.

CORRELATIONS REGARDING QUALITY PARAMETERS OF THE JUICES OBTAINED IN A PROFILE UNIT FROM ILFOV COUNTY AND CONSUMER SAFETY

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Introduction: Juices have become more and more consumed products in the last decade, therefore consumers' concern for safe products has increased. Also there are more and more studies regarding the technology of obtaining and the quality control of fruit juices (Bates *et al.*, 2001, Falguera and Ibarz, 2014).

Aims: The purpose of this paper was to highlight the importance of quality control in a juice producing unit from Ilfov county, taking into account the basic analyzes that must be performed.

Materials and Methods: Five samples from each different type of juice (apple, grapefruit, cherry, orange with pulp and peach) were analyzed. The measurements included sensorial evaluation, acidity, pH value, soluble substance and microbiological analysis for the juice and nitrogen pressure and Torque- closing force for the bottle.

Results: For the sensorial evaluation the juices scored between 18-20 points. Scores of 18 and 19 points confirm that the juices are of good quality, and those with a maximum score of 20 points have superior qualities. For physical-chemical analyses the results were within the limits provided by the legislation, as following: 2.98-6.93 g citric acid/l for acidity, for pH 2.50-3.13, and 9.80—12.55° for soluble substance. Microbiological results (coliform bacteria, yeasts and moulds) were negative for all varieties. For nitrogen pressure, the values were between 0.4-0.8 bar and for Torque- closing force 20-23,21 Lb/in respectively.

Conclusion: Following the sensorial, physical-chemical and microbiological analyzes carried out, it can be stated that the unit respects the pre-established parameters in obtaining fruit juices, the quality of the products and consumers' safety.

Keywords: juice, food safety, consumers

References

1. Bates, R.P., Crandall, P.G., Morris, J.R. (2001), Principles and practices of small- and medium-scale fruit juice processing, Food Science and Human Nutrition Department, United States.
2. Falguera, V., Ibarz, A. (2014), Juice Processing, Quality, safety and Value-Added Opportunities, Contemporary Food Engineering Series, CRC Press

ANTIMICROBIAL EFFECT OF ORGANIC ACIDS TO INHIBIT THE GROWTH OF *LISTERIA MONOCYTOGENES* INTO THE READY-TO-EAT PRODUCTS

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Introduction: The food safety concern in relation with *Listeria monocytogenes* (LMO) represents a reality and the purpose of this article is to highlight that using the organic acids represent an useful measure to inhibit the growth of LMO into ready to eat products during of shelf life. LMO infection is a foodborne zoonoses that affect humans as mild illness (the gastro-enteric form or non-invasive form) or as severe illness (the invasive form), in relation to the physiological condition of the individual. LMO could contaminate ready-to-eat products, both of animal and non-animal origin, due to its special behavior in relation to environmental conditions. The prevention of this disease is a continuing concern, hence the use of organic acids to preserve the RTE is a good food safety measure.

Aims: In this paper, we are presenting the antimicrobial effect of organic acids to inhibit or limit the growth of LMO in RTE products based on mayonnaise throughout the shelf life of the product. One of these is the dry buffered vinegar which contains acetic acid that has an important antimicrobial with strong antagonistic action against LMO.

Materials and Methods: In order to evaluate the antimicrobial effect of dry buffered vinegar (BactoCEASE® NV DRY, Kemin) added to Boeuf salad (salad with mayonnaise) it was conducted a research to LMO identification and counts of LMO during the shelf life. For this purpose a challenge test for 3 batches of RTE treated with dry buffered vinegar (Boeuf salad with chicken breast) evaluates the growth potential of LMO during the shelf life (15 days).

Results: The highest growth potential for these three batches is 0.04. Values for *Listeria monocytogenes* to be achieved by the product on the following days after production so as not to exceed 100 cfu/g on the last day of storage.

Conclusion: Following the microbiological analyses carried out, it can be stated that growth of *Listeria monocytogenes* is not possible in the tested samples. The highest value of the obtained growth potential is less than 0.5 and it is 0.04.

Keywords: dry buffered vinegar, food safety, LMO, shelf life

References

1. Osman Erkmen, T. Faruk Bozoglu, Food microbiology, Principles into practice , vol I Microorganism related to foods , Foodborne diseasesand Food spoilage
2. ISO 20976-1:2019 Microbiology of the food chain — Requirements and guidelines for conducting challenge tests of food and feed products — Part 1: Challenge tests to study growth potential, lag time and maximum growth rate
3. Commission Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs

ASSESSMENT OF THE BIOACTIVE POTENTIAL OF TWO BEE PRODUCTS WITH THE ADDITION OF NATURAL OILS

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Introduction: Bee honey and propolis are two essential products of the beehive, being appreciated due to their beneficial effects on health. Natural oils such as sea buckthorn oil and thyme essential oil are also receiving increased attention among researchers due to their rich content of bioactive compounds.

Aims: As pathogens become more diverse and resistant to the drugs currently available, it is imperative to develop new remedies in order to combat the imminent danger to public health. The present research aimed to develop two new formulas with bee products and natural oils as well as evaluate their bioactive potential.

Materials and Methods: The experimental products were developed in collaboration with a commercial company. The first product consisted of honeydew honey, propolis soft extract and thyme essential oil, whereas the second product contained honeydew honey and sea buckthorn oil. The following determinations were carried out: physico-chemical parameters of the honeydew honey; compositional analysis of sea buckthorn and thyme oils; total polyphenols and flavones/flavonols content; antioxidant capacity.

Results: The results highlighted the compliance with the legal framework of the honeydew honey sample and natural oils. Moreover, the two investigated products registered a rich content of total polyphenols and flavones/flavonols correlated with good antioxidant activity.

Conclusion: The present research revealed promising results regarding the bioactive potential of the evaluated products, certifying their authenticity and quality.

Keywords: antioxidant, bee products, sea buckthorn oil, thyme essential oil

OLEOGELS FASE IMPACTS THE MANUFACTURING OF MEAT PRODUCTS AND IMPROVE THEIR NUTRITIONAL PROFILE

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Introduction: Meat products contain high amount of saturated fatty acids, which are specific for animal fat and according to the World Health Organization, saturated fat consumption should be less than 10% of the total caloric intake. When the plastic properties of the fats are maintained in the product, the substitution of solid fats with liquid oils can be appropriate. Oleogelation is an alternative structuring method that requires the production of solid fat containing lower saturated and trans fatty acids. In oleogels, the organic liquid phase is immobilised by a three-dimensional network.

Aim: The aim of this study was to develop meat products in which animal fat was substituted with oleogels in order to enhance their nutritional profile.

Materials and Methods: In Bologna and Traditional Romanian sausages pork backfat was replaced with oleogels, and three experimental prototypes were developed for a comparative analysis: PM- control sample with pork backfat, P1- sample with oleogel with 10% glycerol monostearate, and P2- sample with oleogel with 10% candelilla wax. The meat composition was subjected to physical analysis (texture profile, emulsion stability, rheological measurements) and the sausages were analyzed both raw and prepared for consumption.

Results: In terms of texture analysis of meat composition for Bologna sausages, P1 registered the maximum hardness value- 17.44 N, followed by PM-15.55 N and P2- 13.85 N. Analysis of the rheological properties of the sample containing pork back fat and candelilla wax revealed a similar behavior, for both type of sausages. During the thermal treatment, the glycerol monostearate oleogel melted and accumulated under the membrane, while the candelilla wax sample visually mimics the animal fat sample. For Traditional Romanian sausages, after boiling, the hardness of the finished products varied between 13.35 N (P1), 30.90 N (P2) and 68.12 N (PM). The fat loss in the emulsion stability test was below 6.57% for all samples.

Conclusion: In addition to providing the need for unsaturated fatty acids consumption, substituting animal fat with structured oil systems in meat products has the potential to produce foods with desirable physical and sensory characteristics.

Keywords: Fat substitution, oleogels, physical characterization

HARNESSING THE ANTIOXIDANT POTENTIAL OF CONIFEROUS TREES WASTE MATERIALS FOR VALUE-ADDED ANTIOXIDANT PRODUCTS

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Introduction: The utilization of plant-based waste materials for value-added products has gained significant importance due to the growing emphasis on sustainability and waste reduction. Wastes from the coniferous biomass serve as abundant sources of bioactive compounds, including antioxidants, which hold potential for the development of functional foods, cosmetics, and pharmaceuticals.

Aims: This review aims to provide a comprehensive overview of the extraction and characterization techniques employed for phenolic compounds derived from coniferous waste materials, along with an exploration of their antioxidant properties.

Materials and Methods: Data records available for the phenolic compounds registered in the *PubChem* database were cross-referred with the scientific literature, clinical trials repositories, the *DrugBank* database, and the expert-curated database of the *RELISH* consortium.

Results: While the utilization of coniferous waste materials for value-added products holds great promise, several challenges need to be addressed for successful implementation. These challenges include optimizing extraction efficiency, ensuring the stability and scalability of the production process, establishing standardized characterization methods, and addressing regulatory considerations for the commercialization of these products.

Conclusion: Recent advancements in biorefining and bioprocessing technologies were highlighted, showcasing their potential for transforming coniferous waste materials into valuable products with antioxidant properties for farm animals and human nutrition, cosmetics, and pharma industries. Moreover, the utilization of coniferous waste materials and their antioxidant extracts also extends to agricultural and environmental applications.

Keywords: antioxidants, circular bioeconomy, coniferous waste, phenolics

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GREEN ITACONIC ACID PRODUCTION: CLOSING THE LOOP THROUGH SOLID-STATE FERMENTATION OF WHEAT BRAN

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Introduction: The sustainable production of itaconic acid (IA) from food industry-derived by-products is a promising approach that aligns with the circular economy model. This study focuses on optimizing the solid-state fermentation process of wheat bran using *Aspergillus awamori* for enzyme production and hydrolysate formation, followed by IA production using *Aspergillus terreus*.

Materials and Methods: Wheat bran was fermented by *A. awamori* under varying moisture contents (60%, 70%, 80%) for 10 days at 30 °C. The resulting samples were characterized for total reducing sugars, glucoamylase, cellulase, endoglucanase content, and polyphenols. Hydrolysis was performed on the enzyme-rich substrate for three days at 50 °C, and the hydrolysate was characterized similarly. IA production with *A. terreus* was conducted through submerged fermentation in flasks and bioreactors using a model medium. Growth parameters including temperature and pH were optimized, and existing literature informed the choice of these parameters.

Results and Discussion: *A. awamori* fermentation showed that the 80% moisture content led to the highest enzyme production. The hydrolysate formed from the fermented substrate exhibited significant enzymatic activity, suggesting the potential for IA production. In the IA production phase, *A. terreus* was grown under pH conditions of 3.0-3.4 and temperatures of 30-35 °C, based on literature evidence. The utilization of glucose and xylose mixture as a carbon source further improved IA yield.

Conclusions: Solid-state fermentation of wheat bran using *A. awamori* yields enzyme-rich hydrolysate suitable for IA production by *A. terreus*. The optimized conditions for IA production, including pH, temperature, and carbon source, were determined. This study offers valuable insights into the potential of circular economy-based IA production, utilizing food industry by-products and sustainable fermentation methods.

Keywords: Circular economy, Enzyme production, Itaconic acid, Solid-state fermentation, Wheat bran

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NOVEL METAL COMPLEXES ASSESSED FOR THEIR CYTOTOXIC AND CATALYTIC EFFICIENCY

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Introduction: The development of metal complexes with a naturally inspired framework is an intriguing area of research that bridges the gap between the biological and chemical worlds. These complexes can exhibit a range of functionalities, including cytotoxic and catalytic properties. These are compounds formed when metal ions bind to other molecules, known as ligands, through coordination bonds. The properties of metal complexes can be finely tuned by selecting specific metal ions and ligands. Metal complexes are widely used in various fields, including food, medicine, catalysis, and materials science.

Aims: The MET-EFFECT project plans to develop novel multifunctional rhenium (Re) and iridium (Ir) complexes. Re and Ir complexes containing apigenin-like ligands, a natural bioactive flavone-type of molecules, will be synthesized and investigated for their antitumor and catalytic properties.

Conclusion: Metal complexes with naturally inspired frameworks with enhanced cytotoxic and catalytic properties have immense potential, and could lead to the development of novel anticancer drugs that are more effective and selective than current treatments.

Keywords: complex; homogeneous catalysts; sustainability; ligand; tumor

References

1. <https://met-effect.com>
2. <https://cordis.europa.eu/project/id/101086373>

Acknowledgment: The project has received funding from European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101086373—MET-EFFECT.

DIETARY SUPPLEMENTS WITH NATURAL ALTERNATIVE PROTEINS FROM LEGUME-BASED RESIDUAL BIOMASS

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Introduction: The EU-funded ALEHOOP project is aiming to extract dietary proteins as natural alternative proteins from algae-based and plant residual biomass for livestock feeding. The project intends to contribute to a reduction of the EU's dependency on imported proteins and the increase of raw material security. As protein demand for both human food and animal feeding increases, the EU requires 30 million t of imported soy each year.

Aim: Dietary food supplements with alternative proteins have gained popularity in recent years as people seek to diversify their protein sources, reduce their environmental impact, or accommodate specific dietary preferences or restrictions. Legume-based residual biomasses (e.g. pea, lupine, bean and lentil) in EU-funded ALEHOOP project have been converted into alternative forms of proteins for a variety of uses and applications in nutritional awareness and health management. The alternative proteins obtained have been tested in different dietary supplements formulations.

Conclusions: The alternative proteins have been affected the new formulated dietary food supplements appearance, taste and other technofunctional properties. Different protein sources can have distinct flavors and textures, so choose one that suits consumers taste preferences is an ongoing challenge. Besides, the protein source must provide the essential amino acids and nutrients the body needs. Therefore, further research is conducted to optimize the formulated dietary food supplements.

Keywords: dietary supplement, legume residual biomass, bio-based, alternative protein source

References:

1. <https://alehoop.eu/>
2. <https://www.bbi.europa.eu/projects/alehoop>

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SUSTAINING CARP CULTIVATION: ENHANCING QUALITY AND SUSTAINABILITY THROUGH LIFE CYCLE ASSESSMENT

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Introduction: The cultivation and trade of freshwater fish globally yield substantial revenue, while fish consumption provides a crucial protein source for human nutrition, but also unsaturated fatty acids, vitamins, and minerals (Biermann and Geist, 2020). In Romania, carp (*Cyprinus carpio* L.) is the most popular and traded fish species due to its rapid growth rate and resilience to varying aquatic conditions such as oxygen levels and pH.

Aims: The primary goal of carp cultivation is to achieve the highest possible survival rate and optimal growth, ensuring fish can be brought to market in the shortest timeframe. The objective of incorporating life cycle assessment in fish farming is to comprehensively assess and enhance the sustainability of the entire production process, considering environmental, social, and economic factors.

Materials and Methods: A systematic approach involves constant monitoring of crucial water parameters like oxygen, pH, and temperature to detect deviations from normal ranges swiftly. Prompt interventions are then taken to rectify imbalances, ensuring the aquatic ecosystem's and its inhabitants' well-being.

Results: Carp are raised on an exclusive diet comprised of grains, a practice that contributes to the exceptional quality of their meat. Following a natural growth period of two years within an extensive system, these fish undergo careful harvesting. Subsequently, they are delivered alive to a range of clients, including supermarkets, in quantities tailored to meet specific demands.

Conclusion: Incorporating life cycle assessment in carp cultivation aims to enhance overall sustainability. At the same time, meticulous monitoring of water parameters ensures aquatic ecosystem health and the delivery of high-quality, grain-fed carp meat meets market demands efficiently.

Keywords: *Cyprinus carpio* L., fish farming, sustainability

References

1. G. Biermann, J. Geist (2020), Life cycle assessment of common carp (*Cyprinus carpio* L.; Aquaculture, 524:735273.

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ELABORATION OF NOVEL SMART (PROTOTYPE) EDIBLE COATING WITH MICROALGAE AND MACROALGAE IN ORDER TO PRODUCE PRODUCTS OF HIGH FUNCTIONALITY

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Introduction: Thin layers of edible substances are used as edible coatings on food surfaces. They keep food fresh longer, make it last longer, and make it look better. They are used in a variety of goods to improve quality and promote sustainable packaging because they are made from natural substances and form a barrier against moisture loss and deterioration.

Aims: Berries with edible coatings have a longer shelf life and better quality. These coatings protect freshness, color, and flavor by reducing moisture loss, microbial development, and oxidation. Additionally, they provide an eco-friendly packaging option that lessens the demand for unnecessary plastic and encourages environmental responsibility in the food business.

Materials and Methods: In this work alternative edible coatings from microalgae and macroalgae were developed in order to extend the shelf life of berries and improve their quality. The membranes were evaluated for their properties.

Results: Significant differences were observed in the alternative edible coatings.

Conclusion: The films that contain ingredients from algae seem to have better properties and provide a better protection to the berries, leading to better quality.

Keywords: Berries, edible coatings, macroalgae, microalgae

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THE INVESTIGATION OF THE CORRELATION BETWEEN THE CHEMICAL PROFILE OF WHEAT AND OAT BRAN AND B12 BIOSYNTHESIS

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Introduction: There is limited research on natural *in situ* fortification of vitamin B12 in cereal by-products, whereas there is no scientific evidence investigating the correlation between

initial chemical profile of the wheat and oat bran and vitamin B12 biosynthesis.

Aims: The present paper aims to characterize the wheat and oat bran from nutritional, chemical and biological perspectives in order to investigate how the nutrient composition and acidification

properties of the matrices correlate with vitamin B12 biosynthesis.

Materials and Methods: Nutrient compositions was analyzed according to AOAC international standard methods. Carbohydrate composition was done by quantitative acid hydrolysis and subsequent HPLC analysis. The acidification properties via pH and total titratable acidity (TTA), while the riboflavin content by HPLC-UV detection technique.

Results: The concentration of riboflavin in wheat bran was 0.51 ± 0.11 mg/100g, and in oat bran it was 0.22 ± 0.08 mg/100g. The acidifying properties were expressed as pH (wheat bran $=6.70 \pm 0.38$; oat bran $=6.78 \pm 0.12$) and TTA (wheat bran $=3.45 \pm 0.11$ ml; oat bran $=2.28 \pm 0.15$ ml). Among the major phenolic acids identified, ferulic acid is of increased importance considering its strong antioxidant capacity. Wheat bran recorded a DPPH free radical inhibition percentage of 39%, while oat bran 46%. The cereals bran showed an antimicrobial effect against the tested strains.

Conclusion: Overall, the preliminary results suggest that wheat and oat bran can be exploited for existing macronutrients and bioactive compounds, it contains significant amounts of riboflavin, an important precursor in the biosynthesis of vitamin B12.

Keywords: composition, bioactivity, riboflavin extraction

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SESSION 4 HORTICULTURE

A BIOPROTECTION STRATEGY OF MUSTS TO LIMIT SULFITING PROCESS DURING WINEMAKING

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Introduction: In the wine industry, sulfur dioxide (SO₂) has an important role, as an antioxidant, antioxidant, and antiseptic additive (Santos *et al.*, 2023). SO₂ is also responsible for different allergic reactions, and for this reason, it is of great interest for its replacement with alternative additives or technologies (Puyo *et al.*, 2023). Lately, manufacturers of products specific to wine production technology are developing biological protocols for treating musts and wines using different types of yeasts.

Aims: The purpose of the research was to study the impact of replacing sulfur dioxide (SO₂) in the first phase of the winemaking process with biological methods on the profile of anthocyanins, flavonoids, polyphenols, and antioxidant potential in Fetească neagră wine.

Materials and Methods: The red wine from Fetească neagră, 2021 harvest – SERVE Winery, Ceptura Winegrowing Center – Dealu Mare Vineyard, was obtained by two methods: treated with SO₂ and treated with PrimaFlor VR Bio Oenolia – AEB France (a product containing *Saccharomyces* and non-*Saccharomyces* yeast strains, *Metschnikowia pulcherrima*). Research methods consisted of anthocyanin extraction; HPLC analysis of anthocyanins; determination of total flavonoids; determining the total content of polyphenols by the Folin-Ciocalteu method and determining the antioxidant activity.

Results: The variant with Primaflora VR Bio favoured the extraction and accumulation of +8.2% more anthocyanins compared to the variant treated with SO₂. Among anthocyanins, malvidin-3-glucoside represents approximately 66% of the total of those compounds. The variant with Primaflora VR BIO favoured the accumulation of +3% more total flavonoids compared to the variant treated with SO₂ (345 mg GAE/L). In contrast, the variant with Primaflora VR BIO accumulated less total polyphenols (1498 mg GAE/L), compared to the SO₂ variant (1501 mg GAE/L), with significant differences.

Conclusion: Primaflora VR Bio represents an effective and promising alternative in terms of the quality of oenological and biochemical parameters and a basic variant for ecological, biological wines with a low sulfite content.

Keywords: Fetească neagră, polyphenols, PrimaFlor VR Bio, SO₂, wine

References

1. Santos C.V.A., Pereira C., Martins N., Cabrita M.J. and Gomes da Silva M. (2023). Different SO₂ doses and the impact on amino acid and volatile profiles of white wine. *Beverages*. 9(2):33.
2. Puyo M., Simonin S., Klein G., David-Vaizant V., Quijada-Morín N., Alexandre H. and Tournier-Maréchal R. (2023). Use of oenological tannins to protect the colour of rosé wine in a bioprotection strategy with *Metschnikowia pulcherrima*. *Foods*. 12(4):735.

HISTORICAL AND LANDSCAPE STUDY - CENTRAL GREEN SQUARE - CENTRAL MILITARY EMERGENCY UNIVERSITY HOSPITAL "DR. CAROL DAVILA"

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Introduction: Central Green Square has the code in the List of historical monuments B-II-m-B-19408.18 and is part of the Military Hospital, ensemble category, value group A, with the code in the List of historical monuments B-II-a-A-19408.

Aims: The objective of the study was the detailed analysis of the Central Green Square area in the context of the restoration of the site.

Materials and Methods: An extensive study was carried out based on: the analysis of the area of interest in the context of the Register of Green Spaces and the General Urban Plan of the city of Bucharest, the analysis of the historical evolution of the square, the existing vegetation and the deficiencies.

Results: Based on the historical maps, a reconstruction of the original shape of the square was carried out and later a comparative analysis with its current shape. The situation of the square, reconstructed according to the historical plans from 1900 and 1910, does not show any notable changes compared to the situation from 1895-1899. According to the analysis of the existing vegetation and the overlaps, we identified similar positions of the existing specimens of *Tilia* sp. with the original tree. The dominant species in the years 1900-1910 was *Tilia* sp. In the historical form of the square, there were no conifers. There are no data on the existing shrub species in the landscaping of the square in the year 1900-1910. By comparing the historical plans with the existing one, it follows that the location of the monuments currently existing in the square corresponds to the two circular central areas of the historical form.

Conclusion: The existing situation inside the square no longer corresponds to the historical records. Analysing the new species introduced and preserved in-situ, we assume that these changes occurred around the 1970s. Even if the original characteristics were not preserved, general but important guidelines could be drawn from the historical and landscape study of the Central Green Square.

Keywords: historic, landscape, Romania, square

LANDSCAPE STUDY FROM A HISTORICAL PERSPECTIVE - GÉZA TELEKI CASTLE PARK, PRIBILEȘTI, MARAMUREȘ

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Introduction: In order to rehabilitate the Géza Teleki Castle, Pribilești – referring mainly to the landscape architecture – an extensive analysis of the existing and historical records was necessary. Currently, the exterior space of the castle is reduced and the elements that characterized the park have not been preserved.

Aims: The objective of this study was to identify the exact area of the historical park, its shape and the main elements that characterized it.

Materials and Methods: The data related to the surface of the park (data from existing scientific paper) are erroneous due to mistakes in the translation of the measurement units. We carried out an extensive documentation of the historical measurement units for the correct calculation of the area. For the main characteristics of the park, we used the following methods: the analysis of historical writings (1894-1900) and the accounts of the locals, the analysis of the date of introduction of some new varieties/species of trees in Europe or Romania; correlation between historical images, present-day images of the castle and historical maps.

Results: Correlating the historical maps with the correct units of measurement shows that the topographic elevation of 1869-1887 is conform to the descriptions in the available historical texts and that the area of the park was 3.4528-4.6040 ha. In the east, southeast and north there was a large area of land, available for the development of a park, according to the existing historical descriptions. It follows that the west, south-west and south area of the property had a functional role that subordinated the aesthetic role (this being concentrated in the east, Southeast and North).

Conclusion: Although no component of the park has been preserved, we were able to establish, following the analysis and digital modelling, the surface, the structure, the functional characteristics and the plant composition – data that constitute a solid basis for the restoration of the park.

Keywords: castle, historic, landscape, park, Transylvania

INFLUENCE OF BAGGING ON FRUIT QUALITY IN KANZI APPLES

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Introduction: Fruit bagging technique was developed and used first in Japan in the 20th century for pears and grapes. The main role of bagging is to protect fruits from mechanical or biotic damages especially in those regions where fruits are liable to various pest attacks or diseases. Bagging fruits can control sunlight, temperature, humidity, residues of pesticides, cracking and fruit coloration. Bagging technique can also lead to an increased fruit size, soluble sugar content or acidity depending on the fruit type. Due to fruit characteristics such as appearance, crispiness and flavour, Kanzi apples reached a high market value and an increasing demand.

Aims: The main purpose of this work was to investigate the effects of fruit bagging (with paper bags) on fruit quality evaluated with the help of physical and chemical properties of the fruits.

Materials and Methods: The experiment has been carried out in a high-density apple orchard established in 2011 grafted on M9 rootstocks. The fruits were bagged right after fruit set and removed 3 days before harvest. In order to evaluate fruit quality, the following measurements were carried out: fruit weight, size, shape, colour, density, water content, firmness, acidity, total soluble solids and TSS/acidity ratio.

Results: The results show that bagging had a positive influence on most of the physical traits and also on soluble solids' content. Furthermore, bagging in Kanzi apples increased fruit softening and water loss. Peel colouration and colour intensity was also affected by bagging. Non-bagged fruits developed an attractive red colour, while bagging suppressed the yellow/red colour development. Fruit damage caused by cracking was increased in bagged fruits and observed during post-harvest period.

Conclusion: Based on the observations, it can be concluded that fruit bagging with yellow paper bags improved the quality of Kanzi apples by increasing fruit size, weight, TSS content and protected them against pests, but decreased some marketable characters such as peel coloration and cracking.

Keywords: fruit bagging, fruit colour, fruit cracking, fruit firmness, Kanzi

THE INFLUENCE OF SOME TECHNOLOGICAL MEASURES ON LONG PEPPER SEED CROP CAPSICUM ANNUUM L. VAR. LONGUM

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Introduction: Through this scientific work, it was aimed to make a modest contribution to the development of knowledge in the field of research in vegetable cultivation and especially that of the conservation of local varieties through own research on the production of seeds in different conditions of density and fertilization.

Aims: The influence of plant density on fruit production (at technological maturity) and on seed production (at physiological maturity) was analysed, along with the influence of fertilization method on the production of seeds in the long pepper crop, Orange variety. The combined influence of experimental factors on seed production was determined.

Materials and Methods: Three experimental factors were considered: the biological material used to establish the experiment (seeds from the biological category S.A. (author's seed), *Capsicum annuum* L. var. *longum* variety Orange. This cultivar is part of the collection of the Iernut Vegetable Research and Development Station; Factor A – fertilization, with a1 – chemical and a2 – organic methods respectively; Factor B – plant density, with b1 – 30 thousand plants/ha (75/45 cm) and b2 – 45 thousand plants/ha (75/30 cm); Factor C – fruit load per plant, with c1 – with all fruits per plant and c2 – with 5 fruits. From the combination of experimental factors, 8 experimental variants resulted, placed in blocks subdivided into three repetitions, the surface of the experimental plot being 12.6 m² and the entire experience 302.4 m².

Results: Presenting the significance of the differences of the eight variants resulting from the interaction fertilization x density x fruit load, it can be said that the highest production was recorded in the variant with chemical fertilization, density of 45 thousand plants, all fruits considered, with a production of 2.81 kg/m² and a production increase of 6% compared to the distinctly significant control variant. Regarding the organic fertilization at a density of 45 thousand plants, all the fruits reach a production increase of 0.74% compared to the same significant control.

Conclusion: Regarding plant development and the biometric results, we can say that they were significantly influenced by the chemical fertilization method, while regarding plant density, the best results were noted with 30 thousand plants/ha.

Keywords: density, experiences, fertilization, plant, production

VARIABILITY OF DIFFERENT LEAF TRAITS USEFUL FOR DIFFERENTIATING EUROPEAN AND ASIAN PEAR GENOTYPES

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Introduction: The morphological variability of the leaves within different species of *Pyrus* can be used as an important criterion for their identification and classification (Vidaković *et al.*, 2022), as well as of the cultivars important for fruit production. This variability can be observed in a number of leaf morphological characteristics, e.g., shape, size, edge, texture, colour, veining, etc. Morphological variability of the leaves can be correlated with several elements of interest in taxonomic studies or pear breeding (Simionca Mărcășan *et al.*, 2023).

Aims: Interesting particularities of the leaves of different pear genotypes, represented by varieties with different origins belonging to European and Asian species, between which there were notable phenotypic and genetic differences, were analysed.

Materials and Methods: The main morphological leaves' traits were analysed using representative samples (100 random leaves/tree, from five trees of each cultivar). The dimensions of the leaves were determined with the Caliper Digital, and the area of the leaves was measured with the Digimizer Image Analysis Software. Chlorophyll was determined with the MC-100 chlorophyll meter, statistical and multivariate analysis was performed with specific software.

Results: A large variability was identified among 20 pear genotypes, of which 14 European and 6 Asian cultivars, for leaf traits: the length of the leaves varied between 4.5 cm (Conference) and 12.7 cm (Hosui); the width between 3.2 cm (Kleiper) and 7.2 cm (Kumoi); the area of the leaves between 11.4 cm² (Conference) and 65.7 cm² (Hosui); the total leaf chlorophyll content between 195.4 μmol/m² (Kleiper) and 482.3 μmol/m² (Tama). Significant positive Pearson correlations were identified between leaf morphological characters, but chlorophyll content was only correlated with leaf width. For all analyzed leaf traits, the t-test revealed significantly higher values ($p < 0.05$) for the Asian genotypes.

Conclusion: Leaf morphological and statistical parameters are useful in the identification and discrimination of pear genotypes, including European and Asian resources.

Keywords: cultivars, diversity, genetic resources, leaf traits, variability

References

1. Simionca Mărcășan, L.I., Pop R., Somsai P.A., Oltean I., Popa S., Sestras A.F... and Sestras R.E. (2023). Comparative evaluation of *Pyrus* species to identify possible resources of interest in pear breeding. *Agronomy*. 13(5):1264.
2. Vidaković A., Šatović Z., Tumpa K., Idžojić M., Liber Z., Pintar V... and Poljak I. (2022). Phenotypic variation in European wild pear (*Pyrus pyraeaster* (L.) Burgsd.) populations in the North-Western part of the Balkan Peninsula. *Plants*. 11(3):335.

VITAMIN C LEVEL IN TRADITIONAL RED FRESH CHORICERO PEPPERS UNDER OPEN FIELD CONDITIONS

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Introduction: Spain has a multitude of traditional pepper varieties, adapted to different agroclimatic regions and it is considered as the fifth ranked country in the world for fresh consumption of pepper (*Capsicum annuum* L.). Peppers are known as one of the most consumed vegetable species worldwide; however, consumption of vegetables as a source of vital nutrients is highly important for human health and peppers are considered good precursors of them. Specially vitamin C (mainly as ascorbic acid), which is acting as an antioxidant in the body. There is no information about Vitamin C content in the leaves of “choricero pepper” which is widely used for gastronomy in Spain.

Aims: Present research aimed to evaluate Vitamin C level in traditional red fresh Spanish varieties of “choricero” pepper types, to identify genotypic effect under the traditional system of growing in the open field.

Materials and Methods: There were investigated 16 “choricero” ecotypes from all Spanish geography (1,2,3,4,5,9,10,11,12,13,14,15,17,18,19,20), grown in Almeria area, under the traditional method (Open Field). Samples were harvested from all varieties and a high-resolution chromatograph, HPLC (Agilent 1220 Infinity model) was used for measurement of Vitamin C.

Results: Differences were found among accessions for Vitamin C content, particularly in number 2 (Ugíjar landrace from Almeria-Spain) and 13 (Gorostiza from Basque country – Spain), for the smallest and the highest levels of vitamin C respectively.

Conclusion: The differences in Vitamin C level in Open Field conditions suggest that are good opportunities to select “choricero” traditional peppers with high content of this compound, thus opening a possibility to rescue traditional varieties, which are clearly in regression, and also adding nutraceutical value for human health. This can be the base of a future breeding programme for choricero local pepper varieties.

Keywords: antioxidants, choricero, nutraceutical, pepper, vitamin C

EVALUATION OF YIELD IN SPANISH CHORICERO PEPPERS ECOTYPES IN OPEN FIELD ENVIRONMENT

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Introduction: Peppers (*Capsicum annuum* L.) are widely grown in Spain for fresh and gastronomic consumption. Choricero landraces are traditionally used, the ones in red colour being preferred. They are usually grown in open field conditions; during summertime producing, a reduction in fruit set, and consequently a decrease in production, is noted. Due to this, growers are quickly replacing such traditional landraces by F1 hybrids, commonly appreciated for their productivity, but then losing bio-diversity.

Aims: The task target was to find the most attractive ecotypes in terms of production (kg/m²) for choricero pepper, cultivated in open field conditions, across multiple Spanish landraces, trying to contribute to maintain biodiversity.

Materials and Methods: Choricero landraces from all Spanish geography (1,2,3,4,5,9,10,11,12,13,14,15,17,18,19 and 20) were grown in “Finca 4 vientos”, Almeria area (Spain), under the traditional method (Open Field) in two different cycles (2021 and 2022). Single landraces with marketable ripen were harvested and weighed.

Results: Differences were found among studied accessions, particularly in landrace number 20 (from San Jose-Almeria-Spain, and variety number 11 (Barrika-Basque Country-Spain), having the lowest and the highest production resulted in the current survey.

Conclusion: Results suggest that there are still opportunities to stop the clear regression of choricero peppers, whereas the possibility to get a proper production, in terms of quantitative and quality traits, under open field conditions, exists. That opens up the possibility to rescue traditional varieties for a breeding program. It can also encourage cultivating peppers in the open field system in favour of intensive agriculture.

Keywords: choricero, ecotypes, landraces, yield

POLLEN VIABILITY AND GERMINATION CAPACITY OF SOME WALNUT CULTIVARS UNDER THE CLIMATIC CONDITIONS OF NORTHEASTERN AREA OF ROMANIA

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Introduction: Pollination and fertilization are two important processes in tree fruiting and consist in transporting mature pollen grains from anthers to the stigma of the flower and then germinating them concomitantly with the penetration of the polynic tube into the embryonic sac. An important role in the optimal development of the two phenomena is played by the viability and germination capacity of pollen, which are variable depending on the species and variety, being directly influenced by the climatic conditions of the year.

Aims: The purpose of this work was to test the viability and germination capacity of pollen in the climatic conditions of 2023.

Materials and Methods: The study was conducted on 7 varieties of walnut, cultivated in the North-East area of Romania. To determine viability, we collect catkins from the field and put them to dry at room temperature, to remove pollen grains. The determination of pollen viability was performed using the carmine-acetic staining method, by which fertile pollen is coloured in carmine red, and sterile pollen is coloured in weak pink or remains colourless. The germination capacity of pollen was determined *in vitro* by cultivation on solid nutrient medium (15% sucrose, 1.5 g agar-agar, 0.01 g boric acid per 100 ml distilled water), in laboratory conditions (at approximate temperature of 22 °C and relative humidity of 70-90%).

Results: In the climatic conditions of 2023, walnut budding occurred the earliest at Prezident variety, on 13 Apryl, and at the latest on 25 Apryl at Geagogiu 65 variety, so that in correlation with the sum of active temperature degrees, the percentage of viability was a very good one, ranging from 92% to the Prezident variety, and 99.3% in the Bortko variety. Also, the germination capacity of pollen registered values between 30.1% for Ovidiu variety and 65.7% for Prezident variety.

Conclusion: In correlation with the climatic conditions, the higher the viability of the pollen is, the more the possibility of proper pollination and fertilization increases.

Keywords: climatic condition, germination, viability

TESTING THE EFFECTS OF DIFFERENT NUTRITION TIMES WITH LETTUCE TEST PLANT IN AEROPONIC CONDITIONS

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Introduction: Global climate change is increasing the risk of extreme weather events, which create many uncertainties in crop production technologies. Soilless cultivation may be one of the alternative technologies for adaptation (Tunio *et al.*, 2022). In aeroponic systems, the roots of plants are suspended in the air, while being sprayed with a mist of nutrient-rich water at fixed intervals.

Aims: The use of lettuce in indoor experiments has attracted the interest of many researchers due to its high nutritional value and mineral content. Our research aimed to determine the effect of different nutrient solution intensities on aeroponically grown lettuce (*Lactuca sativa* L., 'King of May' cultivar).

Materials and Methods: In the aeroponic system, we had four treatments representing the different nutrient solution times. We placed five lettuce plants in each growing unit. The experiment lasted for nine weeks, during which we measured the evolution of head diameter, leaf number and root length, and determined total chlorophyll ($\mu\text{g/g}$) and carotenoid content ($\mu\text{g/g}$) using destructive method.

Results: Based on our results, the highest daily nutrient application time (9 times x 15 min/day) resulted in the largest head diameter (39.75 ± 5.73 cm). For leaf number (89 ± 32 pcs), and root length (50.8 ± 12.7 cm) our results indicate that frequent nutrient application is not necessary. For pigment content, the highest values were obtained at the highest daily nutrient application intensity, significantly different from the lowest daily nutrient application treatment ($p < 0.05$).

Conclusion: The lettuce head diameter decreased with decreasing nutrient solution time (-20% compared to the maximum daily nutrient solution treatment). However, for leaf number and root length 4 times x 15 min/day nutrient solution treatments are sufficient.

Keywords: aeroponics, lettuce

References

1. Tunio M.H., Gao J., Lakhia I.A., Solangi K.A., Qureshi W.A. and Shaikh S.A. (2021). Influence of atomization nozzles and spraying intervals on growth, biomass yield, and nutrient uptake of butter-head lettuce under aeroponics system. *Agronomy*. 11(1):97-113.

EVALUATION OF SOME STRAWBERRY SELECTIONS OBTAINED IN THE BREEDING PROGRAM

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Introduction: Strawberry (*Fragaria x ananassa* Duch.) is a fruit species of interest to growers and consumers due to the early ripening of the fruits, high yields and special nutritional qualities (high content of minerals and vitamins). Strawberry fruits are some of the most consumed fruits in the world, being appreciated especially for their taste and aroma (Sehrish *et al.*, 2021; Porter *et al.*, 2023).

Aims: The objective of this study was to evaluate relevant fruit quality and production attributes for 14 strawberry selections and a control cultivar ('Premial') in order to select new genotypes for future breeding stages.

Materials and Methods: The research was carried out during 2021-2023, at the Research Institute for the Fruit Growing in Pitesti, in open experimental field. The following genotypes were studied: Romanian cultivar 'Premial' used as control and the selections obtained from cross combination: 'Nora' × 'Benicia' ('16-2-10', '16-2-12', '16-2-15', '16-2-55', '16-2-127', '16-2-216', '16-2-233', '16-2-237') and 'Mira' × 'Argentera' ('16-3-48', '16-3-86', '16-3-123', '16-3-170', '16-3-188') in 2016 year.

Results: Significant differences for average fruit weight were found between the investigated genotypes. In the current study four selections with fruit weight over 30 g were noted, respectively '16-3-188' (40.71 g), '16-3-86' (39.81 g), '16-2-237' (31.78 g) and '16-2-12' (31.11 g).

Conclusion: Our results will strengthen the breeding process at the Research Institute for Fruit Growing Pitesti; based on the data obtained, from the 14 selections studied, it was proposed to introduce into next stages for evaluation those that recorded over 500 g/plant and over 20 g/fruit, namely: '16-3-188', '16-2-12', '16-3-170', '16-3-123'.

Keywords: *Fragaria × ananassa* Duch., productivity, quality characteristics, selection

References

1. Porter M., Fan Z., Lee S. and Whitaker V.M. (2023). Strawberry breeding for improved flavor. *Crop Science*. 63:1949-1963.
2. Sehrish J., Jahangeer A.B., Sharma M.K., Sheikh Q., Tajamul F.W., Shemoo N., Tashi A., Shaila D., Shahzad and Safina Kossar. (2021). Evaluation of different strawberry cultivars for growth, yield and quality characters under temperate conditions of North Western Himalayas. *Int. J. Curr. Microbiol. App. Sci.* 10(03):837-844.

THE INFLUENCE OF GROWING SYSTEM ON VEGETATIVE GROWTH AND FRUITING POTENTIAL OF RASPBERRY PLANTS

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Introduction: Raspberries are soft fruits with a high marketable value due to their extreme perishability. Raspberry plants are woody shrubs that a perennial root system and long, thin stems called as canes, which are biennial. There are two types of raspberries, some of them known as primocane-fruiting, while others are known as florican-fruiting. Primocane-fruiting raspberries have a more extended fruiting period, from late summer to fall in comparison to florican-fruiting varieties. Besides, primocane-fruiting raspberries need a shorter chilling period which makes them to be grown in warmer regions.

Aims: The main aim of this study was to determine the influence of the growing system on vegetative growth and productivity of 'Versailles' raspberry plants.

Materials and Methods: Raspberry plants were grown both in a potted growing system and in-ground soil. In order to determine the differences between the two growing systems several morphological characteristics of the raspberry plants were measured followed by the physical and chemical properties of the fruits.

Results: The results show that potted raspberry plants had a higher productivity than those grown in-ground soil. Regarding fruit quality, raspberries harvested from in-ground soil culture were bigger and heavier than those obtained from potted-culture. The chemical properties of the fruits showed higher values in raspberries harvested from in-ground culture, however the TSS/Acidity ratios were very similar (12.58 vs. 12.57).

Conclusion: The current research demonstrates that the cultivation of raspberry plants in-ground soil is more favourable than that in pots. Slight differences have been observed regarding vegetative growth, but regarding productivity, in-ground soil culture was more productive and yielded in high quality fruits as compared to potted culture.

Keywords: chemical properties, physical traits, productivity, *Rubus idaeus* L., vegetative growth

THE INFLUENCE OF GIBBERELIC ACID TREATMENT ON UDP GLUCOSE: FLAVONOID-3-O-GLUCOSYLTRANSFERASE MUTANT OF *ARABIDOPSIS THALIANA* L.

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Introduction: *Anthocyaninless1* is a mutant of *Arabidopsis thaliana* L. deficient on *UDP-glucose:flavonoid-3-O-glucosyltransferase* (UDP-F3GT) gene, involved on late steps of phenylpropanoid pathway. It is known that gibberellic acid (GA) induces pigmentation of tissue as a result of the coordinate induction of the anthocyanin biosynthetic genes of phenylpropanoid pathway. Here we investigated the role of high dose of gibberellic acid treatment on *anthocyaninless1* mutant of *Arabidopsis thaliana* on growth and gene expression on phenylpropanoid pathway key genes. We also evaluated the *anthocyaninless1* and its wild type background plant pigments like chlorophyll and anthocyanin content, in both *anthocyaninless1* mutant and wild type. The results showed the diminished gene expression of several genes involved on phenylpropanoid pathway and also lower chlorophyll and anthocyanin pigment amount on *anthocyaninless1* mutant in comparison with its wild type.

Aims: Considering that the *anthocyaninless1* mutant is a synthetic gene involved in the latest steps of phenylpropanoid pathway we analysed the response of the mutant under exogenous exposure to plant hormone gibberellic acid.

Materials and Methods: Gibberellic acid was added to *in vitro* cell cultures medium seedlings we analysed rough UV vis Spectrophotometer the total anthocyanin and chlorophyll. The biosynthetic gene expression was analysed using total RNA extracted from seedlings.

Results: *Anthocyaninless1* seedlings showed significantly decreased level of anthocyanin and diminished level of chlorophyll, but the developmental parameter did not showed differences. CHS (chalcone synthase) gene and UDP-F3GT were downregulated in *anthocyaninless1*.

Conclusion: UDP-F3GT gene is involved in gibberellic acid pathway and showed a link to late steps of phenylpropanoid pathway.

Keywords: *Arabidopsis thaliana*, gibberellic acid, phenylpropanoid pathway, UDP-F3GT

References

1. Ohlsson A. and Berglund T. (2001). Gibberellic acid-induced changes in glutathione metabolism and anthocyanin content in plant tissue. *Plant Cell, Tissue and Organ Culture*. 64:77-80.
2. Ilan A. (1994). Gibberellic acid decreases anthocyanin accumulation in wild carrot cell suspension cultures but does not alter 3'-nucleotidase activity. *Physiologia Plantarum*. 92:47-52.

YIELD ANALYSIS OF F1, BC1 VS CHORICERO PEPPERS LANDRACES UNDER GREENHOUSE CONDITIONS

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Introduction: Almería is worldwide known as the orchard of Europe because of the massive extension of greenhouses in which commercial F1 varieties are grown by thousands of growers. These F1 varieties have displaced landraces traditionally grown in the area, such as the choricero pepper, with the consequent loss of agrobiodiversity.

Aims: The objective of this work is to carry out a survey among the materials traditionally used in Almería in order to identify candidates to establish a breeding program, generating new varieties, similar to the original ones, but more commercially attractive for farmers in the area, so we will be able to contribute to food security.

Materials and Methods: Five choricero pepper landraces from Almería, namely Gorostiza, Barranca, Derio, Guernika and Numex Sandia (from the North of Spain) were screened for yield (grams/plant) in Almería traditional greenhouse, in order to identify promising material for establishing a breeding program. For this, we also included the F1 coming from crosses among the original landrace and commercial variety, as well as the BC1.

Results: Variety effect showed significant differences for yield and the type of line (original line, F1 and BC1). We could identify how original lines showed the lowest yield compared with F1 and BC1. Highest yield was showed by F1 and then BC1. Two landraces from Almería were found within the most productive.

Conclusion: During this screening, enough variability was found for the trait under study in order to establish a breeding program. Also, it was important to see how with a BC1 can be closer to the original line and increase the potential yield, so potentially we could even start the breeding program with a BC1.

Keywords: agrobiodiversity, choricero, conservation landrace

TOTAL SUGAR LEVEL IN CHORICERO PEPPER ECOTYPES IN NETHOUSE SYSTEM

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Introduction: Almería, orchard of Europe, had several pepper landraces known as “choricero” peppers. However, with the F1 varieties commercialization, these ecotypes have almost disappeared with the consequent loss of agrobiodiversity. For that reason, is important to understand the variability we could found within these genotypes for traits as total sugar level, which could be important for the future, since customers are more worried about how healthy and tasty food is.

Aims: The objective of this work was to carry out a survey among the materials traditionally used in Almería in order to identify candidates to be used in a breeding program when we are interested in total sugar level.

Materials and Methods: Seven choricero pepper landraces from Almería, namely Gorostiza, Barranca, Derio, Guernika and Numex Sandia (from the North of Spain) were screened for total sugar level (gr/kg) in mature state by HPLC in Almería traditional greenhouse, in order to identify promising material to be used in a breeding program. Data was analyzed with Statgraphics Centurion XVI.

Results: Variety effect showed significant differences, as well as repetition on the field, for total sugar level. The highest level was showed by a choricero pepper from the north of Spain and the lowest level was showed by a choricero pepper from Almería. The difference between both of them was almost double. Within the Almería material, we saw significant differences, been able to find varieties with low total sugar levels and varieties with high sugar levels.

Conclusion: During this screening, it was found enough variability for the trait under study in order to consider them as possible candidates to participate in a breeding program.

Keywords: agrobiodiversity, choricero, landrace, total sugar content

CARBON FOOTPRINT OF WHEAT AND MAIZE: A GREEK CASE STUDY

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Introduction: Wheat and maize constitute two of the most dominant crops with notable importance for human nutrition (Acevedo *et al.*, 2020). As agriculture has been proven to be responsible for approximately the 1/3 of the anthropogenic greenhouse gases emissions, scholars, researchers, and policy makers around the world call for the optimization of practices in order to reduce the carbon footprint of agriculture (including these crops) (World Bank, 2023).

Aims: The objective of the present study was to estimate the carbon footprint of two major crops (wheat and maize) in the area of Larisa, Greece. Besides the emitted CO_{2eq} per kg of product, the respective emissions per ha and per g of harvested plant protein were also estimated.

Materials and Methods: The measurement of the carbon footprint was carried out via the utilization of the CoolFarm Tool (Cool Farm Alliance). Data were collected by questionnaires and interviews with local farmers.

Results: The results reported a significantly higher footprint per ha in maize, in comparison to the respective one of wheat. The footprints per kg of product and per g of harvested plant protein were insignificant. Tillage was the main factor that increased the CO_{2eq} emissions in both crops.

Conclusion: In the present research work, we demonstrated that tillage regimes are crucial for the reduction of agriculture-related greenhouse gases emissions. Assessing the effects of no-till or conservation tillage in these crops could reduce significantly the carbon footprint of agriculture in Greece.

Keywords: carbon footprint, maize, wheat

References

1. Acevedo M., Pixley K., Zinyengere N., Meng S., Tufan H., Cichy K., Bizikova L., Isaacs K., Ghezzi-Kopel K. and Porciello J. (2020). A scoping review of adoption of climate-resilient crops by small-scale producers in low-and middle-income countries. *Nature plants*. 6:1231-1241.
2. World Bank (2023). Climate Smart Agriculture.
3. Available online: <https://www.worldbank.org/en/topic/climate-smart-agriculture>

SUSTAINABLE IRRIGATION IN URBAN GREEN SPACES

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Introduction: Increasing the efficiency of water use in urban landscapes is achieved by providing a quantity of water strictly determined by the requirements that plants have for maintaining health and aesthetic appearance. The water demand (consumption) of urban landscapes differs substantially from that of agricultural crops and lawns due to the specific conditions in the urban environment.

Aims: The objective of this study was to highlight sustainable water management solutions in the urban environment – especially in the maintenance process of green spaces. Also, the research aimed to obtain efficient, sustainable water management options adapted to the current context characterized by climate change.

Materials and Methods: A number of 50 scientific articles, books and reports dealing with the sustainability of urban green spaces and irrigation water management were included in the study.

Results: Irrigation of landscapes in the urban environment is an important component in the water circuit. Unlike agricultural crops and lawns, landscaping is composed of a mixture of trees, shrubs and perennial flowering species with different water consumption requirements. In addition, in the urban environment there is a wide range of microclimates determined by built-up, shaded or paved areas, which can affect solar radiation and reflection, winds or other meteorological parameters. All of these variables must be considered when designing effective irrigation systems.

Conclusion: Due to the variety of landscapes and microclimates, research on irrigation and water use in urban landscapes must include residential, industrial, commercial, urban public spaces to obtain an edifying overview. Irrigation in the urban environment can influence the hydrological cycle by increasing water consumption, changing evapotranspiration and infiltration values, etc. By understanding patterns of irrigation performance, economic approaches can be developed to encourage water conservation.

Keywords: irrigation, landscape, sustainability, urban

ASSESSMENT OF MORPHOLOGICAL AND BIOCHEMICAL MARKERS TO EVALUATE DROUGHT RESPONSES IN TWO *TROPAEOLUM* SPECIES USED IN LANDSCAPING

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Introduction: Drought is a major challenge for horticultural crops, especially in arid and semiarid regions like the Mediterranean basin. Selecting stress-tolerant cultivars is crucial due to increasing water scarcity and limited irrigation. The *Tropaeolum* L. genus, belonging to the Tropaeolaceae family, is found in Central and South America. It has been introduced to various regions worldwide, known for its vibrant flowers, and utilised for gardening, landscaping, as an edible and medicinal plant, as well as for trapping aphids in vegetable gardens (Badenes-Pérez, 2019).

Aims: The study aimed to evaluate which of two selected *Tropaeolum* species, *T. majus* and *T. minus*, is better suited for cultivation under limited water resources, and to examine their response mechanisms to water deficit stress.

Materials and Methods: Full-grown plants of *T. majus* and *T. minus* were subjected to two water stress treatments (six plants per treatment) for four weeks. Throughout this period, soil moisture, electroconductivity and various morphological parameters were determined. After the treatment, the plants were harvested for biochemical analyses.

Results: Both *Tropaeolum majus* and *T. minus* exhibited comparable responses to water deficit, but *T. majus* showed greater tolerance to severe water stress based on a lower reduction in total, fresh, and dry weight.

Conclusion: Both species demonstrated similar behaviour under mild water stress, with minimal impact on growth parameters. Proline and malondialdehyde were identified as effective biomarkers for water stress in both species.

Keywords: ornamental plants, reactive oxygen species, tolerance mechanisms

References

1. Badenes-Pérez F.R. (2019). Trap crops and insectary plants in the order *Brassicales*. *Annals of the Entomological Society of America*. 112(4):318-329.

RESPONSES TO DROUGHT AND SALT STRESS IN TWO ORNAMENTAL AND POTENTIALLY INVASIVE *IPOMEA* SPECIES

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Introduction: *Ipomea purpurea* Roth and *I. tricolor* Cav. are two species native to tropical America, intentionally introduced in Europe as ornamental, covering plants for walls, fences, or pergolas, and are known for their rapid growth and climbing habits, enabling them to compete effectively for light and resources in diverse ecosystems. *Ipomea purpurea* is listed in the Atlas of invasive species in the Iberian Peninsula. Both *I. purpurea* and *I. tricolor* have also been studied for their ecological roles and adaptations to environmental stresses, and have demonstrated unique mechanisms to withstand adverse conditions such as drought and salinity (Gianoli, 2004).

Aims: This project explores the tolerance to water and salt stress in these two related species, to establish which of them is more suitable for cultivation in settings of low hydric resources and salty environments. The study also aims to identify biochemical stress markers useful in characterising their abiotic stress response mechanisms. Heat, drought, cold, and salinity are the primary abiotic stressors that cause serious harm to all plant species.

Materials and Methods: A total of 40 *Ipomea purpurea* and *I. tricolor* plants were watered twice a week with water containing different concentrations of NaCl (Control, 100 mM, 200 mM) or were not watered at all, and growth parameters were determined after three weeks of treatment. Photosynthetic pigments, osmolytes and ion contents were further analysed for a better understanding of the tolerance mechanisms to the stress conditions.

Results: The two species were more susceptible to water stress than to salinity. After three weeks of lack of irrigation, all growth parameters were significantly reduced in comparison to the control group. Regarding the biochemical parameters, photosynthetic pigments were more affected under salt stress.

Conclusion: The two species responded in a similar manner to the stress treatments. Both were affected by water stress, but proved to be tolerant to lower concentration of NaCl.

Keywords: abiotic stress, ornamental plants, oxidative stress markers

References

1. Gianoli E. (2004). Evolution of a climbing habit promotes diversification in flowering plants. *Proceedings of the Royal Society of London B*. 271:2011-2015.

THE EFFECTS OF POLYMERIC HYDROGELS ON THE GROWTH AND YIELD OF *LACTUCA SATIVA* L. UNDER VARYING WATERING CONDITIONS

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Introduction: Lettuce (*Lactuca sativa* L.) represents one of the most consumed fresh vegetables in the world and it is also known as an important source of phytonutrients, phenols and vitamins. At the same time, lettuce is one of the most sensitive vegetable species to drought, which represents a natural disaster with an extremely complex, damaging and costly effect. Hydrogels with a very higher water retention capacity represent one of the alleviating methods that could be used regarding this issue.

Aims: The study was conducted to assess the effects of different hydrogel compositions regarding different parameters in the lettuce growth process under controlled drought and regularly irrigating conditions.

Materials and Methods: The hydrogels were obtained from National Institute for Laser, Plasma and Radiation Physics and the lettuce seedlings were acquired from SCDL Buzău. Four different compositions of hydrogels based on acrylic acid, carboxymethyl cellulose, sodium alginate and montmorillonite were used in two different forms: granular and beads. The hydrogels were placed in the soil at the root level of the lettuce seedlings. Over a period of 40 days, the drought stress conditions were simulated with no watering applied, compared to the regularly irrigated plants.

Results: Upon the drought induced stress, the results showed there were no highly significant differences on the studied parameters such as total and root length, shoot and root weight, root volume, stump diameter and number of leaves.

Conclusion: The results of the study showed a great potential of the polymeric materials regarding the growth of lettuce in the stressed induced drought conditions.

Keywords: drought, hydrogel, *Lactuca sativa*

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THE PARTICULARITIES OF THE GROWTH AND DEVELOPMENT OF FETEASCA NEAGRA WINE VARIETY DEPENDING ON THE TERROIR

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Introduction: Climate change at the global level causes various disturbances in viticultural ecosystems, causing varieties to adjust their annual vegetation cycle, often with negative consequences on the quantity and quality of the harvest, as well as the quality of the wines obtained. The analysis of the evolution of the pheno-phases of the vine vegetation, closely related to the environmental conditions, is an effective method of assessing the level of climate change.

Aims: The purpose of this study was to analyse the peculiarities of growth, development and fruiting of the grapes of Feteasca neagra wine variety in different wine-growing regions of the Republic of Moldova.

Materials and Methods: The study was based on the grapes of Feteasca neagra wine variety, grown in the 3 wine-growing regions intended to obtain wines with Protected Geographical Indication (PGI): Valul lui Traian IGP (Alexandru Ioan Cuza, Bugeac and Leova), Ștefan Vodă IGP (Purcari) and IGP Codru (Speia and Nisporeni). In order to achieve the proposed goal and objectives, a series of observations, records and analyses were carried out according to the methods and standards.

Results: According to the experimental data, we find that during the research period 2017 - 2019, for the Fetească neagră variety cultivated on the experimental land - Alexandru Ioan Cuza, the average number of shoots per vine obtained values between 29.86 and 29.86 shoots. The number of grapes per shoots obtained the average value of 1.12 grapes per shoot. The number of grapes per fertile shoots obtained values of 1.4 grapes per fertile shoot.

Conclusion: As a result of the research, it was found that the value of the quality and productivity indices depends on the canopy management, the number of buds and shoots and the pedoclimatic conditions of the region.

Keywords: fertility, phenophases, productivity, region, variety

References

1. Nechita A., Zaldea G., Damian D., Filimon R., Pisticiuc I. and Filimon V.R. (2020). The evolution over time of the development of vegetation phenophases of the vine varieties cultivated in the Copou Iași wine center in the context of climate change. *Lucrări Științifice Seria Horticultură USAMV Iași*. 63(1):89-94.

THE DEVELOPMENT OF THE VITICULTURE AND WINE SECTOR THROUGH THE INFLUENCE OF ECOLOGICAL AND TECHNOLOGICAL RISK FACTORS

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Introduction: The wine sector in the Republic of Moldova is strategic for the national economy. In recent years, the development of the wine sector is increasingly influenced by a series of risk factors – economic, financial, informational, political, ecological, technological etc.

Aims: The purpose of the research was to determine the level of influence of different risk factors on the development of the viticulture and wine sector in the Republic of Moldova.

Materials and Methods: The research was carried out with a survey of entities in the sector according to a series of criteria in the period 2020-2023. The research was carried out within a national program.

Results: The main factors of influence are included into next groups:

1. The group of economic factors; 2. The group of political factors; 3. The group of technological factors; 4. The group of environmental factors; 5. The group of legislative factors; 6. The group of information factors; 7. The group of moral factors.

The group of technological factors with high influence level included: Application of technical-scientific progress; Modernization of equipment; Technology modernization; Know-how; Land consolidation; Rent for activity; Property; Other risks.

The group of environmental factors with high influence level included: Climate changes; Natural disasters; Landslides; Deforestation; Drainage of water basins; Other risks.

Conclusion: In the results of the studies, it was found that the influence of both groups of factors were evaluated with more than 4 points out of 5. The results demonstrated a high level of positive significance, and a high correlation.

Keywords: risk factors, viticulture, wine

REVISITING THE SOMEȘ-NADĂȘ INTERFLUVE. THE METROPOLITAN SYSTEM FOR LEISURE I. CITADEL-HOIA-SUCEAGU

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Introduction: With the rapid urban expansion around Cluj-Napoca, revisiting the general strategy for environmental protection and urban development is critically needed. Our study brings forward the untapped potential of the Someș-Nadăș interfluve, as one major generator of a new, integrated approach to planning in Cluj metropolitan area.

Aims: This article aims to cover a gap in research concerning the interfluve formed by Someșul Mic and Nadăș river. We drive for a deeper understanding of the area and its complex circumstances, aiming to define it as one coherent planning unit, to be conserved as a green axis serving the continuous townscape emerging along its river valleys.

Materials and Methods: Cartographic materials were analysed, focusing on natural environment, cultural heritage, urban dispersion, and road infrastructure.

Results: Considering several analysis criteria, the interfluve between Someș and Nadăș rivers incorporates unique environmental, urban, and cultural features that form a coherent hole amidst an ever-growing urban density. Predominantly covered by forests and meadows, the interfluve includes important archaeological sites, and historical settlements spanning all the way from Citadel Hill, up to Suceagu village. Main points of interest are spatially clustered and naturally circumscribed by the hill topography. Dividing the highly urbanised river valleys, we concur that Someș-Nadăș Interfluve emerges as one major green spine, which we named the "Metropolitan System of Leisure I. Citadel-Hoia-Suceagu". The main threats that endanger the natural areal are the newer residential districts near Floresti and Baci, as well as potential new highways crossing over the interfluve.

Conclusion: In our present research, we demonstrated the complex environmental and urban role of the interfluve in between Someșul Mic River and Nadăș River, and assert the need for a new urban strategy, aimed at its sustainable and integrated development.

Keywords: environmental and urban sustainability, Hoia Forest, integrated planning strategy, Someș-Nadăș Interfluve

THE INFLUENCE OF SALT STRESS ON THE CONTENT OF VITAMIN C IN THE LEAVES OF SOME VARIETIES AND LINES OF BITTER CUCUMBER (*MOMORDICA CHARANTIA*)

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Introduction: Bitter cucumber is a tropical and subtropical plant with a long history of medicinal use. The plant is also of nutritional importance, its aerial parts being consumed. Soil salinity is a major abiotic stress that affects the morphology and physiology of plants, leading to reduced growth, production yield or in some cases their death.

Aims: Salt stress increases the accumulation of reactive oxygen species in plants. They developed adaptation mechanisms by increasing the level of antioxidants, including vitamin C. The aim of the study was to estimate the amount of vitamin C in the studied plants to determine the ability to adapt to salinity and improve nutritional properties (Kesawat *et al.*, 2023).

Materials and Methods: To carry out the experiment, two varieties and three experimental lines of bitter cucumber subjected to saline stress through treatments with saline solutions of different concentrations were used. The estimation of vitamin C content was carried out by UV-Vis spectrophotometry using the calibration curve method with standard *L*-ascorbic acid and KMnO_4 . Statistical analysis was performed using the Anova Two Factor.

Results: After performing the analysis of variance on the varieties and lines of bitter cucumber, subjected to salt stress by applying the two treatments, it was found that the accumulation of vitamin C was insignificantly influenced by the factor *a*- the number of the treatment, but it was significantly influenced by the factor *b*- the concentration saline solution.

Conclusion: In the present paper, we highlighted the fact that vitamin C helps to adapt the bitter cucumber to salt stress, thus being accumulated in larger quantities compared to untreated plants.

Keywords: *Momordica charantia*, salinity, vitamin C

References

1. Kesawat M.S., Satheesh N., Kherawat B.S., Kumar A., Kim H.U., Chung S.M. and Kumar M. (2023). Regulation of Reactive Oxygen Species during salt stress in plants and their crosstalk with other signaling molecules - current perspectives and future directions. *Plants*. 12(4):864.

INTEGRATING UAV MULTISPECTRAL INDICES (NDVI & NDRE) WITH YIELD DATA FOR OPTIMIZING FLAX (*LINUM USITATISSIMUM* L.) CULTIVATION

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Introduction: Flax (*Linum usitatissimum* L.), a member of the Linaceae family, spanning 150 species, is versatile, grown for fibre, seed and oil (Stavropoulos *et al.*, 2023). Canada is the foremost producer, while in Greece, diverse areas yield significant crops (Kakabouki *et al.*, 2021; FAOSTAT, 2022). Proper fertilization, particularly with nitrogen, is vital for enhanced growth and yield. The incorporation of inhibitors in nitrogen fertilizers ensures prolonged nitrogen availability to the crop, optimizing its use (Kakabouki *et al.*, 2021). Organic fertilization also offers notable benefits for crop growth. Moreover, seeding distance, crucial for many crops, affects inter-plant competition, especially at shorter distances. Research particularly focuses on 40 and 30 cm seeding intervals.

Aims: The aim of this study was to evaluate the growth of a flax crop with NDVI and NDRE maps obtained via UAV multispectral imaging.

Materials and Methods: A field experiment was set at the field of Agricultural University of Athens. The experimental design was the split – plot. The main plots examined the effects of different fertilizers (urea, urea with inhibitors, organic, fertilization, control) on flax's agronomic characteristics. Subplots analysed the influence of sowing distances (30 and 40 cm) on flax growth. A UAV equipped with a multispectral camera was utilized to produce NDVI and NDRE index maps. The statistical analysis was performed with Sigma Plot 12 statistical software (Systat Software Inc., San Jose, CA, USA). The level of significance was 5%.

Results: According to the results, fertilization influenced the NDVI and NDRE. Best results were shown at organic fertilization. The lowest NDVI was measured at control (with no fertilization). The highest NDRE was measured at organic fertilization and the lowest at control (with no fertilization).

Conclusion: To conclude, both NDVI and NDRE were influenced by fertilization and plant density. These two indices can be used to check crop's growth.

Keywords: Flax (*Linum usitatissimum* L.), NDRE, NDVI

References

1. FAO. (2022). World Food and Agriculture – Statistical Yearbook. Rome. <https://doi.org/10.4060/cc2211en>
2. Kakabouki I., Mavroeidis A., Tataridas A., Roussis I., Katsenios N., Efthimiadou A., Tigka E.L., Karydogianni S., Zisi C., Folina A. and Bilalis D. (2021). Reintroducing flax (*Linum usitatissimum* L.) to the Mediterranean Basin: The importance of nitrogen fertilization. *Plants*. 10(9):1758.
3. Stavropoulos P., Mavroeidis A., Papadopoulos G., Roussis I., Bilalis D. and Kakabouki I. (2023). On the path towards a “Greener” EU: A mini review on flax (*Linum usitatissimum* L.) as a case study. *Plants*. 12(5):1102.

PRELIMINARY ASSESSMENT OF WATER USE EFFICIENCY OF C₃, C₄ AND CAM PLANT SPECIES IN SIMULATED EXTENSIVE GREEN ROOF

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Introduction: In semi-arid regions, such as the eastern Mediterranean area, water scarcity is an important issue that makes the water use efficiency of plants an important parameter for the selection of suitable plant species for extensive green roofs.

Aims: The aim of the study was to evaluate plant species of the three types of photosynthetic metabolism (C₃, C₄, CAM) in terms of their suitability for use in extensive green roofs under water stress conditions, based on water use efficiency.

Materials and Methods: Six plant species, representing CAM plants (*Sedum sediforme* and *Mesembryanthemum cordifolium*), C₃ Mediterranean drought tolerant plants (*Pallenis maritima* and *Cistus* × *purpureus* 'Alan Fradd') and C₄ plants (*Atriplex halimus* and *Muhlenbergia capillaris*), were selected for study in a simulated extensive green roof. Plants were grown in a greenhouse, in containers with green roof infrastructure fitted and 10 cm deep substrate (grape marc compost:perlite:pumice, 3:3:4, v/v), under regular and sparse irrigation (substrate moisture 17-20% and 8-11% v/v, respectively, water quantity of 4 L per irrigation per box). In the February-November period, three prunings were applied with the aim of maintaining the vegetation within the box margins at a height of 6-8 cm, and the dry weight of the plant biomass removed was measured. Water use efficiency was calculated as the quotient of the total biomass dry weight removed and the total water supply of each species.

Results: In both irrigation frequencies, in the February-August period, higher water use efficiency was observed in *M. cordifolium* (0.41-1.25 g/L), *A. halimus* (0.28-0.59 g/L) and *C. × purpureus* 'Alan Fradd' (0.09-0.26 g/L), while in the August-November period, resulted for *S. sediforme* (2.04-2.42 g/L), *M. capillaris* (1.60-1.68 g/L) and *C. × purpureus* 'Alan Fradd' (0.99-1.01 g/L).

Conclusion: C₄ plants competed with CAM plants in water use efficiency, while C₃ Mediterranean plants showed the least water use efficiency, while requiring a greater volume of water throughout the experiment period.

Keywords: CAM plant, C₃ plant, C₄ plant, drought stress, photosynthesis type

THE QUALITY OF GRAPES OF THE MOLDOVA VARIETY ACCORDING TO THE FOLIAR FERTILIZATION SYSTEM IN THE PHENOPHASE OF THE BERRY GROWTH

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Introduction: The fertilization of the vineyards is an important and sometimes decisive technological process in the production technology of table grapes (Nicolaescu and Cazac, 2012). Knowing the nutritional needs of the grapevine in different phenophases ensures obtaining homogeneous, quantitative and qualitative harvests, but also increases the plants' resistance to adverse environmental conditions (Carbonneau *et al.*, 2015).

Aims: The objective consists in the analysis of the quality indices of the Moldova table grape variety, following the application of Ca treatments, in the phenophase of berry growth.

Materials and Methods: In the research, different variants of application of treatments with Ca (Calcinite) were studied, with 1-4 treatments, in different periods. Observations, measurements and determinations were carried out in the field, as well as chemical laboratory analyses, according to the methods approved in viticulture.

Results: The growth of the berries on the vine begins a few days after flowering and lasts until the grapes enter the field (Perstniov *et al.*, 2000). Following the study, a positive influence of calcium treatments on grain firmness was observed in the variants with the highest number of foliar applications.

Conclusion: The use of individual or combined calcium fertilization of the Moldova variety in the production conditions with 1-4 post-fertilization treatments, depending on the conditions of the year, positively influenced the quality of the harvest.

Keywords: fertilization, grapes, Moldova, phenophase, quality, variety

References:

1. Carbonneau A., Deloire A., Torregrosa L., Jaillard B., Pellegrino A., Méta A., Ojeda H., Lebon É. and Abbal Ph. (2015). *Traité de la vigne*. 2e édition. Dunod.
2. Nicolaescu Gh. and Cazac F. (2012). *Producerea strugurilor de masă, soiuri cu bobul roze și negru. Ghid practic. (Production of table grapes, pink and black varieties. Practical guide.)* Ed. Chișinău.
3. Perstniov N., Surugiu V., Moroșan E. and Corobca V. (2000). *Viticultură*. Ed. Chișinău.

CARBON FOOTPRINT ANALYSIS OF PROCESSING TOMATO CULTIVATION IN GREECE

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Introduction: Agricultural operations consume a significant amount of energy, contributing to global warming through the emission of carbon dioxide, methane, and nitrogen oxide (Folina *et al.*, 2021). It is important to note that the search for food security tends to take into consideration the problem of greenhouse gas emissions (GHGs), as well as the growing concern about the impact of population growth on climate change (Mavroeidis *et al.*, 2022). As one of the most important horticultural crops, tomato is of great economic value, as well as being of high sensory quality and nutritional value (Bilalis *et al.*, 2018). The majority of tomatoes grown around the world (approximately 80%) are processed into sauces, juices, ketchup, canned tomatoes and soups.

Aims: The goal of the current study was to estimate all the sources of the GHG footprint of commercially grown processing tomatoes in Greece.

Materials and Methods: The GHGs were calculated with Cool Farm Tool. The questionnaires were completed by 40 producers from the main processing tomato-growing regions of Greece.

Results: The estimated total carbon footprint value of tomato cultivation for a mean area of 7.16 ha (producing 94.8 tones of tomatoes per ha) was 24,846.47 kg CO₂-eq. Specifically, the estimated carbon footprint values per hectare and tonne of fruit were 3,763.04 and 51.12 kg CO₂-eq, respectively. In addition, the highest CO₂-eq emissions per tonne were observed in energy use (fuel consumption) for field operations, with a value of 20.70 kg CO₂-eq corresponding to 40.49% of the total emissions per tonne of product.

Conclusion: Efforts should be made to improve the environmental impact of processing tomato cultivation by minimizing GHG emissions and mitigating the climate change effect by adopting several management strategies.

Keywords: carbon footprint, greenhouse gas emissions, primary energy demand, processing tomato

References

1. Bilalis D., Krokida M., Roussis I., Papastylianiou P., Travlos I., Cheimona N. and Dede A. (2018). Effects of organic and inorganic fertilization on yield and quality of processing tomato (*Lycopersicon esculentum* Mill.). *Folia Horticulturae*. 30(2):321-332.
2. Folina A., Kakabouki I., Mavroeidis A., Arydogianni S.K., Kouneli V. and Bilalis D. (2021). A study on the factors affecting greenhouses emissions in cotton in Greece. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Horticulture*. 78(2):79-84.
3. Mavroeidis A., Roussis I. and Kakabouki I. (2022). The role of alternative crops in an upcoming global food crisis: A concise review. *Foods*. 11(22):3584.

PRESERVING POSSIBILITIES OF JAPANESE PEARS AS JELLY

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Introduction: Japanese pears (*Pyrus pyrifolia*), well known as Asian pears or Nashi pears, are highly appreciated in Japanese and Chinese culture, but over time this species has remained widely cultivated more locally than in other countries. Japanese pears have a different appearance compared to European (Western) varieties due to their round, flattened shape, skin color and also flavor having a crispy texture, juicy pulp and enhanced fruit fragrance but no taste. For this reason, the current research has been carried out to try to increase the market value of these fruits as preserved.

Aims: The main aim of this research was to elaborate various recipes for jelly made from Japanese pears in order to improve the taste and to evaluate consumers' preferences against the final products.

Materials and Methods: To carry out this research four Japanese pear varieties have been used as raw materials namely Kumoi, Hayatama, Tama and Hosui which have been harvested from the experimental orchard of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. In addition, Starkinson apples were also used as main ingredients to improve taste, beside cinnamon, cloves, ginger and all-spice.

Results: Female respondents appreciated the most all varieties with cinnamon excepting Tama and Starkinson combination, while the least attractive variants from sensorial point of view proved to be Hayatama with cloves and lemon juice. On the opposite, male respondents disliked the most jellies prepared from Hosui, Tama and Hayatama varieties with lemon juice and ginger added, while the most appreciated variants were pear varieties combined with Starkinson apples seasoned with cloves and ginger.

Conclusion: The findings of this research reveal that Hosui and Hayatama varieties had the highest output for jelly preparation as compared to the other varieties. The results of the survey indicate that women's taste is far superior to men, but both genders agreed that the jelly made of Hosui pear was the least attractive based on the sensory analyses.

Keywords: all-spice, Asian pears, cinnamon, fragrance, juiciness, Starkinson

CHARACTERIZATION OF SOME BEAN LINES FROM THE GERMPLASM COLLECTION OF THE VEGETABLE RESEARCH AND DEVELOPMENT STATION BUZAU

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Introduction: The garden bean, *Phaseolus vulgaris* L. belongs to the Fabaceae family and is one of the oldest cultivated plants. Beans are grown mainly for their pods, which are consumed exclusively prepared (fresh or canned), either as immature beans in salads or as mature beans (grains) in various dishes. The bean culture is of particular nutritional importance, due to the high content of proteins, vitamins and other nutrients, and also agro-phytotechnical and economic-social importance.

Aims: In this study, sources of beans with different origins were chosen, which were subsequently examined comparatively, retaining for the breeding process and the continuation of the selection, the most valuable material from a qualitative point of view. Another objective was to analyze the selected lines for their distinctiveness compared to varieties with similar characteristics, even aiming to obtain a new bean variety, superior in terms of quality, quantity and tolerant to diseases and pests.

Materials and Methods: For this purpose, the biological material used was represented by the bean collection of the Vegetable Research and Development Station Buzau. The lines were characterized by their biometric parameters namely height, number of shoots, number of pods, length of pods, number of grains in pods, weight of grains etc.

Results: Some of the plants in the lines suffered due to heavy rainfall, high temperatures and the attack of pathogens. However, some of the analyzed lines proved to be resistant to these atmospheric conditions, completing their biological cycle and having a good yield in terms of fruiting.

Conclusion: As a result of this study, an appreciable number of bean lines resistant to certain limiting environmental factors could be observed. These lines are further studied to be taken to the stage of varieties.

Keywords: bean lines, breeding process, new variety

CHINA'S WINE SECTOR – CURRENT AFFAIRS AND PROSPECTS

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Introduction: China boasts a rich history of winemaking, with its origins tracing back to the time of Emperor Wu during the Han Dynasty. *Vitis vinifera*, introduced to China by Zhang Qian's mission to the western regions (138 BC – 119 BC), captured the attention of Emperor Wu, marking a significant turning point in the region's viticulture. With the introduction of grapes from the western regions, they first arrived in Xinjiang, traversed the Hexi Corridor in Gansu to reach Xi'an in Shaanxi, and gradually spread throughout northern China, north-eastern China, and beyond.

Aims: The hereby article sets the stage for a comprehensive exploration of China's wine industry, highlighting both its current status and future prospects. In this regard, it will delve deeper into the challenges and opportunities faced by the Chinese wine industry, shedding light on sustainability and its evolution in the years to come.

Materials and Methods: For this article, we analysed the Chinese and international databases – OIV, FAO etc.

Results: Currently, China's wine industry is in an intriguing phase of development and transformation. As of 2018, the total grapevine cultivation area for wine production in China stands at approximately 163,200 ha. Xinjiang leads the country with 36,700 ha of grapevine planting, followed by 34,000 ha in Helan Donglu and 20,500 ha in the Hexi Corridor, ranking third. These top three production regions collectively represent about 56% of the planted area. Grape varieties from these special production zones serve not only for fresh consumption and juice extraction, but also for winemaking purposes.

Conclusion: However, regarding the current state of China's wine sector, it is important to note that obtaining precise data differentiating between viticultural and fresh consumption areas remains a challenge due to various factors, including climatic variability. The grapevine cultivation area along the old Yellow River course has experienced a sudden decline, making it the region with the smallest grapevine cultivation area for wine production. A national distribution map of grape crop cultivation has been prepared based on surveys. This study encompasses not only Eurasian wine grapes, but also *Vitis vinifera* and Prickly Grapes, resulting in significant grapevine cultivation areas in the southern regions. Except for special production zones and southwestern alpine production areas, grapevine cultivation remains predominantly concentrated in the northern region.

Keywords: China, prospects, wine

EVALUATION OF YIELD AND GROWTH CAPACITY OF FOUR KALE CULTIVARS GROWN IN A HIGH TUNNEL

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Introduction: Green leafy vegetables are of great interest among vegetable producers, being considered as functional foods, especially due to their superior phytochemical profile and reported evidences about the strong relationship between their increased consumption and reduced risks of developing diseases (Turati et al., 2015, Hahn et al., 2016). In our country, green leafy vegetables are cultivated on small areas, mostly in small gardens, although they have low requirements regarding pedo-climatic conditions and easy technology of culture. Kale is a leafy vegetable which tolerates low temperatures, being feasible for both in field and protected cultivation in Transylvania's climate conditions.

Aims: The aim of this research was to evaluate the yield and growth capacity of four kale cultivars ('Red Siberian', 'Black Tuscany', 'Dwarf curled' and 'Scarlet') grown in a high tunnel.

Materials and Methods: The four kale cultivars were cultivated in 2022 year in a high tunnel, in Colina Farms, which is located in Băbuțiu village – Cluj County. Each experimental variant was placed in three replicates, the surface of each being 15 m². Plant growth dynamic was assessed by plant height, plant rosette diameter and the number of leaves per plant, which were recorded for a period of one month after plantation. The total yield, measured as fresh edible leaves, was calculated as mean of the three replicates for each variant and expressed as kg m⁻².

Results: The best results concerning the plant growth were obtained for 'Red Siberian' followed by 'Dwarf curled' and 'Black Tuscany' cultivars. Kale yield varied from 2.9 kg m⁻² for 'Scarlet' to 4.30 kg m⁻² for 'Red Siberian' cultivar. Yield increases in comparison with control were recorded for 'Red Siberian', 'Dwarf curled' and 'Black Tuscany', while statistical significant yield differences were recorded for 'Red Siberian' and 'Dwarf curled' cultivars.

Conclusion: High tunnel cultivation of kale offers season extension and more predictable yield, thus being an important source of income for the farmers in Transylvania. In this study 'Red Siberian' 'Dwarf curled' and 'Black Tuscany' cultivars revealed the best yield and growth capacity, being recommended for high tunnel cultivation.

Keywords: growth, kale, high tunnel, yield.

References

1. Hahn C., Müller A., Kuhnert N. and Dirk Albach. (2016). Diversity of kale (*Brassica oleracea* var. *sabellica*): glucosinolate content and phylogenetic relationships. *Journal of Agricultural and Food Chemistry*. 64(16):3215-3225.
2. Turati F., Rossi M., Pelucchi C., Levi F. and La Vecchia C. (2015). Fruit and vegetables and cancer risk: a review of southern European studies. *British Journal of Nutrition*. 113:102-110.

SESSION 5: ECONOMICS AND RURAL DEVELOPMENT

AN OVERVIEW OF THE ROMANIAN PROJECT ON TRACEABILITY OF AGRI-FOOD PRODUCTS - IMPLEMENTATION STAGE

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Introduction: Traceability of agri-food products refers to the ability to trace the history of a product through records related to identification data, such as the origin of the materials, the history of processing and the distribution and location of the product after delivery.

Aims: The purpose of this paper is to highlight the importance of traceability systems in the Romanian agri-food sector and provides an overview of the project “Strengthening the capacity of the Ministry of Agriculture and Rural Development to develop specific policies and regulations in order to implement a national strategic system for the traceability and integrity of agri-food products”.

Materials and Methods: The results were concluded based on bibliographic study, analysis and interpretation of relevant databases and evaluation of the activities performed during the project.

Results: Through the activities carried out within the project, the aim is to achieve the following results: a package of public policy proposals, active fund of the simplified legislation, regulations to reduce the administrative burden, procedures for reducing bureaucracy in citizen-public institutions interaction, transfer of knowledge and creation of new skills for MARD in order to manage public policies.

Conclusion: The first steps were made starting with 2022 and none of the objectives are reached at this point in time. There are some activities that will deliver results in the forthcoming period and by the end of this year the project will be finalized. At the same time, by the end of this project, it will also simplify market legislation and reduce administrative burdens for the business environment and citizens. Further research can be concluded based on the final results of the project, the impact (especially over the Romanian legislative framework) and on events that will be carried out in the future.

Keywords: differentiation, food industry, origin identification, product attributes, product trail

ASPECTS OF RURAL TOURISM IN MARAMUREȘ

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Introduction: Maramureș represents a specific historical and ethno-folkloric region located in the north part of Transylvania. From an administrative point of view, the region is located in the North-West Development Region of Romania.

Aims: The aim of this article consists of the analysis of the tourist potential of the region, the situation of the main tourist attractions and the opinion of tourists regarding them.

Materials and Methods: To achieve the objectives of this article, the method used was the analysis of the documents done in the past and who treated this subject. Document analysis is a fundamental source of social research in social sciences and, thus, in rural sociology. Also, a series of interviews were conducted with various tourists found in the area.

Results: Maramureș is a destination more specific to the concept of rural tourism. More than 7200 reception units operate in the region, their number being in a continuous increase. The tourist attractions specific to the place are cultural-religious-historical destinations (Bârsana, Rohia, Moisei monasteries etc., the wooden churches, the Merry Cemetery from Săpânța (due to its specificity, unique worldwide), traditional Romanian villages, but also mountain resorts (Borșa, Cavnic etc.). Maramureș has on the UNESCO list the wooden churches of Bârsana, Budești, Desești, Ieud, Rogoz, Poienile Izei, Plopiș and Șurdești, respectively forests within the radius of Băiuț, Poiana Botizei, Lăpuș and Groșii Țibleșului. The cultural diversity of this county is also due to the four distinct ethno-folkloric regions represented by the "countries" Lăpuș, Chioar, Codru and historical Maramureș.

Conclusion: In conclusion, it can be said that this region has a high tourist potential, being one of the most important and attractive in Romania. The region must be the subject of a more effective promotion campaign at the international level.

Keywords: rural tourism, Maramureș, monography, village

References

1. Cucerzan M. (2010), *Introducere în sociologie*, Ed. AcademicPres, Cluj-Napoca.

SESSION 6: ANIMAL SCIENCE

COMPARISON OF PERFORMANCE AND COCOON TRAITS OF CERTAIN ROMANIAN SILKWORM *B. MORI*

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Introduction: A high-quality cocoon of *B. mori* serves as the farms' economic tools (Samami *et al.*, 2019). There are knowledge gaps about the performance and cocoon characteristics of several breeds/lines of silkworms currently raised in Romania, and a screening of these become a necessity.

Aims: Evaluation of the larval development and raw cocoon parameters of certain silkworm *B. mori* monovoltine indigene breeds (B75, J90, AC29) and lines (AO/T, SK2/F, C108/T) maintained at gene pool of Research Station for Sericulture Băneasa.

Materials and Methods: The trial was conducted during the spring-summer season in silkworm-rearing rooms under standard conditions and facilities. Silkworm larvae (250 larvae/group, 5 replicate/group) were fed ad libitum with mulberry leaves. Measurements included larval stage [weight (LW) and length (LL) in 4th and 5th instars; n=25 larvae/group] and pupa stage [cocoon weight (CW), shell weight (SW), pupae weight (PW); n=50 cocoon/group]. The shell/weight (S/W) ratio was calculated. For cocoon traits, the sex effect was also evaluated.

Results: In the 4th instar, higher larval development was achieved by breed B75 and line SK2/F (p<0.0001). In the 5th instar, higher differences in larval growth were noticed between 2 and 9d, for breeds and lines (3 to 3.6-fold for LW and 1.3 to 1.36-fold for LL). At the end of 5th instar, the B75 breed had higher LW, and LL means than AC29>J90, while from lines by SK2/F=AO/T>C108/T (p<0.0001). Raw cocoon traits were influenced (p<0.0001) as follows: for CW and SW the higher values for breeds were obtained by B75>J90=AC29 and for lines SK2/F>AO/T>C108/T, for PW the trend was B75>AC29=J90 and SK2/F>AO/T>C108/T, whereas for S/W ratio the values were J90=AC29>B75 and SK2/F=C108/T>AO/T. Lines had superior cocoon traits than breeds. Females had higher CW, PW, lower S/W ratio, and similar SW than males. Significant positive correlations were found between 5th instar final performance variables and cocoon traits, except the S/W ratio negatively correlated with CW.

Conclusion: This study reveals that better larval development was achieved by breed B75 and lines SK2/F and AO/T. However, line SK2/F, followed by breed B75, had the highest cocoon traits. As expected, females had cocoon traits superior to males, except for S/W ratio. All measurements were within the range allowed by breeds/lines under normal growth conditions.

Keywords: *B. mori*, cocoon traits, larval development, Romanian breed/line

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MANAGEMENT OF DONKEY BREEDING FOR MILK PRODUCTION

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Introduction: The breeding of donkeys has become an important topic because their milk has proven to be a functional food successfully used in feeding children and people suffering from food allergies (Valle E., et al., 2017). The main task of donkeys was as trance animals used on the farm, for transport, especially in sheep farms, due to their muscles showing high resistance to effort and due to their tolerance to dehydration (Singh M. K., Gupta A. K., Yadav M. P., 2005).

Aims: The aim of the study is to highlight the importance of donkey breeding for milk production and the benefits of forming a management strategy within farms. Also highlighting the types of feed used and husbandry systems with the aim of improving the quality of milk production.

Growth strategies: In Europe, raising donkeys for milk has become an activity of interest with the discovery of the properties of their milk and its use in certain categories of people (Dai F., et al., 2019). Studies conducted so far have demonstrated differences in donkey milk depending on the growth system used, thus observing a higher percentage of milk fat in animals kept for longer periods on pasture (Valle E., et al., 2017).

Conclusion: It is observed that the quality of the yields obtained is greatly influenced by the growth strategies that include both feeding and supplementation with fodder that contributes beneficially to obtaining quality milk.

Key words: Donkey, milk quality

References

1. Dai F., Dalla Costa, E., Burden, F., Judge, A., & Minero, M. (2019). The development of guidelines to improve dairy donkey management and welfare. *Italian Journal of Animal Science*, 18(1), 189-193.
2. Gebreab F., Wold G. A., Kelemu F., Ibro A., Yilma K. (2003). Donkey utilisation and management in Ethiopia. *Donkeys, People and Development. A Resource Book of the Animal Traction Network for Eastern and Southern Africa (ATNESA)*. Wageningen: ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA), 92-9081
3. Valle E., Pozzo L., giribaldi M., Bergero D., Gennero M. S., Dezzutto D., McLean A., Borreani G., Coppa M., Cavallarin L. (2017). Effect of farming sustem on donkey milk composition. *Journal of the Science of Food and Agriculture*, Volume 98 (7): 2801-2808.

COMPARATIVE STUDY ON TECHNOLOGICAL PARAMETERS OF CRUDE COCOONS FROM 4 BREEDS/LINES OF *BOMBYX MORI* SILKWORM

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Introduction: The cocoons are made of natural silk with a superior microstructure and ecological capabilities (Zhou *et al.* 2020). Silk production is highly correlated with cocoon characteristics. Several factors are involved in obtaining adequate cocoon quality and production. Thereby, silkworm larvae need an optimized bed spicing from brushing to spinning in addition to other factors like feeding, hygiene, and environment to achieve full larval development, good survival, and appropriate cocoon production (Morimoto, 2022).

Aims: Assessment of technological characteristics of the crude cocoon (weight, length of transversal and longitudinal axis and their ratio, silk incartment and shell ratio) of 4 monovoltine *Bombyx mori* silkworms' breeds/ lines.

Materials and Methods: The technological parameters (crude cocoon weight, the length of transversal and longitudinal axis and their ratio, silk incartment and shell ratio) were determined on a total of 150 cocoons samples from two silkworm breeds (RG90 and GCB) and two lines (AO33 and Line Z) reared utilizing a rare technique of about 10% on the shelves (76 x 95 cm size), 3 replication each one. The data were analyzed by IBM SPSS software (2011), LSD test.

Results: A higher mean value of line compared to breeds was noticed for the length of transversal axis (>1.18 times, $P<0.0001$) and longitudinal axis (>1.01 times, $P=0.04$), incartment (>1.32 times, $P<0.0001$) and SR (>1.14 times, $P<0.0001$). Line AO33 recorded the higher weight of the cocoon (1.30 g), longitudinal axis ($L=30.04$ mm), transversal axis ($l=16.42$ mm), and their ratio $L/l = 2.26$, with an incartment of 0.19 g and $SR=15.38\%$. The lower mean value of cocoon weight and incartment were noticed for breed GCB (0.99g and 0.13g, respectively). LSD test showed differences between the AO33 line and GCB for cocoon weight, while incartment was different between $AO33>Line\ Z>GCB>RG90$ ($P<0.0001$), $GCB>Line\ Z$ ($P<0.0001$) and $Line\ Z>RG90$ ($P=0.001$). The SR% differed higher significantly between $AO33>GCB>RG90$ ($P<0.0001$); GCB was significantly lower compared to Line Z ($P=0.005$), while Line Z was 12% higher than RG90 ($P<0.0001$).

Conclusion: This study emphasizes the superior quality of the AO33 line and the lines' higher value for technological characteristics compared to breeds.

Keywords: Cocoon, technology, silkworms

Acknowledgement: This study was supported by the Ministry of Agriculture and Rural Development of Romania through project ADER 24.1.3/2023.

THE OCCURRENCE OF POLYCYCLIC AROMATIC HYDROCARBONS IN FISH MEAT AND THEIR IMPACT ON FOOD QUALITY

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Abstract. Polycyclic Aromatic Hydrocarbons (PAHs) are organic compounds known to be potentially toxic for human health. Humans are exposed mostly through ingestion, but also through inhalation and skin contact. Thus, their concentrations in foods should be as low as possible. Fish products are appreciated as functional food, with high nutritional properties and organoleptic attributes. Despite these qualities, fish products may also contain PAHs. Humans are exposed to PAHs by eating fish meat, which can be contaminated from environmental sources, from industrial food processing methods, and from some home cooking practices. The main aspects concerning PAHs contamination of fish meat are briefly discussed: analysis and occurrence in some fish products, main factors and sources of contaminations, methodology of the determination of PAHs and current legislation on PAHs. The contamination of fish meat with PAHs has an impact on food quality.

Key words: Benzo[a]pyrene, contamination, human health risks, meat products, PAHs

THE IMPORTANCE OF LABORATORY DIAGNOSIS IN THE PREVENTION AND CONTROL OF SILKWORM DISEASES

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Abstract. The aim of the paper was to highlight the importance and relevance of laboratory diagnosis in the identification, prevention and control of major silkworm diseases, which contribute to the improvement of silkworm health and sericulture production. The examinations were carried out by direct microscopy and laboratory diagnostic methods for specific diseases (bacterial, parasitic, mycotic and viral) according to the methodology of the OIE manual (Ed. 2016) and that of Insect Pathology (E. Steinhaus, vol. II, ch. 7 and ch. 9), adapted to the conditions of the Laboratory of Genetics, Breeding and Pathology of Silkworms of S.C.S.B.B. Direct microscopic and bacterioscopic examinations were carried out to exclude the risk of the presence of pathogens in future generations selected for the conservation of the genetic background. The samples collected from the 84 breeds under conservation were subjected to the examination of direct microscopy and bacterioscopy on two developmental stages of silkworms: egg stage, larval stage 1-5. The results of the laboratory examinations required the elimination of inappropriate biological material (seed) from reproduction, a fact that allowed obtaining disease-free reproductive material of the best quality. Acknowledgement: this work was supported by the financial support of MADR, under the coordination of ASAS, Romania.

Key words: Contagious and non-contagious diseases, laboratory diagnosis, silkworms

References

1. Deb S., Sinha, A.K., Saha, A.K. and Chakraborty, S. (2023). Superiority of Azadirachtin Over Other Bio Chemical Active Compounds in Controlling Nuclear Polyhedrosis (Grasserie Disease) of Silkworm, *Bombyx Mori* Linnaeus. *Journal of Agricultural Policy*, 6(1), pp.18-35.
2. Sharma A., Sharma, P., Thakur, J., Murali, S. and Bali, K. (2020). Viral diseases of Mulberry Silkworm, *Bombyx mori* L.-A Review. *Journal of Pharmacognosy and Phytochemistry*, 9(2S), pp. 415-423.
3. Tayal M.K., Chauhan, T.P.S. (2017). *Silkworm Diseases and Pests*. In: Omkar (Eds.) *Industrial Entomology*. Springer, Singapore.

EVALUATION OF INORGANIC SULFUR SOURCES EFFECT ON RUMINAL DEGRADATION OF FORAGES BY *IN SITU* MEASUREMENTS

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Introduction: Rumen microbes need minerals for their growth and activity (Meschy 2010), especially sulfur (S). For diets containing high amounts of forages, the microbial S requirements are often not covered, hence supplementation can allow optimizing fermentation activity. Several sources of S are used today, but their effectiveness of use by the rumen microbes is not well known.

Aims: Evaluate the effects of elemental sulfur (ES) and magnesium sulfate (MgS) on the *in situ* degradation kinetics of the dry matter (DM) and neutral detergent fiber (NDF) of hay (Bermuda grass) and maize silage.

Materials and Methods: Following a 3x3 Latin square design, 6 Nelore rumen cannulated steers were used in this study, averaging 943±96 kg live body weight (BW). Experimental periods included 2 weeks for treatment adjustment followed by 2 weeks for substrate incubation. The basal diet was individually adjusted to 1.2% BW (dry matter basis) and consisted of 90% maize silage and 10% hay. The S content of the diet met the recommended dietary S concentrations (0.20% DM, INRA, 2018) for ruminants. The treatments were: no S supplementation (CON) and supplementation with 0.05% DM intake of S/d with either ES or MgS. The substrates were incubated for 0, 6, 18 and 24 h. The DM and NDF degradation kinetics were adjusted using the Orskov model (Ørskov and McDonald 1979).

Results: Hay DM degradation was significantly increased with MgS when compared to CON and ES ($P<0.05$; 34.2±0.40, 32.4±0.57 and 33.3±0.40%, respectively), but no significant effect was observed on maize silage DM degradation. MgS significantly increased hay NDF degradation when compared to CON and ES ($p<0.05$; 35.5±0.92, 32.0±0.88 and 33.1±0.88%, respectively), while ES decreased the NDF degradation of maize silage ($P<0.05$; 36.8±1.16, 38.2±1.16 and 41.4±1.16% for ES, MgS and CON, respectively).

Conclusion: Supplementation of hay-based diets in ruminants with up to 0.30% DM of highly rumen soluble sulfur (MgS) improves substrate degradation and ruminal fermentation efficacy.

Keywords: Ruminants, sulfur, forages, degradation

References

1. Meschy F. (2010). Mineral nutrition of ruminants. Quae. Versailles, France: Quae; 2010.
2. Ørskov ER, McDonald I. (1979). The estimation of protein degradability in the rumen from incubation measurements weighted according to rate of passage. J Agric Sci. 92(2):499–503.

SESSION 7: BIOTECHNOLOGY

PUBLIC ENGAGEMENT TECHNIQUES FOR BIOTECHNOLOGY

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Introduction: Public engagement with science is a participatory model, in which scientific and education experts have a two-way dialogue with the community. In the context of constant and rapid scientific development, people feel disconnected from scientific research, leading to a lack of understanding, fear or concern. This is clear for biotechnology innovations, that can trigger opposition despite their benefits to the environment and to the overall health and socioeconomic status of the public.

Aims: In this analysis, we look at the potential of public engagement actions to bridge the gap between scientists and the public.

Materials and Methods: We discuss techniques that have proved effective in helping scientists communicate their research to a more diverse public, as well as ways in which the local and global communities can be involved in shaping the research landscape.

Results: During the past decades, science has become increasingly difficult to grasp for people without a solid scientific background. Specialized jargon is in constant use and advances are made at incredible speeds as part of complex projects. As a consequence, initiatives that promote the engagement of the public have emerged, such as citizen science and community-based participatory research, interactive exhibitions and public hands-on forums.

Conclusion: This analysis describes a variety of approaches that can be used by biotechnology researchers to engage the public and promote trust, critical thinking and curiosity.

Keywords: Public engagement, dialogue, innovations

References

1. Bell L. et al (2018). Public Engagement with Science - A guide to creating conversations among publics and scientists for mutual learning and societal decision-making, Museum of Science.
2. Jimenez J. et al (2022). Public Engagement with Biotechnology Inside and Outside the Classroom: Community-Focused Approaches. *GEN biotechnology*, 1(4), 346-354.

STUDY OF BIOLOGICAL ACTIVITIES OF THE SEEDS OF THE *CERATONIA SILIQUA L.* HARVESTED IN THE REGION OF BEJAIA

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Introduction: The carob tree (*Ceratonia siliqua L.*) has been the subject of much scientific research for several decades and is a natural remedy that is effective in the fight against cholesterol, acute childhood diarrhoea and pulmonary tuberculosis (Berrougui, 2007). The pulp is the main constituent of the carob pod (90%).

Objectives: It is based on the valorisation of *Ceratonia siliqua L.* encompassing phytochemical screening and evaluation of their biological activities of the aqueous and methanoic extracts of seeds.

Material and methods: Study of the anti-inflammatory effect by measuring the volume of the oedema of the leg. Study of antioxidant activity and antibacterial activity based on the method of diffusion (Vlietinck and Berghe, 1991).

Results and discussions: The assay of polyphenols reveals the richness of methanolic extracts in polyphenols, i.e. 30 mg of gallic acid/g of extract. The aqueous and methanolic extracts could reduce the stable free radical 2,2 diphenyl-1-picrylhydrazyl to diphenyl picrylhydrazine with respective IC₅₀s of 0.7mg/ml and 0.2mg/ml. The extracts are capable of reducing oedema by up to 81.89%. The methanolic extracts of the seeds have a moderate antibacterial action against *E.coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. On the other hand, the aqueous extracts have a weak antibacterial action against the same bacteria. However, the aqueous extracts show a very strong inhibitory action against *Candida albicans* and are similar to that of the antifungal antibiotic Econazole (1%).

Conclusion: both extracts from seeds and pods are endowed with an important anti-radical and antioxidant potential. The aqueous extracts of the seeds have shown a very important inhibitory action against *candida albicans L.*

Keywords: Antimicrobial activity, antioxidant activity, *Ceratonia siliqua L*

References

1. Berrougui H. (2007). Le caroubier (*Ceratonia siliqua L.*), une richesse nationale aux vertus Médicinales. Maghreb Canada Express Vol. 5: N° 9.
2. Vlietinck A.J. and VandenBerghe D.A. (1991). Can ethnopharmacology contribute to the development of antiviral drugs. Journal of Ethnopharmacology. 32: 141-153.

BIOTECHNOLOGIES FOR HEALTHY AND SAFE DAIRY PRODUCTS IN THE CONTEXT OF VALORIZATION DOMESTIC RESOURCES

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The evolution during ripening on aromatic characteristics and texture of Smoked kaskaval cheese was studied in this research.

The cheese samples were subjected to the ripening process for a period of 14 days at temperatures between 14 - 16°C (Mureșan, 2021) and humidity between 82-85%. The ripening of the product was carried out in two versions: open, unpackaged product, organized on fir wood planks and packed in heat-shrinkable film. The unpackaged product was turned over on the boards once a day to avoid mold spots.

The cheese samples were controlled and evaluated periodically (at 7 days) during ripening for physicochemical parameters (pH, moisture, fat, fat in dry matter, NaCl), microbiological (total combined yeasts and molds count (TYMC), total viable count (TVC), *Escherichia coli*, *Staphylococcus aureus*.

The ripening period showed different effects on the texture depending on the type of ripening (packaged or unpackaged) of the cheese (Moavro, 2020)

In conclusion, the texture of the unpackaged product is compact, and a 1.5-2 mm thick shell has formed on the surface of the product which protects the inside of the product and maintains the ratio of fat to dry substance at at least 47%. The color of the crust formed on the outside of the product became much more pronounced, and the smoke flavor did not penetrate deeply. In the case of the product packed immediately after smoking, the crust formed on the outside is soft, breaks apart in strips and has a light brown color. The ratio of fat in dry matter is higher than in the case of the first sample, which is due to the tightness of the plastic packaging. The texture of the product is softer than in the first case, and the deep color has also become slightly brown.

Keywords: Aromatic compounds; cheese, packaging, smoke

References

1. Muresan C. (2021) Changes in Physicochemical and Microbiological Properties, Fatty Acid and Volatile Compound Profiles of Apuseni Cheese during Ripening, *Foods* 2021,10, 258.
2. Moavro A. (2020) Stuffed cheese with superficial *Penicillium nalgioense* development: Role of microperforated film packaging in the ripening process, Elsevier, *International Dairy Journal*, Volume 110

CHANGES IN GROWTH PARAMETERS INDUCED BY VESICULAR- ARBUSCULAR FUNGUS *RHIZOPHAGUS IRREGULARIS* IN AERIAL PARTS OF *ECHINACEA PURPUREA*

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Introduction: *Echinacea purpurea* is a widespread plant, mainly known for its medicinal, and ornamental value. Several studies have shown that growth parameters affecting the ornamental value can be increased by elicitors (e.g. arbuscular-mycorrhizal fungi-AMF), although most of these studies have been performed under *in vitro* conditions.

Aims: In order to integrate these positive effects into production experiments on different substrates are needed to observe the ability of these AM fungi to compete with the soil microbiome. Therefore, the aim of this study was to investigate the competitiveness of *Rhizophagus irregularis* on different substrates (greenhouse and field conditions) in the presence of local microbial communities, in order to induce quantitative and qualitative changes in the ornamental value of *E. purpurea*.

Materials and Methods: Greenhouse and an open field experiment were conducted with *E. purpurea* inoculated with *R. irregularis* and control plants. In the greenhouse experiment three different soil types and sterile peat were used. At the end of the first growing season, the following parameters were measured on each plant individually: plant height, number of branches, leaf number, inflorescence number, and fresh- and dry biomass.

Results: In the first growing season the biometrics parameters were not influenced by the inoculation with *R. irregularis*, however in some cases significantly lower values for plant height, branches- and inflorescence number, and biomass were registered compared to the control plants.

Conclusion: *R. irregularis* was not efficient in the used substrates, not even on sterile peat. However, investigations should continue in the following growing seasons. The objective of our research was to examine the impact of AMF also within different stressful substrates. Further studies would be necessary with other AMF species in combination with growth-promoting bacteria, to assess their competitive behavior with the native microorganisms.

Keywords: Arbuscular mycorrhizae, *Echinacea purpurea*, ornamental value, plant-AMF interactions, *Rhizophagus irregularis*

OPTIMIZATION OF THE PRELIMINARY STEPS FOR SUNFLOWER ROOTS CRYOPRESERVATION

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Introduction: The cryostorage is the saving strategy for long-term preserving of valuable biological material in *in vitro* culture. It reduces the labour and the contamination risk associated with the periodic passing of the tissues on fresh medium. The challenge of cryostorage is that it requires a series of preliminary steps, each of which must be well established for ensuring the tissue viability all along. Although there are some generally valid principles for cryopreservation techniques, the method requires optimisation for each individual system.

Aims: The aim of this study was to establish a protocol for cryostorage by vitrification of young sunflower normal roots as a model to be subsequently used for preserving sunflower transformed with *Rhizobium rhizogenes* root lines (Ri roots).

Materials and Methods: We tested different concentrations of proline as a cryoprotectant in the meristem culture of the sunflower roots during the loading steps, before the treatment with the Plant Vitrification Solution 3 (PVS3). The viability of the root tissue was estimated using FDA assay after 2-3 days of recovery post PVS3 treatment.

Results: The preliminary data showed that the pre-treatment with a concentration of 2.5% proline of the sunflower roots meristems increases the viability of the explants after recovery from the PVS3 treatment even without pre-culture on medium with high sucrose concentration. This result suggests that proline has a very good osmoprotective role.

Conclusion: Although it is expected that small adjustments will have to be made for preserving the transformed Ri roots line, the protocol we developed using normal roots as model is very promising in terms of efficiency and simplicity.

Keywords: Cryopreservation, cryoprotectant, proline, PVS3, sunflower roots

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APPLICATION OF CELL-PENETRATING PEPTIDES AS NEW THERAPEUTIC AGENTS

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Introduction: Buforins are a group of naturally occurring antimicrobial peptides (AMP) that play a crucial role in the host's innate immune system, helping it to defend against various pathogens (Giuliani et al., 2007). Buforins are of particular interest due to their unique structure and potential applications beyond antimicrobial activity, including their exploration as potential agents in fields such as cancer research (Cho et al., 2009; Jang et al., 2012).

Aims: The aim of this study is to comprehensively assess the properties, mechanisms of action, and potential applications of buforins, a group of antimicrobial peptides.

Materials and Methods: Peptides were obtained by FMOC solid-phased peptide synthesis, and the crude peptide was purified using ultra-high-performance liquid chromatography (UHPLC), and the final product was characterized using electrospray ionization - mass spectrometry (ESI-MS).

Results: The structure, synthesis, and hydrophobicity of bioactive peptides are linked to their antioxidative properties, and their antibacterial action against a wide range of microorganisms. However, anticancer peptides (ACPs) are a category of AMPs capable of targeting cancer cell membranes, and although the inhibition or cancer-killing mechanisms are uncertain, there are similarities to those of antimicrobial activity.

Conclusion: Despite constant advances in research, medicine and clinical treatments, there are still many limitations to conventional antibiotic treatments regarding their efficacy, toxicity, adverse effects, interactions, and possible microbial resistance

Keywords: Anticancer, antimicrobial peptides, buforins, cell-penetrating peptides

References

1. Cho J.H., B.H. Sung and S.C. Kim (2009). Buforins: Histone H2A-derived antimicrobial peptides from toad stomach. *Biochimica et Biophysica Acta (BBA) - Biomembranes*, 1788(8): p. 1564-1569.
2. Giuliani A., G. Pirri and S. Nicoletto (2007). Antimicrobial peptides: an overview of a promising class of therapeutics. *Open Life Sciences*, 2(1): p. 1-33.
3. Jang S.A. et al. (2012). Mechanism of action and specificity of antimicrobial peptides designed based on buforin IIb. *Peptides*, 34(2): p. 283-289.

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BIODEGRADABILITY AND ECOTOXICITY ASSESMENT OF POLYMERIC BASED HYDROGELS

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Introduction: In our current situation, at a global level, the agricultural sector faces great problems such as continuous drought conditions or water scarcity, which increase the degenerative processes of the soil and seriously affects the quality of crops. Hydrogels, known as water holding reservoirs that can store a large amount of water and release it under controlled constant flow are highly studied by reserchers as a solution for these major problems. Biodegradability represents one of the most important requirements for these polymers that can be applied in agriculture and could represent a sustainable mechanism. Another requirement imposed on hydrogels refers to their lack of ecotoxicity, so that after the biodegradation process, no harmful compounds should be released into the environment.

Aims: The aim of this study was to test different formulations of hydrogels based on acrylic acid, carboxymethyl cellulose and sodium alginate regarding their biodegradability rate after 100 days while assesing their ecotoxicity potential.

Materials and Methods: The hydrogels were obtained from National Institute for Laser, Plasma and Radiation Physics. The biodegradability was tested using the soil burial method and the ecotoxicity was assesed using the seed germination bioassay on seeds of *Lactuca sativa* and *Raphanus sativus*

Results: The biodegradability testing showed a greater rate of biodegradability for the samples containing a higher amount of sodium alginate. Regarding the ecotoxicity of the polymers, the germination rate and rootlet length were close or higher for the tested samples, compared to control with few differences.

Conclusion: The results of the study showcased a promising process of biodegradation of the hydrogels without presenting a notable ecotoxicity level of the materials.

Keywords: Biodegradability, ecotoxicity, hydrogel

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CRITICAL METALS EXTRACTION WITHIN ACTIVE CIRCULAR PROCESSES

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Introduction: Providing global economy with critical metals occupies an important position for national security, being the defining condition for the development of industrial modernization. Global implementation of modern technologies, such as: technologies for creating high-speed vehicles and intellectual systems for controlling new types of transport; technologies of new and renewable energy sources, including hydrogen energy; technologies for the creation of new-generation rocket-space and transport technology are not possible without critical metals. Over the last ten years, bio-based approaches have demonstrated their effectiveness in extracting critical metals from diluted waste streams and mine tailing.

Aims: In this article, we investigate into the world of biotechnology-driven critical metals extraction and its potential to reshape resource recovery paradigms.

Material and methods: A comprehensive literature review was conducted with focus on the critical metal recovery from mine tailings.

Results: The conventional methods for extracting critical metals involve energy-intensive processes, often associated with significant environmental degradation. Mining operations can result in habitat destruction, water pollution, and greenhouse gas emissions. Moreover, as ore grades decline, the energy and resource inputs required for extraction increase, further exacerbating the problem. Biotechnology, with its ability to harness the power of microorganisms and biochemical processes, offers a green and efficient alternative for critical metals extraction. Several promising biotechnological approaches have emerged in recent years such as: bioleaching, biosorption, biomineralization, genetic engineering.

Conclusion: Despite the promising potential of biotechnology in critical metals recovery, several challenges remain. These include optimizing bioprocesses, addressing scalability issues, and ensuring economic viability. Additionally, regulatory frameworks and public acceptance will play a significant role in the widespread adoption of these technologies.

Keywords: Circular economy, critical metal, biotechnological methods, green extraction

PLANT AND INDUSTRIAL BIOTECHNOLOGIES FOR SUSTAINABLE BATTERY PRODUCTION: EXPLORING VEGETABLE WASTE WITHIN THE CIRCULAR BIO-ECONOMY

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Introduction: The increasing demand for sustainable energy storage solutions has prompted research into alternative materials for battery production. This study focuses on the utilization of vegetable waste for battery production (classic batteries and microbial fuel cells – MFCs).

Aims: The aims of this review are to critically examine the utilization of vegetable waste in battery production, evaluate the potential of vegetable waste for electrode and electrolyte development, and explore the biotechnological strategies used to enhance the performance of vegetable waste-derived batteries.

Materials and Methods: A systematic search was used to identify relevant studies from scientific databases.

Results: Vegetable waste offers promising opportunities to develop sustainable electrode and electrolyte materials. Biotechnological strategies (genetic engineering and fermentation processes) show potential for enhancing the performance and efficiency of vegetable waste-derived batteries.

Conclusion: The integration of plant and industrial biotechnologies in utilizing vegetable waste for MFCs and battery production within the circular bio-economy presents a promising avenue for sustainable energy storage. The results demonstrate the potential of plant-based resources and biotechnological advancements in developing efficient and environmentally friendly electrode and electrolyte materials. Future research should focus on optimizing bioprocesses, scaling up production, and conducting life cycle assessments to evaluate the overall sustainability of vegetable waste-derived batteries.

Keywords: Battery production; circular bio-economy; MFCs; vegetable waste

Acknowledgments: PN 23 15 04 01 *The cascade valorisation of agro-industrial waste of plant biomass type in bioproducts with added value in the circular bioeconomy system* & PN-III-P1-1.1-TE-2021-0673 *Stabilizing SBA-15-based anodes with highly conductive single-ion polymer electrolyte for Solid State Lithium-Ion Batteries*.

SESSION 8: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

RELATIONSHIP BETWEEN WELFARE AND PRODUCTIVE PERFORMANCE IN DAIRY CATTLE

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Introduction: Dairy products are a basic element of world's population's diet. The world's population growth leads to an increase in food demand, so attention is focused on obtaining as much milk as possible. The wellbeing of dairy cows is a global concern for moral and financial reasons, particularly in order to obtain milk of high quality.

Aims: This review article aims to investigate if there is a link between dairy cattle's welfare and their production.

Methods: A comprehensive analysis was performed on Google Scholar, PubMed, and Web of Science databases. The most relevant articles were reviewed, and the information was synthesized.

Results: Currently, there are too few studies that can demonstrate the direct correlation between welfare and productivity, and it's not completely accepted.

Discussions: The majority of research on the connection between dairy cattle production performance and welfare has been done, focusing on certain welfare measures.

Conclusions: Nowadays, farm animal welfare is a global concern. Food quality is becoming a concern for consumers progressively. For the farmer, it is important that milk yields increase, so a first step to improving performance is to increase animal welfare.

Keywords: dairy cattle, dairy products, milk, welfare

EXPRESSION MOLECULAR MARKERS TRANSFER OF ZONA PELLUCIDA FROM PIG TO WILD BOAR

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Introduction: Wild boar populations have surged over 20 years, prompting concern due to resultant damage. Growing wild boar numbers in Europe and beyond have prompted the exploration of innovative methods, like immunocontraception, for population control. Zona pellucida facilitates oocyte-sperm interaction and contains proteins pivotal for sperm coupling and polyspermia prevention. Zona pellucida's antigenic nature has enabled researchers to use it in reproductive function control.

Aims: This study aimed to identify and compare gene expression related to fertilization in domestic and wild pigs. The focus was on gene sequences (CD9, ITGA6, MFGE8, ZP1, ZP2) to pinpoint potential candidates for PZP immunocontraceptive vaccine development.

Materials and Methods: Oocytes were swiftly isolated through suction and subjected to nucleic acid isolation. DNA solutions enabled End-Point PCR for specific molecular marker identification. Gene expression was gauged via RT-qPCR and SYBR Green reagents. Expression levels were quantified using the $2^{-\Delta\Delta C_t}$ method.

Results: Genes coding for zona pellucida proteins exhibited high similarity in both subspecies, evidenced by specific amplification products from reactions using highly specific primers. Occasional non-specific amplification products emerged in CD9, ITGA6, and ZP2 genes due to genome-present alleles. These artefacts did not impact similarity or gene expression quantification. Gene expression analysis identified CD9, ITGA6, MFGE8, ZP1, and ZP2 genes responsible for zona pellucida protein coding in wild boars, suggesting substantial protein similarity.

Conclusion: The present study demonstrated that the five ZP glycoproteins may be candidates for immunocontraceptive procedures in wild boars. Thus, DNA sequences specific to ZP genes in the wild boar genome were identified, and their expression level was quantified to identify proteins that can be used in making a ZP vaccine for contraceptive use.

Keywords: *Zona pellucida*, wild boar, molecular expression markers, molecular data transfer

HOW TO STUDY UNDERWATER FAUNA *IN SITU*: FIRST STEP-BECOME SCUBA DIVER

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Underwater fauna can be studied by sampling, underwater photography and videography, respectively *in-situ* using SCUBA (Self-Contained Underwater Breathing Apparatus) techniques (Heine, 2011). In order to become a scuba diver, you have to attend the courses of a scuba diving school, courses that are structured on several levels. The first level (open water) involves a number of 20-25 hours, both theory and practice. History of diving, aquatic environment, marine life injuries, physics and physiology, scuba equipment, dive planning and underwater navigation are studied during the theory classes. Meanwhile, 2-3 dives in pool (or confined water) and at least 4 dives in open waters should be performed during the practice hours. At the Faculty of Veterinary Medicine of our university we have organized a summer school where students are trained in order to become scuba divers (Borda *et al.*, 2017, Borda, 2021). In the 9 editions that took place up now 108 students obtained diver certification. After gaining experience as a diver, one can move to the next level (advanced) and/or follow a specialized course, "Methods of underwater research".

Keywords: Fauna, scuba diver, underwater

References

1. Borda C., Popescu S., Oros D.C. and El Mahdy I.C. (2017). "Underwater Research and Biodiversity" Summer School-an Alternative for Veterinary Students' Practical Activities; Conference: Gochfeld, DT, Wright, C.S., eds. Diving for Science: Proceedings of the American Academy of Underwater Sciences 36th Symposium.
2. Borda C. (2021). Is it suitable to transform Veterinary students into scuba divers? In "Recent trends in education", AkiNik Publications, New Delhi.
3. Heine J.N. (2011). Scientific diving techniques. Best Publishing Company, Palm Beach Gardens, USA.

EXPLORING *CRATERELLUS CORNUCOPIOIDES*: MEDICINAL AND NUTRITIONAL POTENTIAL OF THE BLACK TRUMPET MUSHROOM

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Introduction: *Craterellus cornucopioides*, a member of the *Cantharellaceae* botanical family, is commonly referred to as the black trumpet or the trumpet of the deceased. In its dehydrated state, the black trumpet is renowned for its culinary excellence, and its ground form yields a powder often termed the "truffle of modest means." This mushroom variety manifests its presence during the transitional period from summer to autumn, spanning from June to October. It predominantly thrives in acidic soil environments within deciduous forests characterized by oak and beech trees. *Craterellus cornucopioides* assumes a trumpet-shaped morphology, boasting a tender flesh that spans a color spectrum from grey-black to brown. Its distinguishing features include an undulating rim and a hollow stem. Noteworthy pharmacological investigations have proposed that extracts derived from the black trumpet encompass in-vitro attributes such as antimicrobial, genotoxic, anticancer, and antioxidant properties. Furthermore, *Craterellus cornucopioides* has been identified as a substantial source of protein and total carbohydrate reserves, reflecting proximate compositions of 42.21 g/100 g and 44.54 g/100 g, respectively. Additionally, its lipid content remains notably modest at 4.87 g/100 g. The black trumpet variety exhibits significant quantities of monosodium glutamate-like constituents and total flavor 5'-nucleotides, quantified at 45.85 and 13.88 mg/g, respectively.

Aims: The purpose of this article is to review the current data regarding the morphology, chemical composition and medicinal potential of the black trumpet mushroom, by highlighting the unique attributes. This aims to contribute to the broader understanding of the black trumpet value and potential applications in the medical and nutritional fields.

Conclusion: The review examines the diverse potential of *Craterellus cornucopioides*, also known as the black trumpet mushroom. It sheds light on its medicinal benefits such as antimicrobial and antioxidant properties. The study underscores the distinct attributes of the black trumpet, rendering it a subject of significance in medical research.

Keywords: chemical composition, *Craterellus cornucopioides*, morphology, therapeutical properties

References

1. Læssøe T., Petersen J. H. (2019), Fungi of Temperate Europe, Volume 1, page 47, Published by Princeton University Press, ISBN:978-0-691-18037-3
2. S. Beluhan, A. Ranogajec, Chemical composition and non-volatile components of Croatian wild edible mushrooms, Food Chemistry, Volume 124, Issue 3, 2011, Pages 1076-1082, ISSN 0308-8146, <https://doi.org/10.1016/j.foodchem.2010.07.081>.
3. Kosanić, Marijana & Ranković, Branislav & Stanojkovic, Tatjana & Radović Jakovljević, Marina & Ciric, Andrija & Grujicic, Darko & Milosevic-Djordjevic, Olivera. (2019). *Craterellus cornucopioides* Edible Mushroom as Source of Biologically Active Compounds. Natural Product Communications. 14. 1934578X1984361. 10.1177/1934578X19843610.

THE IMPACT OF FAST FOOD PRODUCTS ON CONSUMER HEALTH AND ITS ASSOCIATION WITH OBESITY AND CARDIOVASCULAR DISEASES: A REVIEW

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Introduction: Fast food products from various fast-food establishments have become increasingly prevalent in recent decades, primarily due to their convenience and affordability. However, the frequent consumption of these items has raised concerns regarding their nutritional quality and their potential implications for consumer health (1).

Aims: The primary aim of this study is to analyze the nutritional content of fast food items and explore how regular consumption may contribute to health-related issues.

Materials and Methods: To achieve this goal, we conducted a cross-sectional research study, collecting data from a selection of articles about the nutritional content of fast food products from different establishments and conducting statistical analysis to assess their potential impact on consumer health.

Results: Our findings reveal that a significant proportion of fast food products are high in calories, saturated fats, sodium, and added sugars, while being low in dietary fiber, vitamins, and minerals. Excessive consumption of such products was correlated with weight gain, elevated cholesterol levels, hypertension, and an increased risk of type 2 diabetes. Furthermore, it was observed that diets dominated by fast food offerings could negatively affect overall health, resulting in chronic fatigue, decreased energy levels, and an elevated risk of cardiovascular diseases.

Conclusion: The lower nutritional quality of fast food products is evident, and their regular consumption can have serious consequences for consumer health. Promoting nutritional education and encouraging healthier dietary choices are essential steps in addressing this issue. Fast food establishments should consider revising their menus to offer healthier alternatives, contributing to the overall improvement of public health.

Keywords: fast-food, obesity, cardiovascular diseases

References

1. Fatima, A. & Srivastava, S. (2017). Impact of Fast Food on Health. *International Journal of Applied Social Science*, 4 (9&10), pp 350-354.

THE GOOD, THE BAD AND THE UGLY: ANTIBIOTIC STEWARDSHIP IN RABBITS

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Introduction: The domestic rabbit (*Oryctolagus cuniculus*) is among the most common specialty and exotic pets. (Chomel, 2015). The most frequent bacterial diseases in pet rabbits are respiratory diseases, dental issues, otitis, and septicemia. (Lennox and Kelleher, 2009). Among the most used antibiotics in rabbit care is enrofloxacin. (Hedley, 2018)

Aim: The aim of this study is to conduct an epidemiological investigation of diverse rabbit samples, emphasizing the correlation between various pathologies and the utilization of antibiotics. By examining the prevalence of antibiotic usage in cases without prior microbiological examination, the research seeks to contribute insights into the judicious and evidence-based application of antibiotics in rabbit healthcare.

Materials and Methods: An observation sheet was developed to gather data from rabbit cases at the clinic, covering attributes like sex, age, pathology, and antibiotic treatment. Data was structured in an Excel spreadsheet. Antibiotic treatment analysis captured medication details and their relevance to presented pathologies.

Results: Between November 2022 and July 2023, 69 rabbit samples underwent microbiological examination, revealing male-female distribution (58% and 42% respectively) and an age breakdown. The pathologies varied, including dental (34.8%), respiratory (24.6%), ocular (17.4%), auricular (16%), and other issues (7.2%). Of all cases, 40.6% received antibiotics pre-microbiological examination. Antibiotics included trimethoprim-sulfamethoxazole, doxycycline, and fluoroquinolones in varied combinations.

Conclusions: The study highlights worries over widespread antibiotic use in rabbit healthcare, neglecting microbial diversity and increasing resistance risks.

Keywords: antibiotics, awareness, epidemiology, rabbits, samples

References:

1. Chomel BB. (2015). Diseases transmitted by less common house pets. *Microbiol Spectrum* 3(6):IOL5-0012-2015
2. Hedley J. (2018). Antibiotic usage in rabbits and rodents. *In Practice*, 40: 230-237.
3. Lennox AM, Kelleher S. (2009). Bacterial and parasitic diseases of rabbits. *Vet Clin North Am Exot Anim Pract.* 12(3):519-30.

MORPHOLOGICAL ASSESSMENT OF THE COMMON CAROTID ARTERIES IN GOAT (*CAPRA HIRCUS*)

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Introduction: In ruminants, the bicarotid trunk passes in a cranial direction between the two subclavian arteries and continues with the common carotid arteries. These follow an upward path on the edges of the trachea to the cranial part of the cervical region, where they continue with two branches, the external carotid and internal carotid (Damian, 2001).

Aim: The aim of this study was to evaluate the common carotid arteries in goat through anatomical and histological investigations.

Materials and Methods: The biological material used was 5 common breed goats, dead for various causes. Anatomical dissection was realised, then arterial fragments were collected and processed for histological examination.

Results: Anatomically, the common carotid arteries are disposed laterally by the trachea, from the bicarotid trunk to the extremity of the cervical region. Structurally, these are arteries with a general appearance of muscular arteries in which the most developed tunica is the tunica media. It developed an internal elastic limiter that causes the internal portion to be undulated, including endothelium and subendothelial layer. Particular for the tunica media of common carotid arteries in goat is that although circular smooth muscular cells predominate in their structure, they also contain a relatively well-represented elastic component. The elastic component is made of concentric elastic lamellae arranged relatively rigorously at some distance from each other, which gives the tunica media a very particular appearance.

Conclusion: The common carotid arteries in goat have a muscular arteries type structure and also a well-represented elastic component with a particular disposition. It seems to me that this particular structure is the result of adaptation to the haemodynamic demand specific to this species, in relation to the anatomical provision and the structures it serves.

Keywords: anatomical, carotid, histological

SUCCESSFUL TREATMENT WITH ORAL AFOXOLANER OF *TRIXACARUS CAVIAE* INFESTATION IN A PET GUINEA PIG

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Introduction: Guinea pigs kept as pets are more and more common in recent decades, and as a result, more and more veterinarians will be taking these animals on as patients. *Trixacarus caviae* is one of the most important and common ectoparasites responsible for mange in guinea pigs. There are several molecules that proved efficient against this burrowing mite, like injectable ivermectin or spot-on selamectin, but repeated administrations are needed and reports of resistance are more and more frequent and the spot-on formulations are unsuitable in severe crusty dermatitis. Isoxazolines are good alternatives for the treatment of mange in other animal species and there are no reports of resistance yet.

Aim: Considering the limited efficacy of avermectins, the severity of the infestation by *T. caviae*, and the safety and efficacy of isoxazolines in other animal species, the aim of this study was to evaluate the effectiveness of oral afoxolaner (NexGard) in a severe case of mange infestation in a pet Guinea pig.

Materials and Methods: One female Guinea Pig was referred to the New Companion Animal Clinic due to severe dermatological problems. The animal was previously treated for dermatophytosis elsewhere without improvement of the clinical signs. At the first visit to the clinic, a clinical evaluation and skin scrapings were done, and detected ectoparasites were morphologically identified. The animal was treated with a single oral dose of 2.50 mg/kg afoxolaner, and the lesions and presence/absence of mites were evaluated weekly for 4 weeks.

Results: At the time of the examination, the animal was in severe pain with crusty generalized lesions. The detected mites were morphologically identified as *T. caviae* mites. A week after the medication, the lesions were milder, but pruritus was still present and was attributed to the healing process. Only 2 dead mites/4 examined slides were detected. Further examinations showed significant improvement with the complete remission of clinical signs and no mites at the microscopic examination after 4 weeks.

Conclusion: Afoxolaner is a safe and easy molecule to be administered in Guinea Pigs for the treatment of *T. caviae* mange, with no repetition needed.

Keywords: afoxolaner, guinea pig, *Trixacarus caviae*

IMMUNE-MEDIATED HEMOLYTIC ANEMIA: EPIDEMIOLOGY STUDY IN CANINE AND FELINE SPECIES WITHIN FMV CLUJ-NAPOCA

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Introduction: Immune-mediated hemolytic anemia (IMHA) is the most commonly diagnosed autoimmune pathology in Europe and North America. The clinical features of the disease are anemia, hemolysis, jaundice and weakness (Swann JW, 2016).

Aims: The purpose of this work is to determine the occurrence rate of immune-mediated anemia in canine and feline species from 01.01.2020 to 01.06.2023, in FMV Cluj-Napoca. In addition, the interest is to observe the diagnostic methods applied and the therapeutic protocol instituted, in order to be able to determine possible improvements.

Materials and Methods: An epidemiological study by analysing all the files in the faculty's Atlas Vet and hematology laboratory database was thoroughly made.

Results: 16 cats and 5 dogs were presented to the I.R. in Cluj-Napoca, in the period 2020-2023. The Abacus counter together with the saline agglutination test and Coombs test (in dogs) represented the materials used to carry out the diagnosis. The major etiological cause, in the feline species was *Mycoplasma haemofelis*, causing a secondary form of IMHA. In the canine species, it appears that the predominant incidence rate was given by infectious or post-transfusional etiology. The treatment of choice remains immunosuppressive therapy using glucocorticoids, especially dexamethasone, prednisone and methyl prednisolone, but association with other molecules was reported.

Conclusion: Establishment of a standard diagnostic protocol, following the algorithm found in the consensus on the diagnosis of IMHA in dogs and cats, prepared by Garden O.A. et al., in 2019 is necessary to improve patient prognosis.

Keywords: IMHA, Agglutination test, *Mycoplasma haemofelis*

References

1. Garden O.A., Kidd, L, Mexas, AM, și colab., 2019, ACVIM consensus statement on the diagnosis of immune-mediated hemolytic anemia in dogs and cats, Journal of Veterinary Internal Medicine, Journal 33, Pages: 313–334
2. Swann J.W., Skelly B.J., 2016, Canine autoimmune hemolytic anemia: management challenges, Veterinary medicine (Auckland, N.Z.) Journal, Journal 7, Pages: 101 – 112

NOVELTY ASPECTS REGARDING THE ADMINISTRATION OF ZEOLITES WITH BIOMEDICAL POTENTIAL IN SMALL ANIMALS AND MURINE MODELS (REVIEW)

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Introduction: Natural zeolites are minerals categorized as aluminosilicate compounds with a tridimensional structure in which the atoms take a tetrahedral shape. The biomedical applications of zeolites are due to their high adsorptive capacity and their ability to enclose atoms, properties which facilitate ionic exchanges and help retain toxic molecules within the porous structure, thus acting as "molecular sieves" contributing to the detoxification of the animal and human body alike. There are circa 50 types of natural zeolites and over 150 synthetic zeolites currently known, clinoptilolite being the most used and researched natural zeolite in the medical field.

Aims: The aim of this review is to analyze and compare the results of relevant research that used zeolites in prophylactic and therapeutic protocols for small animals and murine models.

Materials and Methods: The articles cited in the current paper were obtained using databases such as Web of Science, Google Scholar, and PubMed.

Results: Zeolites are used to help maintain and improve the general health status of small animals and laboratory animals through the adsorption, removal of residues and harmful compounds such as heavy metals, radioisotopes, aflatoxins, and pathogens (Kraljević Pavelić et al., 2018). All this argues the increased prophylactic-therapeutic potential of natural zeolites and supports their use in veterinary medicine, based on their antioxidant, immunomodulatory, antidiarrheal, and radioprotective effects. Despite the great abundance of observations regarding the biomedical applications of zeolites, there are currently few clinical studies regarding their therapeutical use in small animals.

Conclusion: The data contained within the current review arouses a real interest in supporting and advancing clinical investigations regarding the biomedical applications of natural zeolites in veterinary medicine.

Keywords: biomedical use, murine models, small animals, zeolites

References

1. Kraljević Pavelić S., Simović Medica J., Gumbarević D., Filošević A., Pržulj N., and Pavelić K. (2018). Critical review on zeolite clinoptilolite safety and medical applications in vivo. *Frontiers in pharmacology*, 9, 1350.

USE OF ANTIOXIDANTS IN MEAT AND MEAT PRODUCTS FROM KNOWLEDGE TO CONSUMERS' PERCEPTION

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Introduction: The role of safe food in human nutrition and food preservation concerns was and still is the subject of many research papers. Previous studies have evaluated responses in different countries concerning food ingredients or additives (Aoki et al., 2010), chemicals in foods (Dickson-Spillmann et al., 2011) and food safety topics (Ruby et al., 2019).

Aims: The present study aimed to assess consumers' knowledge of the use of antioxidants and potential health benefits, taste perception and quality of meat products containing antioxidants.

Materials and Methods: A survey using a Google form questionnaire was conducted among the general population of Romania from September to November 2022, with a total of 605 participants. The questionnaire had 27 questions regarding demographic elements, evaluation of general knowledge related to antioxidants and consumers' perception towards the consumption of meat products. Also, associations of respondents' personal data with the natural antioxidants or consumption of meat products-related traits were evaluated via logistic regression at a significance level threshold of $p < 0.05$.

Results: The survey showed that most consumers are aware of the potential harmful effect of long-time consumption of synthetic antioxidants. Most of the interviewees responded that they consume meat and meat products almost on a daily basis; however most of the respondents stated that they would not buy a meat product if the used natural antioxidant would cause changes in the product's color and taste.

Conclusion: As shown in the study, research methods such as surveys can provide valuable insights into consumers' attitudes and purchasing habits.

Keywords: survey, antioxidants, meat products

References

1. Aoki, K., Shen, J., & Saijo, T. (2010). Consumer reaction to information on food additives: evidence from an eating experiment and a field survey. *Journal of Economic Behaviour & Organization*, 73(3), 433-438
2. Dickson-Spillmann, M., Siegrist, M., & Keller, C. (2011). Attitudes toward chemicals are associated with preference for natural food. *Food Quality and Preference*, 22(1), 149-156.
3. Ruby, G. E., Ungku Zainal Abidin, U. F., Lihan, S., Jambari, N. N., & Radu, S. (2019). A cross sectional study on food safety knowledge among adult consumers. *Food Control*, 99, 98-105

DIAGNOSTIC METHODS IN FELINE LOWER URINARY TRACT DISEASE : A RETROSPECTIVE STUDY

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Introduction: Feline lower urinary tract disease (FLUTD) is one of the most common diseases occurring in cat populations.

Aims: The aim of our retrospective study was to collect and analyze epidemiological and laboratory data to identify the most important and relevant diagnostic methods.

Materials and Method: The data was collected from the FMV Cluj-Napoca Veterinary Hospital's database, using both the AtlasVet software and physical registers and patient files. The statistical analysis was conducted using Microsoft Excel.

Results: Urolithiasis and Feline Idiopathic Cystitis were common diagnoses. Short-haired European breed, neutered males with robust constitution were frequently affected. Clinical symptoms included bladder distention, abdominal tenderness, and varying body temperatures. Hyperglycemia was present in 41% likely due to stress. Urine analysis indicated proteinuria and leukocytes in some cases. Blood biochemistry changes were minimal, with only a small percentage showing altered urea and creatinine levels. Hematological analyses showed that inflammatory response was present in only 6% of cats and anemia was absent in all patients.

Conclusion: Most patients presented with lower urinary tract issues were diagnosed with Feline Idiopathic Cystitis (FIC) followed by urolithiasis. Common trends include higher incidence in neutered males with a robust constitution. Echography and urine analysis revealed distinctive characteristics, such as bladder distension and presence of particles in urine. While some plasma biochemistry changes were expected due to lower urinary tract issues, they were not prevalent, and anemia and inflammation were minimal.

Keywords: diagnostic methods, feline urology, idiopathic cystitis, urolithiasis

TOPOGRAPHIC DISTRIBUTION OF MAMMARY GLAND TUMORS IN DOGS DEPENDING ON THEIR HISTOLOGICAL TYPE

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Introduction: Mammary gland neoplastic pathology is often found in current veterinary medical practice, so there are numerous protocols to address it. Most involve surgical removal of the mammary tumor and histopathological diagnosis of the neoplasm, the prognosis being established according to the type of tumor and its degree of invasion.

Aims: This study was motivated by the lack of data regarding the association of the tumor type with the topography of its origin in the literature, this study being the first to correlate the two aspects of mammary gland tumors in dogs.

Materials and Methods: During the study, 70 females with mammary gland tumors aged between 5 – 16 years, were evaluated. Clinical staging and surgical treatment by unilateral or bilateral mastectomy were performed within the framework of The Reproduction Obstetrics and Reproductive Pathology Department, and sample processing and histopathological diagnosis were performed under the guidance of The Pathology Department.

Results Within our database, there were 17 tumor types diagnosed, most of them being 23,6% complex carcinoma, followed by 19,1% intraductal papillary carcinoma and 15,7% simple tubular carcinoma. An increased incidence of mammary gland tumors has been observed in the left chain, both in number of tumor types and in number of cases.

Conclusion: The most obvious pattern was observed in cases diagnosed with complex carcinoma, predominantly present on the right A2 segment and with intraductal papillary carcinoma, which was mainly found on the left A2 breast.

Keywords: histopathological diagnosis, mammary tumor, tumor type, tumor topography

References:

1. Moulton, J. (1999). *Tumours in Domestic Animals*, 3rd Edition. Berkley: University of California Press.
2. Zappulli, V., Peña, L., Rasotto, R., Goldschmidt, M. H., Gama, A., Scruggs, J. L., et al. (2019). *International Histological Classification of Tumors of Domestic Animals*. Surgical Pathology of Tumors of Domestic Animals, 2.

A SCREENING OF MUCIN-PRODUCING CELLS AND STRUCTURES, FROM DIGESTIVE SYSTEM IN RATS

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Introduction: Mucins are glycoproteins produced by multiple secretory cell types, depending on the digestive tract's segment (Kim and Ho, 2010). These mucins, through their characteristics, confer most of the physical properties of the mucus layer, thus the protective barrier attributes (Dharmani et al., 2008).

Aims: Performing a screening and a morphological analysis of mucin-producing cells and structures, from the digestive tract, in rats, will further allow to quantify their local and systemic response.

Materials and Methods: A total number of n=10 Wistar rats were selected for this study. In order to perform the screening of mucin-producing cells and their morphological analysis, sections of the sublingual gland, Weber's gland, stomach, jejunum and colon were taken. The obtained samples were stained by the Trichrome Goldner technique. Based on the histological examination, both morphometric and statistical analysis were performed using specific softwares (ToupView and GraphPad Prism Software).

Results: The histological examination showed normal characteristics for the analysed cells and structures. The test for the normal distribution of the data revealed that they are normally distributed and statistical comparison between cell surfaces suggested a significant difference between means with $p < 0,0001$. Moreover statistically significant differences were observed between the areas of Weber gland acini and those of sublingual gland acini ($p < 0,05$).

Conclusion: Based on our results we can conclude that the observed differences, regarding the cellular surfaces, are in accordance with the physiological characteristics of each analysed structure.

Keywords: digestive tract, histological examination, mucin-producing cells

References

1. Dharmani P., Srivastava V., Kissoon-Singh V., Chadee K. (2008). Role of Intestinal Mucins in Innate Host Defense Mechanisms against Pathogens. *Journal of Innate Immunity*. 1(2):123–135.
2. Kim Y.S. and Ho S.B. (2010). Intestinal Goblet Cells and Mucins in Health and Disease: Recent Insights and Progress. *Current Gastroenterology Reports*. 12(5):319–330.

THE ANTIBACTERIAL EFFECT OF TULATHROMYCIN IN BACTERIAL PATHOGENS AFFECTING SHEEP

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Introduction: Tulathromycin is an antibiotic, from the macrolide class, used in the treatment of respiratory infections in cattle and swine and infectious pododermatitis in sheep. Tulathromycin has been studied many times *in vitro* against pathogens such as: *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Haemophilus influenzae*, *Pasteurella multocida* and *Mycoplasma bovis*, having initially relevant results but in time developing antibacterial resistance.

Aims: This article aims to investigate the impact of tulathromycin *in vitro*, on other standardize bacterial cultures which are considered etiological agents specific for clinical sheep infections such as mastitis, dermatitis or ruminitis. Noteworthy is that our interest is in the possibility of developing treatments based on Draxxin in sheep pathology.

Methods: Draxxin antimicrobial potential was performed by microbiological examination, for the reference bacterial strains *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus cereus* and *Enterococcus faecalis*, prepared in suspension in nutrient broth at 0.5-degree McFarland. 7 successive dilutions of tulathromycin corresponding to the following concentrations: 100, 50, 25, 12.5, 6.25, 3.125, 1.562 µg/ml were tested. Minimum bacterial concentration (MIC) was determined by photodensimetry.

Results: The best MIC value was reported at 24h for *P. aeruginosa* at the concentration of 1.562 µg/ml Draxxin, furthermore good results are seen against *B. Cereus*, *E. coli* and then *S. aureus* at 3.125, respectively 12.5 µg/ml.

Discussions: This study provides new perspectives for the use of Draxxin in dermatitis and mastitis in sheep population due to the good sensibility against the bacterial strains described above. Also, the originality of the study is provided by the first testing of Draxxin for such use targeting specific small ruminant pathologies, other than the respiratory ones.

Conclusions: Tulathromycine has great potential for future European Medicines Agency approval for its antimicrobial effect in sheep medicine.

Keywords: Draxxin, MIC, sheep medicine

BRIDGING THE GAP AND FIGHTING INFECTION: A REVIEW OF BIOMATERIALS IN EXPERIMENTAL BONE DEFECT TREATMENT AND OSTEOMYELITIS

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Introduction: Bone defects and osteomyelitis present significant challenges in orthopedics, leading to pain, disability, and a reduced quality of life for many patients. Traditional treatments, such as autografts and allografts, while effective, have some limitations like donor site morbidity and infection risk. Biomaterials, derived from natural substances like collagen or developed as synthetic polymers, have emerged as potential solutions. These materials can mimic natural bone, promoting cell growth and healing. Moreover, adding antimicrobial agents within these biomaterials can aid both in bone regeneration and infection control.

Aims: This bibliographic study aims to provide a comprehensive examination of the potential of biomaterial-based therapies for bone defects and osteomyelitis, including findings from studies using rat models.

Materials and Methods: A systematic literature review was conducted using various databases, focusing on studies that utilized rat models due to their anatomical and physiological similarities to humans. The chosen studies explored the application, effectiveness, safety, and long-term impacts of biomaterials in treating bone defects and managing osteomyelitis.

Results: Biomaterials, especially those infused with antimicrobial agents, showed promising results in rat models. They not only supported bone regeneration but also effectively managed infections. The literature indicated that these materials closely resemble the native bone architecture, promoting cellular adhesion, proliferation, and differentiation.

Conclusion: Based on the bibliographic study, biomaterial-based treatments offer a promising and innovative approach to address the challenges of bone defects and osteomyelitis. Their dual capability of supporting bone regeneration while fighting infections suggests their potential as future mainstays in orthopedic care.

Keywords: bibliographic study, biomaterials, bone defects, osteomyelitis, rat models, bone regeneration

References:

1. Anderson, J. M. (2016). Future challenges in the in vitro and in vivo evaluation of biomaterial biocompatibility. In *Regenerative Biomaterials* (Vol. 3, Issue 2, pp. 73–77). Oxford University Press.
2. Billings, C., & Anderson, D. E. (2022). Role of Animal Models to Advance Research of Bacterial Osteomyelitis. In *Frontiers in Veterinary Science* (Vol. 9). Frontiers Media S.A.
3. Kim, J. H., & Kim, H. W. (2013). Rat defect models for bone grafts and tissue engineered bone constructs. In *Tissue Engineering and Regenerative Medicine* (Vol. 10, Issue 6, pp. 310–316). Kluwer Academic Publishers.

CHARACTERIZATION AND COMPARATIVE ANALYSIS OF THE PROTEIN FRACTION FROM DONKEY MILK

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Introduction: The domestic Balkan donkey (*Equus asinus asinus*) is a native breed of donkey, widely distributed in our country. Donkey milk has a lower protein content than other ruminant milk ranging from 13 to 28 g/L, while proteomic profile is quite similar to human milk. Generally, casein present in different types of milk consists of four genetic fractions: α s1-, α s2-, β - and k-casein. The basic whey proteins in donkey milk are β -lactoglobulin, α -lactalbumin, immunoglobulins, blood serum albumins, lactoferrin and lysozyme.

Aims: The objective of this study was to characterize several of the proteins of Domestic Balkan donkey milk during the lactation period from the 60th to the 240th day.

Materials and Methods: The proteins of donkey milk were separated and quantified using Lab-on-a-Chip electrophoresis technique based on their molecular mass in comparison with the marker protein ladder (4). The chip-based separations were performed using Agilent 2100 bioanalyzer in combination with the Protein 80 Plus Lab Chip kit and the dedicated Protein 80 software assay on 2100 expert software.

Results: Capillary electrophoresis was applied to the relative quantification of several milk proteins. α s1-casein, α s2-casein, β -casein, α -lactalbumin, β -lactoglobulin, lysozyme, lactoferrin and serum albumin were relatively quantified, with the highest relative concentration of lysozyme and α -lactalbumin. The concentration of all determined proteins decreased during the lactation period. The minimum significant changes were observed for α s2-casein, lysozyme and β -lactoglobulin.

Conclusion: The Balkan donkey milk represents a source of antibacterial proteins such as lysozyme and highly digestible proteins such as whey protein, α -lactalbumin and lactoferrin.

Keywords: donkey milk, lactation, protein.

Acknowledgement. This research project was supported by funds from the National Research Development Projects to finance excellence (PFE)-14 (ID 546) and by USAMV-CN project 24905/08.11.2021.

ANALYSIS OF CURRENT HARNESSING AND CONSERVATION OPPORTUNITIES OF THE MAIN INDIGENOUS CATTLE BREEDS IN THE CARPATHIAN MOUNTAIN AREAS (REVIEW)

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Introduction: The Carpathian areas are defined by a specific natural area, outlined by mountain geographical and climatic conditions, which allowed the development of a traditional agriculture, dominated by the growth of native cattle breeds adapted to the restrictive factors of these areas, which limited the expansion of the perfected, highly productive and particularly sensitive breeds.

Aims: The purpose of this review consists in synthesizing and revising a set of data provided by several studies relevant to the analysis of the origin and evolution of the cattle breeding including Transylvanian Pinzgau, Brown Cattle of Maramureș and Romanian Spotted Cattle breeds in various mountain areas of our country, the morpho-productive characteristics and the development of traditional dairy products.

Materials and Methods: The analysed bibliography consisted of numerous scientific articles from different databases, such as Web of Science, PubMed and Google Scholar.

Results: The overall analysis revealed the current level of support and implementation of strategies for the conservation of significant cores of cattle from the main native breeds. Details are also presented regarding the evolution of the morpho-productive indices in correlation with the breeding programs applied over several decades by the research and production stations specialized in the study of cattle from the Transylvanian Pinzgau, Brown Cattle of Maramureș and Romanian Spotted Cattle breeds.

Conclusion: In the current expansion of commercial farms, domestic cattle breeds, mainly the Pinzgau herds, are insufficiently supported, and there is a major risk of a real decline in the upcoming years. In this regard, we believe that efforts to preserve and support local cattle breeds are fully justified.

Keywords: cattle, mountainous areas, native breeds, traditional products

MANAGEMENT OF AN ORO-NASAL FISTULA CONSEQUENT TO LINGUOVERTED MANDIBULAR CANINE IN A THREE-YEAR-OLD BEAGLE MIX DOG

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Introduction: The most frequently encountered malocclusion in dogs is the linguo-version of the mandibular canines. Local complications may vary from mild to severe. So, one may present a minimal impression of the canine tip on the palatal mucosa, ulceration, or, even worse, an oro-nasal fistula.

Aims: This case report aims to present the diagnosis, management and treatment outcome of an oro-nasal fistula due to the linguoversion of the mandibular canine.

Materials and Methods: A three years old beagle mix female, a neutered dog, was presented for severe halitosis. After pre anaesthetic haematological examination, the dog had an oral and dental examination associated with intraoral radiological findings in general anaesthesia. Surgical management of the oro-nasal fistula involved a mucoperiosteal tension-free flap.

Results: Haematological results were unremarkable, so there were no contraindications for general anaesthesia. The intraoral clinical findings revealed a round oro-nasal fistula with a diameter of five millimetres caused by a linguoverted mandibular canine. Nasal turbinates could be easily seen from the oral cavity. There were also mild deposits of calculus and dental plaque. Intraoral radiographic findings revealed a circular bone loss in the cranial part of the hard palate, corresponding to the oro-nasal-fistula. Professional dental cleaning was first performed. A tension-free mucoperiosteal flap was elevated, and the causal mandibular canine was surgically extracted. Two moth follow-ups revealed a complete and stable closure of the oro-nasal fistula.

Conclusion: Severe halitosis may be caused by oro-nasal fistulas. The correct diagnosis will lead to proper treatment. Removing the etiopathogenetic causes will ensure long-term results.

Keywords: oro-nasal fistula, dog, halitosis, veterinary dentistry

EXTENDED MANDIBULECTOMY ASSOCIATED WITH FRONTAL MAXILLECTOMY IN A FIFTEEN YEARS OLD STRAY DOG

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Introduction: Oral squamous cell carcinoma is one of dogs' most common oral malignancies. Long-term results are obtained when free margins may be achieved. Mandibulectomies and maxillectomies are surgical procedures for dealing with this pathology.

Aims: This case presents the outcome of an extended mandibulectomy and the report of a contact-transmitted oral squamous cell carcinoma from the mandibula to the maxilla.

Materials and Methods: A fifteen years old female neutered dog was presented for a sizeable mandibular mass and a frontal, maxillary mid-sized mass. The dog underwent a surgical procedure a year ago. There was no morpho-pathological analysis of the excised tumour. Two months after the surgery, the mass reappeared. Before general anaesthesia, a haematological panel and blood biochemistry was performed, confirming no contraindications for the surgery. A 9 cm per 7.5 cm large cauliflower-like mass, including the fourth premolars, could be seen at the mandibula. The upper maxilla, between 204 and 203, also presented a macroscopically and radiologically identical tumour. After obtaining the radiological images, a large bilateral rostral mandibulectomy was decided from one carnassial to the other. A frontal maxillectomy removed the maxillary mass that did not involve the nasal mucosa.

Results: Six months follow-up revealed an excellent recovery, wound healing and a good life quality.

Conclusion: Even thou an extended mandibulectomy was performed, the tongue was normally positioned, not drolling out of the mouth, and the patient could feed herself without any outside help.

Keywords: squamous cell carcinoma, dog, mandibulectomy, maxillectomy, teeth

A REVIEW OF THE TOXICOKINETICS OF MICRO AND NANOPLASTIC IN MAMMALS FOLLOWING DIGESTIVE EXPOSURE

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Introduction: Large plastic production associated with the biostability of plastics and poorly managed recycling leads to the ubiquity of plastic in the environment (1). Microplastic(MP) and nanoplastic (NP) pollution is a serious environmental problem with an adverse impact on human and animal health, but it is also a source of growing concern (2). Micro and nanoplastic have been found in soil, rivers, lakes, oceans, and the organisms that live in them (3). Here we review the toxicokinetics of MP and NP after digestive exposure for mammals.

Toxicokinetics of micro and nanoplastic: Plastic particles can absorb through the living cell into the lymphatic system and then to the circulatory system and subsequently accumulate in the organs or affect cell function. The probability of assimilation and removal of particles is influenced by the size, shape, solubility, and surface chemistry.

MP and NP that reach the digestive tract will be absorbed by M cells localized in Peyer's patches of the intestine. The mechanism of MP and NP uptake in the mammal intestine is via clathrin-mediated endocytosis in combination with caveolar-mediated endocytosis and phagocytosis. The absorption is achieved only when the particle size is less than 5mm. When the intestinal barrier has pathological changes, there is an increase in the transport of plastic particles in the body.

Another absorption pathway in the gastrointestinal tract is persorption. Persorption refers to the mechanical kneading of solid particles and subsequent paracellular absorption especially in the desquamated intestinal areas and between the villi. From here the particles reach the lumen of the lymphatic vessels or portal vessels. Thus MP and NP after they get in the systemic circulation subsequently be found in the liver, kidneys, spleen, liver, bone marrow heart, and brain.

Conclusion: MP and NP digestive absorption is possible through several mechanisms but is influenced by their size and shape.

Keywords: adsorption, microplastic, nanoplastic, toxicokinetics

References:

1. Mitrano, D. M., Wick, P., & Nowack, B. (2021). Placing nanoplastics in the context of global plastic pollution. *Nature Nanotechnology*, 16(5), 491-500
2. Liang, Boxuan, Yizhou Zhong, Yuji Huang, Xi Lin, Jun Liu, Li Lin, Manjiang Hu, et al. "Underestimated health risks: polystyrene micro-and nanoplastics jointly induce intestinal barrier dysfunction by ROS-mediated epithelial cell apoptosis." *Particle and fibre toxicology* 18, no. 1 (2021): 20.
3. Deng, Y., Zhang, Y., Lemos, B. and Ren, H., 2017. Tissue accumulation of microplastics in mice and biomarker responses suggest widespread health risks of exposure. *Scientific reports*, 7(1), p.46687.

EXTRACELLULAR VESICLES: A NEW THERAPEUTIC APPROACH FOR THE FUTURE

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Introduction: The recent discovery and characterization of extracellular vesicles (EVs) of diverse origins and biogenesis have altered the current paradigm of intercellular communication, opening up new diagnostic and therapeutic perspectives. Research into these EVs released by plant and mammalian cells has revealed their involvement in a number of physiological and pathological mechanisms, such as embryonic development, immune response, tissue regeneration, and cancer. They are also being investigated as potential biomarkers, disease diagnostics, and drug delivery systems.

Aims: to formulate an extracellular vesicle-based structure derived from mammalian cell plants for the treatment of ulcerative colitis.

Materials and Methods: In this study, we carefully reviewed the numerous articles published over the last few decades on the general knowledge of extracellular vesicles, their application in the therapy of various pathologies, and their prospects as an approach for the future.

Results: The recent discovery and characterization of extracellular vesicles (EVs) of diverse origins and biogenesis have altered the current paradigm of intercellular communication, opening up new diagnostic and therapeutic perspectives. Research into these EVs released by plant and mammalian cells has revealed their involvement in a number of physiological and pathological mechanisms, such as embryonic development, immune response, tissue regeneration, and cancer. They are also being studied as potential biomarkers for disease diagnosis and vectors for drug delivery.

Conclusion: Extracellular vesicles represent powerful tools for intercellular communication and the transfer of bioactive molecules. Their molecular composition and functions can vary according to their origin (plant and mammalian), so their formation, composition, and biological roles open the way to therapeutic applications in a variety of pathologies, which is arousing growing interest in the scientific community.

Keywords: extracellular vesicle, therapeutics, microvesicles, nanovesicles, exosomes, apoptotic bodies

References

1. Jensen, William A. (1965). The ultrastructure and histochemistry of the synergids of cotton. *Am. J. Bot.* 52 (3), 238–256. See on: Publisher's website PubMed | Google Scholar. doi:10.1002/j.1537-2197.1965.tb06781.x.
2. Sall IM and Flaviu TA (2023), Plant and mammalian-derived extracellular vesicles: a new therapeutic approach for the future. *Front. Bioeng. Biotechnol.* 11:1215650. doi: 10.3389/fbioe.2023.1215650.
3. Suharta S, Barlian A, Hidajah AC, Notobroto HB, Ana ID, Indarayani S, Wungu TDK, Wijaya CH. Plant-derived exosome-like nanoparticles: A concise review on its extraction methods, content, bioactivities, and potential as a functional food ingredient. *J Food Sci.* 2021 Jul;86(7):2838-2850. doi 10.1111/1750-3841.15787. Epub 2021 Jun 20.

EFFECTS OF LONG-TERM VITAMIN A AND E SUPPLEMENTED DIETS ON SEMEN TRAITS AND REPRODUCTIVE SYSTEM MORPHOLOGY IN OLDER ROOSTERS

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Introduction: The detailed effects of antioxidant vitamin supplements, as well as the length and the level of supplementation in older roosters are insufficiently known.

Aims: The aim of this work was to find out the effect of long-term vitamin A and vitamin E supplements on the older Cornish hybrid rooster reproductive capacity.

Materials and Methods: The diet of three experimental 40-week-old Cornish rooster groups was supplemented with (/kg of diet): 430 mg retinol, 12.6 mg DL- α -tocopherol acetate or both vitamins, respectively. The experimental feeding begun by 40-wk-age of the birds and lasted 17 weeks. Ejaculate volume, motility, viability density and abnormalities of spermatozoa were monitored. Testicular and epididymal tissues were also histological processed and analyzed. Vitamin contents in semen plasma, adipose tissue and liver was also determined at the end of the experimental feeding.

Results: The research revealed that the long-term vitamin A and E diet supplementation maintained the traits of the semen at the levels significantly higher than those of no supplemented roosters. Vitamin A especially maintained ejaculate volume and sperm density. Vitamin E especially protected sperm motility and viability and decreased the percentage of spermatozoa with morphological abnormalities. Vitamin A and E both protect the seminiferous and epididymal epithelia. Both vitamin A and E accumulate in liver and adipose tissues and eliminate in increased quantities through the seminal plasma. No mutual inhibition or potentiating effects were found between the two vitamins, suggesting that their combined administration should be further analysed.

Conclusion: Vitamin A and E diet supplements improve the sperm traits in older roosters and could prolong their maintenance in the flock. Vitamin A especially protects spermatogenesis while vitamin E, sperm motility and viability.

Keywords: antioxidant vitamins, epididymis, semen traits, spermatogenesis

ANALYSIS OF AN ELIGIBLE PROTOCOL FOR BIOEQUIVALENCE TESTING OF TWO CANINE ANTHELMINTICS PRODUCTS WITH TWO ACTIVE MOLECULES

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Introduction: Bioequivalence of a medical product assumes that the active molecules that make up the evaluated products achieve similar values. This study was designed to evaluate and implement an appropriate working protocol for testing the bioequivalence of a new generic product based on praziquantel and milbemycin oxime.

Aims: Development and implementation of the protocol for bioequivalence and bioavailability testing of this medical product supports the need to supplement the canine anthelmintic therapy with a new interchangeable formula of the innovative product Milbemax, whose patent has expired.

Materials and Methods: The achievement of the proposed objective was ensured by the implementation of a single-center, cross-over, randomized, two-phase design separated by a break of 30 days between them. The current study was conducted on 22 clinically healthy Siberian Husky dogs.

Results: Subjects eligibility was assessed based on their inclusion-exclusion criteria within physiological ranges for clinical, hemato-biochemical blood and urinary parameters respectively. The evolution of plasma concentrations of the active substances during testing required a serial collection of 72 blood samples subject. The relevance of the obtained values was ensured by following the methodology according to the legislation and good practice norms in the field.

Conclusion: The current research assessed the performance of hemato-biochemical tests with high-performance automatic analysers by determination of plasma concentrations with UV HPLC detection and the use of appropriate statistical analysis tests.

Keywords: bioequivalence, Siberian Husky, study design

SESSION 9: VETERINARY MEDICINE - CLINICAL SCIENCES

SEROLOGICAL PREVALENCE OF CANINE AND FELINE CORONAVIRUSES IN THE NORTH-EAST OF ROMANIA

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Introduction: Coronaviruses, which are enveloped and have single-stranded RNA, cause diseases of varying degrees in both animals and humans. They are presently categorized into three antigenic clusters. Research has identified three distinct coronaviruses in dogs. Both canine coronaviruses (CCoVs) type I and II belong to group I coronaviruses, and their evolutionary path is closely intertwined with feline coronaviruses (3).

Aims: The present study follows the serological prevalence of three major coronaviruses that affect household pets: canine respiratory coronavirus (CRCoV), canine enteric coronavirus (CECoV) and feline coronavirus (FCoV/FIP). Taking into consideration the current epidemiological climate, we wanted to identify the presence of antibodies for each of the beforementioned coronaviruses.

Materials and Methods: The study includes serum samples from 208 dogs and 92 cats, that we divided as follows: USV's Surgical and Medical Clinics (128 dogs and 76 cats), two private practices in Iași (31 dogs and 16 cats) and the Tomești rehoming dog kennel (49 dogs). The serum samples were collected from March 2021 to December 2022. The Enzyme-Linked Immunosorbent Assay (ELISA) methods used were two in-house protocols, one for CECoV (3) and one for CRCoV (2), developed by the infectious diseases team at UNIBA, Italy (where the dog sera were tested) and a standard issued protocol by Demeditec Diagnostics GmbH (for the cat sera).

Results: The serological investigation on 208 dog sera and 92 cat sera revealed the presence of anti-CECoV antibodies in 175 samples, of anti-CRCoV antibodies in 199 samples and of anti-FCoV antibodies in 77 samples, respectively. The results of seropositivity from the groups that we created are as follows: 114 (89%) of 128 dog sera tested positive for the presence of anti-CECoV antibodies, 120 (94%) of 128 dog sera tested positive for the presence of anti-CRCoV antibodies, 62 (82%) of 76 cat sera were found positive for the presence of anti-FCoV antibodies (USV's Surgical and Medical Clinics), 25 (81%) of 31 dog sera tested positive for the presence of anti-CECoV antibodies, 30 (97%) of 31 dog sera tested positive for the presence of anti-CRCoV antibodies, 15 (94%) of 16 cat sera were found positive for the presence of anti-FCoV antibodies (the two private practices in Iași), and 36 (73%) of 49 dog sera tested positive for the presence of anti-CECoV antibodies, 49 (100%) of 49 tested positive for the presence of anti-CRCoV antibodies (Tomești rehoming dog kennel).

Conclusion: In the present research work, we discovered that the seropositivity does not match the results of other studies in Europe (1), as they are exceeding them by quite a large margin. Further research will be undertaken to elucidate these differences.

Keywords: Canine enteric coronavirus, canine respiratory coronavirus, feline coronavirus, seroprevalence

References:

1. Decaro N et al., *Emerging Infectious Diseases*. 2010;16(1):41-47. doi:10.3201/eid1601.090726;
2. Decaro N et al., *Vet Microbiol*. 2007;121(3-4):225-230. doi:10.1016/j.vetmic.2006.12.001 ;
3. Pratelli A et al., *J Virol Methods*. 2002;102(1-2):67-71. doi:10.1016/s0166-0934(01)00450-5.

EVALUATION OF THE NEOFORMATION BONE USING MICRO CT ANALYSIS IN OSTEOPOROTIC RATS FOLLOWING THE APPLICATION OF BIOACTIVE GLASS AND GOLD NANOPARTICLES DOPED COMPOSITES

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Introduction: Applications of micro-CT produce functional information by translating in vivo experimental protocols to model tissue engineering systems. The images provided by micro-CT analysis can be used to quantitatively represent bone geometry through a series of calculated parameters based on attenuation.(Wu et al., 2015).

Aims: The aim of this study was qualitative and quantitative evaluation of the neoformation bone at the level of a bone defect (3 mm) created in the femoral distal diaphyses, in 30 osteoporotic Sprague Dawley rats.

Materials and Methods: The biological effects of biomaterials based on biopolymer-bioactive glass composites containing gold nanoparticles (Alg-Pll-BGAuSP) and biopolymers with hydroxyapatite (Alg-Pll-βTCP/HA)(control group) were evaluated by histomorphometric methods on a two-dimensional section model (2-D), at different time intervals. The study was conducted in the authorized Laboratory Animal Facility (University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca). 30 samples representing the entire femur bone were collected from osteoporotic Sprague Dawley rats. The collected samples were preserved in 10% formaldehyde for 7 days, and then scanned and analyzed by micro-CT.

Results: The specific parameters: total bone volume, surface bone, bone volume and density showed higher values for the group treated with Alg-Pll-BGAuSP in comparison to the controls, osteoporotic and Alg-Pll-βTCP/HA treated. More interesting, the 3D reconstruction of the defect site showed 90% surface gap filling in the same Alg-Pll-BGAuSP treated group at 30 days and 60 days post implantation.

Conclusion: All tested biomaterials had osteopromoting activities, more evidenced in the gold nanoparticles group, thus being considered a good candidate in pathological bone tissue engineering.

Key words: biomaterials, bioactive glass, gold nanoparticles, micro CT scan, defect 3D reconstruction

Reference

1. Wu Y., Adeeb S., Doschak M.R. (2015). Using micro-CT derived bone microarchitecture to analyze bone stiffness - a case study on osteoporosis rat bone. Front Endocrinol (Lausanne) 6. <https://doi.org/10.3389/fendo.2015.00080>

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***IN VIVO* ASSESSMENT OF THE ANTIPARASITIC EFFECTS OF *ALLIUM SATIVUM* L. AND *ARTEMISIA ABSINTHIUM* L. AGAINST DIGESTIVE PARASITES IN SWINE**

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Introduction: Parasitic diseases have a considerable effect on pig production, causing economic losses due to high morbidity and mortality. Phytotherapeutics are available and used worldwide, however evidence of their antiparasitic efficacy is currently very limited

Aims: The present study was designed to assess the antiparasitic effects of *Allium sativum* and *Artemisia absinthium* on naturally occurring gastrointestinal parasites of pigs in two low-input (free-range) farms from Northwestern Romania.

Materials and Methods: A total of 720 faecal samples were collected in two farms from three age categories, i.e. weaners, fatteners, and sows. Flotation (Willis and McMaster method), modified Ziehl-Neelsen stained faecal smear, centrifugal sedimentation, modified Blagg technique, and faecal cultures were used to identify parasites and quantify the parasitic load.

Results: The examination confirmed the presence of infections with *Eimeria* spp., *Cryptosporidium* spp., *Balantioides coli*, *Ascaris suum*, *Oesophagostomum* spp., *Strongyloides ransomi* and *Trichuris suis*, distributed based on age category. A dose of 180 mg/kg bw/day of *Allium sativum* L. and 90 mg/kg bw/day of *Artemisia absinthium* L. powders administered for 10 consecutive days revealed a strong, taxonomy-based antiprotozoal and anthelmintic activity.

Conclusion: The results highlighted the therapeutic potential of both *A. sativum* and *A. absinthium* against gastrointestinal parasites in pigs. Its therapeutic effectiveness can be attributed to the presence of polyphenols, tocopherols, flavonoids, sterols, sesquiterpene lactones and sulfoxide.

Keywords: *Allium sativum* L., *Artemisia absinthium* L., digestive parasites, low-input farms

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EVOLUTION OF IONISED CALCIUM AND MAGNESIUM IN CHRONIC ENTEROPATHIES IN DOGS (REVIEW)

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Introduction: Canine enteropathies are a group of gastrointestinal diseases that often affect this species. These diseases cause inflammation, dysfunction or damage to the intestines, resulting in a variety of clinical signs and symptoms. The mineral calcium is the most widespread in the body of animals and plays an important physiological role as a mediator in a number of metabolic and regulatory processes. In patients with known or suspected problems in calcium metabolism, the concentration of free cations in the extracellular fluid, or 'ionised calcium', is usually measured. An important mineral that is necessary for health and well-being of dogs is magnesium. It participates in a number of physiological processes such as growth, energy metabolism, neuromuscular transmission and enzyme activation.

Aims: The aim of this review is to analyze and compare the results of relevant research that evaluated iMg and iCa values in chronic enteropathies in dogs for the purpose of diagnosis and treatment.

Materials and Methods: The articles cited in the current paper were obtained using databases such as Web of Science, Google Scholar, and PubMed.

Results: Enteropathies can disrupt the normal absorption of calcium in the intestines, leading to low blood calcium levels. Hypocalcaemia (low calcium levels) can occur, which can have several consequences, such as muscle tremors, weakness and even seizures. In severe cases, enteropathies can affect the function of the parathyroid hormone (PTH), further contributing to calcium imbalances. Chronic enteropathies, dietary imbalances or medications can disrupt the metabolism and regulation of magnesium in dogs. Regular monitoring of magnesium levels and proper diet management are essential to prevent deficiencies or imbalances and to maintain optimal magnesium status in dogs.

Conclusion: The data contained within the current review arouses a real interest in supporting and advancing clinical investigations regarding the evaluation of ionised magnesium and ionised calcium in veterinary medicine.

Keywords: magnesium, calcium, chronic enteropathies, dog

References

1. Cerquetella, M., Spaterna, A., Laus, F., Tesei, B., Rossi, G., Antonelli, E., ... & Bassotti, G. (2010). Inflammatory bowel disease in the dog: differences and similarities with humans. *World journal of gastroenterology: WJG*, 16(9), 1050.
2. Dandrieux, J. R. S. (2016). Inflammatory bowel disease versus chronic enteropathy in dogs: are they one and the same?. *Journal of Small Animal Practice*, 57(11), 589-599.

ASSESSMENT OF BIOSECURITY ON THE DAIRY FARM

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Introduction: Intensive production in cattle breeding implies a large concentration of animals in a relatively small area, which is why it is necessary to apply certain measures in order to preserve the health of the cattle herd, prevent the introduction and spread of infectious diseases in the herd, and preserve production.

Aims: the aim of this lecture is to give an overview of the assessment of biosecurity measures on farms of high milk cows .

Materials and Methods: The biosecurity assessment was carried out on cow farms where omissions in the application of certain biosecurity measures were observed.

Results: Overlooks, omissions and mistakes in maintaining the required level of biosecurity usually lead to the appearance of diseases, reduction in production volume, death and loss of income, thereby endangering the survival of entire herds of cattle. The presence of bacterial and viral infections led to calf diseases (gastrointestinal and respiratory diseases). In cows, infectious hoof disease (phlegmona interdigitalis).

Conclusion: It is recommended that employees' awareness of the real need to protect production as a whole be constantly raised, that there is an active attitude towards existing threats and that the measures taken represent the key to success in designing and preparing biosecurity plans for each specific situation, i.e. a farm of high milk cows

Keywords: assessment, biosecurity, cow, farm

References

1. Bojkovski J., Prodanović R., Vujanac I., Nedić S., Relić R., Bojkovski D., Bugarski D., Ostojić-Andrić D., Pavlović I., Milanov D. (2017) Breeding disease and welfare calves on dairy farms tied breeding system, 11th International symposium modern trends in livestock production, Belgrade,, Proceedings, 365-377
2. Bojkovski J., Stanković B., Ostojić-Andrić, D., Bojkovski, D., Zdravković, N., Vasić, A., Milanov D. (2015) Health disorders of calves and cows in the stalls housing system, 4th International, Congress New Perspectives and challenges of sustainable livestock production, Proceedings book, 440-456.
3. Stanković B., Hristov S., Bojkovski J. Zlatanović Z., Maksimović N., Todorović-Joksmović M., Davidović V. (2011) The possibility of dairy farms isolation assessment – biosecurity aspect, Biotechnology in Animal Husbandry, 1425-1431

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THE EFFECT OF PECTORAL MYOPATHIES ON POULTRY MEAT QUALITY

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Introduction: Intensive selection and a focus on economic indices in poultry production, without considering the natural anatomical, physiological, and behavioral predispositions of birds, have resulted in the development of pectoral muscle abnormalities (Kijowski și colab., 2014). These abnormalities include white striping (WS), wooden breast (WB), spaghetti meat (SM), and deep pectoral myopathy (DPM). These pectoral myopathies have become significant concerns in the poultry industry.

Aims: This review article aims to investigate the impact of these myopathies on poultry meat quality and provide insights into industry demands.

Methods: A comprehensive analysis was performed on PubMed and Web of Science databases, encompassing studies that examined the occurrence, characteristics, and consequences of pectoral myopathies on poultry meat quality. Relevant research articles were extensively reviewed to gather and synthesize the available information.

Results: Pectoral myopathies, particularly WS, WB, SM, and DPM, were found to significantly alter the sensory attributes, nutritional composition, and technological properties of poultry meat. WS was associated with white striations, increased fat deposition and reduced tenderness. WB resulted in hardened and pale muscle, leading to a tougher texture. SM presented as loose and stringy meat, negatively impacting overall meat quality. DPM, affecting the pectoralis minor muscle, resulted in muscle necrosis and fibrosis, leading to changes in meat texture and quality.

Discussions: The presence of pectoral myopathies poses challenges for the poultry industry, including economic losses and consumer dissatisfaction. The compromised meat quality can lead to reduced market demand and consumer preferences.

Conclusions: Addressing the occurrence and impact of pectoral myopathies is crucial for the poultry industry to maintain its economic sustainability and meet consumer expectations. Understanding the underlying causes and risk factors associated with these myopathies is imperative for developing effective prevention and mitigation strategies.

Keywords: Meat quality, Pectoral myopathies, Poultry industry

CONDITIONS THAT INFLUENCE ANESTHETIC SAFETY IN BRACHYCEPHALIC DOGS

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Introduction: This paper presents a bibliographical research on the most common pathologies associated with brachycephalic dogs, and how they may affect anesthesia management. Brachycephalic breeds are characterized by short, rounded heads with stenosed nostrils, elongated palatine veil, enlarged tongue volume, and hypoplastic trachea. There has been an increase in the popularity of brachycephalic dogs over the past decade, leading to an increase in anesthesia procedures for these dogs.

Aims: In this study, we aim to identify morbidities associated with brachycephaly, predict their effects on anesthetic management, and to determine methods to minimize them.

Discussions: French bulldog and Pug are the most common brachycephalic breeds. Depending on the severity of the pathology, they are more prone to anesthesia risks compared to non-brachycephalic breeds. Among the most common and important pathologies are respiratory and digestive disorders, such as brachycephalic obstructive airways syndrome (BOAS), gastro-esophageal reflux and hiatal hernia. Additionally, brachycephalic breeds have a high prevalence of ocular disorders such as corneal ulcers, cardiac disease such as hypotension and hypoventilation, hematological, and metabolic disorders. The most common respiratory disorder in brachycephalic breeds is represented by BOAS which has the following clinical signs: stenosed nostrils, long and thick palatine wave and hypoplastic trachea and the most common complications that can occur under anesthesia are obstruction of the trachea, hypoxia and apnea.

Conclusion: This research highlights the most common complications that can occur under anesthesia in diseases that affects brachycephalic dogs and how to minimize them.

Keywords: Anesthesia, brachycephalic, dogs

References

1. Fawcett, A., Barrs, V., Awad, M. et al. (2019). Consequences and management of canine brachycephaly in veterinary practice: perspectives from Australian veterinarians and veterinary specialists. *Animals* 9 (1). 2.
2. Packer Rowena, *Health and Welfare of Brachycephalic (Flat-Faced) Companion Animals: A Complete Guide for Veterinary and Animal Professionals*, ED Crc Pr Inc, 2021
3. Schmidt, M.J., Amort, K.H., Failing, K. et al. (2014). Comparison of the endocranial- and brain volumes in brachycephalic dogs, mesaticephalic dogs and cavalier king Charles spaniels in relation to their body weight. *Acta Vet. Scand.* 56 (1): 30.

MYELOYDYSPLASTIC SYNDROME/ MYELOID LEUKEMIA - CASE REPORT

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Introduction: British Shorthair cats are opportunistic in developing myeloproliferative disorders, represented by myelodysplastic syndromes, which often transition to acute myeloid leukemia.

Aims: The purpose of this study was to enhance our clinical pathology knowledge by performing a medulogram in order to better characterize the hematological abnormalities and be able to offer a generalized treatment and prognosis for future similar cases.

Methods: A 6-year-old BSH feline was diagnosed at the Faculty of Veterinary Medicine in Cluj Napoca with non-regenerative anemia, thrombocytopenia, and severe leukocytosis based on different abnormalities in the leukocytic lines. The morphological diagnosis of the peripheral blood smear consisted of numerous blasts derived both from the erythroid and leucoid lineages. Also, a bone marrow sample biopsy was performed under general anesthesia and multiple hemotransfusions.

Results: The smear presented hypercellularity with increased erythroid series cell numbers (more than 50%) and also myeloid monocytic. A refractory anemia based on a low reticulocyte count and multiple blasts was established. Due to the multitude of erythroblasts present on the smear, an acute myeloid leukemia of the erythroid type was suspected.

Discussions: Even though the initial diagnosis was myelodysplastic syndrome, it often progresses to more aggressive neoplasms, targeting both erythrocytes and leukocytes (acute erythroid, acute myeloid leukemia). However, the term myelodysplastic syndrome includes all of these subtypes of neoplasia mentioned above.

Conclusions: The chemotherapy was implemented after the interpretation of the medulogram and hemoleukogram, both being considered the golden standard in such diagnosis. Although the clinical signs improved, the treatment was not effective and the cat still presented severe anemia. Further studies on erythroleukaemia (AML -M6Er) chemotherapy protocols are required.

Keywords: medulogram, myelodysplastic syndrome, refractory anemia

MANAGING OPEN METACARPOPHALANGEAL JOINT SUBLUXATION IN A ROOK: A CASE REPORT

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Introduction: Metacarpophalangeal (MCP) joint enables fine adjustments during avian flight. Luxation and subluxation of this joint in birds commonly result from traumatic incidents. Diagnosis hinges on anamnesis, clinical findings ("floppy wingtip"), and assessments encompassing orthopaedic, neurological, and radiographic evaluations. Treatment options involve measures like splinting and bandaging or surgical intervention. The preferred surgical technique is the use of external fixators to achieve arthrodesis. The outcomes can be inconsistent, leaving birds incapable of resuming their flight abilities. In wild birds, the inability to fly is recognized as a poor prognostic factor for survival, as it hinders their rehabilitation and release into their natural habitat.

Aims: This report aims to document the successful management of an open metacarpophalangeal subluxation in an adult rook (*Corvus frugilegus*).

Materials and Methods: The bird was presented to our facility with a clinical diagnosis indicating an older open subluxation of MCP. Radiographic examination revealed an additional fracture of the ulnar metacarpal bone. The treatment protocol involved wound debridement, the application of an intramedullary pin to achieve arthrodesis, and the daily administration of analgesics, antibiotics, and supportive care. After a 50-day period, sufficient callus formation allowed for the removal of the intramedullary pin. The bird was relocated to a larger enclosure to facilitate wing use. After rehabilitation, it was released into an open environment, displaying no signs of flight impairment, despite the persistence of an abnormal wing position.

Results: After 38 more days, the bird was released in open space, showing no signs of impairment during flight, although the wing remained in an abnormal position.

Conclusion: In conclusion, this report highlights a successful case of rehabilitating a wild rook with an open MCP subluxation through arthrodesis. Further research in this area is warranted to improve outcomes for similar cases.

Keywords: arthrodesis, birds orthopaedics, intramedullary pinning, metacarpophalangeal joint subluxation, wildlife

OSSEOINTEGRATION OF SELF-DRILLING TITANIUM SCREWS IN THE HOLE SMALLER THAN THE SCREW CORE IN THE MALE RABBIT

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Introduction: Inserting orthopedic screws into too small a hole can produce excessive mechanical forces that cause osteocyte death and difficulty carrying out bone repair processes (Shah et al., 2018).

Aims: The aim of the study was to evaluate the osseointegration of titanium screws 6 weeks after their insertion into the femur of male rabbits, in any smaller than the screw core.

Materials and Methods: The study was conducted on 5 male rabbits aged 1 year with orthopedic titanium screws with a length of 5 mm, a diameter of 2 mm and a diameter of a screw core of 1.5 mm. The screws were inserted into the diaphysis of the femoral bone, into the hole with a diameter of 1 mm.

Results: After 6 weeks of insertion of the screws, the presence of newly proliferated tissues is found throughout the interface, but with differences from one area to another. They are many in the periosteal and endosteal areas and very few in the bone wall.

Conclusion: In conclusion, the insertion of titanium screws into the hole with a diameter smaller than the screw core is accompanied by good bone proliferation in the periosteal and endosteal areas of the interface and is exceptionally modest on the portion next to the diaphyseal bone wall.

Keywords: male rabbit, osseointegration, titanium screws

References:

1. Shah FA, Thomsen P, Palmquist A. Osseointegration and current interpretations of the bone implant interface. *Acta Biomaterialia* [Internet]. 2019 Jan;84(84):1–15. <https://www.sciencedirect.com/science/article/pii/S174270611830672X>

THE THERAPEUTIC EFFICACY OF THE PRODUCTS EPRECIS (EPRINOMECTIN) AND IVOMEC PLUS (IVERMECTIN AND CLORSULON) IN PULMONARY NEMATODES IN SHEEP FROM THE HILLY AREA OF BISTRITA-NASAUD COUNTY

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Introduction: Sheep kept on pasture are frequently affected by various parasites, including those with pulmonary localization due to permanent contact with intermediate hosts, their eggs and larvae. For this reason, parasitic infestations are present in a large number of small ruminants worldwide (1). The pulmonary strongylatosis complex in sheep is produced by different species of nematodes from the genera: *Dictyocaulus*, *Protostrongylus*, *Mullerius*, *Cystiocalus* and *Neostrongylus*. In sheep, both ivermectin (administered orally) and moxidectin (administered orally and subcutaneously) have been shown to effectively reduce lungworm infestation and faecal excretion of larvae (2, 3).

Aims: The aim of the study was to evaluate the efficiency of two modern molecules in the therapy of the main pulmonary helminthiasis in Transylvanian sheep.

Materials and Methods: The study was carried out on two flocks of sheep from Bistrița-Năsăud county. The total number was 1181 heads, of which 144 sheep were examined/flock in total 288 sheep. The study included three lots/flock of sheep, each lot consisting of 3 groups. Each group was made up of 12 sheep, with different ages: adult sheep (OA), youth of the previous year (O-AP) and youth of the current year (O-AC). For each group of 12 treated sheep/age category, 12 control sheep were used, in total 288 individuals.

Results: In this study, the comparative use of two commercial products in the treatment of pulmonary strongylatosis in sheep showed a superior efficiency of Ivomecul Plus, this being observed both 12 days post-therapeutic, but especially 28 days after therapy. The results confirm that the treatment of sheep parasitic pneumonia can be carried out by the use of substances from the group of macrocyclic lactones.

Conclusion: In the present research work, we demonstrated that the main pulmonary strongyles were represented by *Dictyocaulus filaria*, *Muellerius capillaris*, *Protostrongylus rufescens* and *Cystiocalus ocreatus*. The efficacy of Ivomec Plus therapy was superior to that of Eprecis in pulmonary strongylatosis in sheep in all age groups

Keywords: *Cystiocalus ocreatus*, eprecis, strongylatosis

References

1. Pavlovic I., S. Ivanovic, M. Petrovic, V. Caro-Petrovic, D. Ružić-Muslić, N. Mederle, (2020), Pulmonary strongylidosis of small ruminants in Serbia, Scientific Works.
2. Papadopoulos, E., Sotiraki, S., Himonas, C., Fthenakis, G.C. (2004). Treatment of small lungworm infestation in sheep by using moxidectin. Vet. Parasitol. 121, 329–336.
3. Rehbein, S., Visser, M., 2002. Efficacy of ivermectin delivered via a controlled-release capsule against small lungworms (Protostrongylidae) in sheep. J. Vet. Med. B 49, 313–316.

PREVALENCE OF CORNEAL LESIONS IN DOGS AFTER NON-OCULAR SURGERY: IMPACT OF PREOPERATIVE TOPICAL LUBRICATION AND DURATION OF ANAESTHESIA

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Introduction: The cornea is one of the two structures of the outer tunic of the eyeball, being a transparent, avascular structure with a role in refracting light (Gellat, 2014). Because of its position in the eyeball, the cornea is very susceptible to injuries (Kaye et al, 2019). Corneal lesions are the most common ophthalmologic complication that occurs during general anesthesia for non-ocular surgery (Simona Di Pietro et al, 2021).

Aims: The aim of this study is to identify the prevalence of corneal lesions in dogs that were administered preoperative ocular lubrication and those that did not and how the duration of general anaesthesia influences the occurrence of these corneal lesions.

Materials and Methods: An ophthalmic examination and a fluorescein test were performed before premedication and after general anesthesia in 18 dogs undergoing nonophthalmic procedures. Individuals with known pre-existing ocular conditions and those with a positive result at the first fluorescein test were excluded. The exact time of administration of the first anaesthetic and the exact time of awakening from anaesthesia were noted in order to determine the duration of general anaesthesia. Subjects were randomly divided into two groups, with one group receiving preoperative ocular lubrication and the other not. Subsequently, the subjects were divided into three groups according to the duration of anaesthesia in order to highlight the correlation between its duration and the occurrence of corneal lesions.

Results: Only 11% of the preoperative lubrication group showed post-operative corneal lesions, while no subjects in the group without preoperative lubrication showed a positive fluorescein test result. Regarding the duration of anaesthesia, 20% of subjects whose duration of anaesthesia exceeded 180 minutes had post-operative corneal lesions and a positive fluorescein test result.

Conclusion: The results of the study could not highlight the protective role of preoperative ocular lubrication. Long-term anaesthesia increases the risk of corneal damage postoperatively. Further studies on a larger number of subjects and homogeneous groups are needed for more relevant results.

Keywords: corneal lesions, general anaesthesia, dog, topical lubrication

References

1. Di Pietro, S. et al. (2021). Dexmedetomidine and Tear Production: Evaluation in Dogs as Spontaneous Model for Ocular Surface Disorders. *Veterinary Sciences*, 8(2), 28
2. Gellat K.N., 2014, *Essentials of Veterinary Ophthalmology*, Third edition, Editura John Wiley & Sons, Inc., Iowa, p. 21, 107, 114-116, 193-194, 217-218, 220-224
3. Kaye A.D. et al. (2019). Postoperative Management of Corneal Abrasions and Clinical Implications: a Comprehensive Review. *Current pain and headache reports*, 23(7), 1-9

MIXED LIVESTOCK FARMING: ASSESSING THE POTENTIAL BENEFITS AND RISKS FOR SUSTAINABLE FARMING. A REVIEW

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Introduction: In recent decades, the intensification of farm technology has seen a significant increase in specialization. To achieve higher yields and make production more efficient, most farms have focused on a single species of animal. However, recent studies support the fact that keeping several species of animals in one farm could present a positive effect on their well-being and their production, though with several risks being involved (Schanz & Moerman, 2020). These farms have received little attention to date (Martin et al., 2020), with research approaches focusing more on the advantages of co-grazing of two or more species on the same pasture (Ulukan et al., 2022).

Aims: Given the fact that little is known whether mixed livestock farming is more sustainable than single species farming, the aim of this study is to balance the risks and benefits of rearing multiple species of livestock in the same farm, thus presenting a significant importance regarding the production and sustainability of the farm.

Materials and Methods: This assessment relies on scientific papers and systematic reviews that were identified across various databases (e.g., Science Direct, Web of Science), using specific and relevant keywords.

Conclusion: Combining two or more species of animals on the same farm did not receive the attention it deserves. There is a shortage in studies regarding the changes in animals' behaviour, as well as how their immunity status is being affected in the presence of other species. While there are some negative aspects, such as the risk of disease transmission between species, the overall findings support that there are several potential benefits of multi-species livestock farming, if the necessary biosecurity measures are being implemented.

Keywords: mixed farming, multi-species farming, livestock, sustainability, small-scale farms

References

1. Martin, G., Barth, K., Benoit, M., Brock, C., Destruel, M., Dumont, B., Grillot, M., Hübner, S., Magne, M. A., Moerman, M., Mosnier, C., Parsons, D., Ronchi, B., Schanz, L., Steinmetz, L., Werne, S., Winckler, C., & Primi, R. (2020). Potential of multi-species livestock farming to improve the sustainability of livestock farms: A review. In *Agricultural Systems* (Vol. 181). Elsevier Ltd. <https://doi.org/10.1016/j.agsy.2020.102821>
2. Schanz, L., & Moerman, M. (2020). *Animal welfare on organic mixed livestock farms across seven European countries*. <https://www.researchgate.net/publication/344339487>
3. Ulukan, D., Grillot, M., Benoit, M., Bernes, G., Dumont, B., Magne, M. A., Monteiro, L., Parsons, D., Veyssset, P., Ryschawy, J., Steinmetz, L., & Martin, G. (2022). Positive deviant strategies implemented by organic multi-species livestock farms in Europe. *Agricultural Systems*, 201. <https://doi.org/10.1016/j.agsy.2022.103453>

IDENTIFICATION OF SOME PREDICTIVE BIOMARKERS IN DOG UTERINE DISEASES

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Introduction: The identification of predictive biomarkers in uterine problems in bitches is a crucial area of research in veterinary medicine aimed at improving early diagnosis, treatment outcomes and overall health by preserving reproductive function. Uterine problems such as pyometra, CEH and other reproductive disorders can lead to significant morbidity and mortality if not promptly diagnosed and managed. Several studies have explored potential biomarkers that could help predict and diagnose uterine problems in bitches. These biomarkers can be classified into different groups.

Aims: The present presentation aims to show that the measurement of these markers could help in the early detection and monitoring of uterine infections.

Materials and Methods: Blood samples on EDTA, from animals suspected with piometra and CEH.

Results: Overall, procalcitonin shows potential as a diagnostic and prognostic tool in the evaluation of bacterial infections and inflammatory responses in dogs, but more research is needed to fully realize its clinical applications.

Conclusion: Inflammation plays a key role in uterine disorders. C-reactive protein (CRP) and procalcitonin (PCT) have been investigated as potential biomarkers for uterine problems. Elevated levels of these markers have been associated with inflammation, including in cases of pyometra. Research has demonstrated the utility of measuring PCT levels in dogs to differentiate between bacterial and non-bacterial causes of inflammation, helping to diagnose and monitor infections. PCT levels have been investigated in various conditions such as sepsis, pneumonia and postoperative infections.

Keywords : C-reactive protein, piometra, procalcitonin, blood samples on EDTA

References:

1. Russwurm, S.; Wiederhold, M.; Oberhoffer, M.; Stonans, I.; Zipfel, P.F.; Reinhart, K. Molecular aspects and natural source of procalcitonin. *Clin. Chem. Lab Med.* 1999, 37, 789–797.
2. Schneider, H.; Lam, Q.T. Procalcitonin for the clinical laboratory: A review. *Pathology* 2007, 39, 383–390.
3. Meisner, M. Update on Procalcitonin Measurements. *Ann. Lab Med.* 2014, 34, 263–273.
4. Morgenthaler, N.; Struck, J.; Fischer-Schulz, C.; Seidel-Mueller, E.; Beier, W.; Bergmann, A. Detection of procalcitonin (PCT) in healthy controls and patients with local infection by a sensitive ILMA. *Clin. Lab* 2002, 48, 263–270.
5. Yamada, H.; Matsuda, S.; Ushio, Y.; Nakamura, K.; Kobatake, S.; Satomura, S.; Matsuura, S. Determination of procalcitonin concentration using the SphereLight 180 clinical auto-analyzer. *Clin. Chim. Acta* 2008, 388, 38–40.
6. Dipalo, M.; Gnocchi, C.; Avanzini, P.; Musa, R.; Di Pietro, M.; Aloe, R. Comparison of Procalcitonin Assays on KRYPTOR and LIAISON® XL Analyzers. *Diagnostics* 2019, 9, 94.

ASSESSING CANINE HIP LAXITY USING A COMMERCIAL DISTRACTOR: A PRELIMINARY INVESTIGATION

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Introduction: Canine hip dysplasia is a complex polygenic disease present in most breeds of dogs, but with higher prevalence in large breeds dogs. A major risk factor for the disease is hip joint laxity, which can take two forms: functional joint laxity and passive joint laxity. Functional joint laxity is the one that occurs during walking and can cause the wear of articular cartilage. Passive hip joint laxity occurs in those hips without active muscular contraction and can be determined by X-rays, using the AIS PennHIP distractor by measuring the distraction index (DI). As DI measures displacement of the femoral head from the acetabulum, it can be used to predict osteoarthritis (OA) following hip dysplasia. Normal DI values range from 0 to 0.3; mild to moderate risks for developing OA, from 0.3 to 0.7, and high risks range between 0.7 to 1. DI is breed-dependent and almost every breed has a mean value of the DI, so a patient may be recommended for breeding if the DI value is below the standard value of 0.3 or has a value below the average of their own breed

Aim: The aim of the current study was to determine the DI and the Norberg angle in different breeds of dogs presented at Veterinary Radiology and Imaging Service of the Faculty of Veterinary Medicine from Cluj-Napoca, between December 2022 – July 2023

Materials and methods: A total of 20 dogs from varying breeds were deeply sedated with butorphanol, diazepam and ketamine in order to measure the DI and the Norberg angle. All patients were part of the clinical cases present in our department. DI and Norberg angle were measured within the local DICOM viewer and the statistical analysis was performed with IBM SPSS Statistics.

Results: Neither of the 20 patients had a DI below the reference value of 0.3. A total of 13 patients had a DI below the average of their breed. It was found that 7 patients had a Norberg angle less than 105 degrees.

Conclusions: The present study is the first one in Romania regarding the determination of DI. DI can be a useful tool for determining the predisposition of the dog for OA and it can be determined starting from 16 weeks of age.

Keywords: AIS PennHIP distractor, distraction index, hip laxity

IN VITRO EFFICACY OF *ALLIUM SATIVUM* AND *ARTEMISIA ABSINTHIUM* EXTRACTS ON SHEEP GASTROINTESTINAL STRONGYLES

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Introduction: Gastrointestinal nematodes are considered one of the greatest threats to sheep production systems, causing reduced weight gain, diarrhea, anemia and, in severe cases, death. Nowadays, resistance to synthetic anthelmintics is increasingly reported in sheep, alternative (non-synthetic) control strategies being more often explored.

Aims: The aim of this study was to test the effectiveness of *Allium sativum* and *Artemisia absinthium* extracts on sheep digestive nematodes.

Materials and Methods: The study was carried out in 2 herds from Cluj County, Roumania, during 2022. For each herd 10 faecal samples were randomly collected from the rectum. Helminth eggs were obtained from the pooled sample by sieving through sieves 200, 150, 100 și 36 (μm). To determine the effectiveness of *A. sativum* and *A. absinthium* extracts on gastrointestinal strongyles, three in vitro tests were performed: the egg hatching test, the larval development test and the larval paralysis test. The concentrations for each alcoholic extract were: 50; 25; 12.5; 6.25; 3.125 and 1.562 mg/ml; 5 replicates were performed for each concentration.

Results: For the egg hatching test, the garlic extract showed statistically significant differences at the concentrations 12, 5; 6.25; 3.12 and 1.56 mg/ml and for the extract of wormwood at 12.5; 6.25 and 1.56 mg/ml. In the case of garlic extract at concentrations 25; 6.25; 3.12 and 1.56 mg/ml, and respectively of wormwood extract at concentrations 6.25; 3.12 and 1.56 mg/ml, for the larval development test, statistically significant differences were found compared to the control. For the larval paralysis test, garlic extract showed significant statistical difference for all concentrations, and for wormwood extract at concentrations 6.25; 3.12 and 1.56 mg/ml.

Conclusion: Both *A. sativum* and *A. absinthium* extracts showed antihelmintic activity but the strongest effectiveness was observed for the garlic extract.

Keywords: digestive strongyles, in vitro tests, plant extracts, sheep

A RARE CASE OF FELINE ANENCEPHALY WITH SEVERE CERVICAL DYSRAPHISM

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Introduction: Anencephaly, a severe neural tube defect characterised by the absence of major portions of the brain and skull, is a rare congenital disorder. Neural tube defects (NTDs) are a group of severe congenital malformations caused by the improper or incomplete closure of the neural tube during embryonic development.

Aims: Taking into account the rare incidence of anencephaly the aim of this paper is to present a case study where anencephaly in a kitten was analysed by different paraclinical methods, such as cytohistological, radiography (Rx) and computed tomography (CT) examination.

Materials and Methods: For cytohistological examination the Hematoxylin-Eosin technique was done. Rx was done with the radiograph Siemens Multix Swing digital X-Ray machine and for CT scan the Siemens Somatom Definition AS 64 scanner was used.

Results: Histological examination of tissue samples from the cranial region, where the skull was absent, revealed the presence of atypical nerve tissue: the neurons and glial cells arranged in clusters, surrounded by extracellular matrix, without evidence of specific structures of the grey substance of the telencephalon. An abundance of blood vessels, which are large, dilated and filled with blood, uncharacteristic of nerve tissue structure was seen. On CT scan was observed that the caudal part of the frontal bone, the fronto-temporal limits and parietal bone were missing, results that were seen primarily on Rx image. The CT scan revealed also that the dorsal neural arch and the dorsal tubercle from atlas, the dorsal neural arch and the spinal process of C2-C7 bones were missing. The fact the dorsal arches of cervical vertebrae were missing lead to a retroflexion of the spinal cord.

Conclusion: Based on CT images we concluded that the kitten was affected by syndromic congenital malformations, a combination of anencephaly, upper brahignatism, closed cranial spina bifida at the level of cervical bone with scoliosis. The significance of employing imaging techniques cannot be overstated when it comes to the accurate diagnosis of NTDs.

Keywords: anencephaly, congenital malformations, neural tube defects

EPIDEMIOLOGICAL AND PATHOLOGICAL STUDY OF TESTICULAR AND PROSTATIC LESIONS IN DOGS

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Introduction: This study delves into the underdiagnosed landscape of testicular and prostatic diseases within geriatric canine populations, particularly in Romania and Eastern Europe. By examining samples from 27 patients, encompassing necropsy findings and biopsies, this research employs histopathological techniques, primarily haematoxylin-eosin staining, to uncover prevalent trends.

Aims: This study aims to uncover the prevalence and types of testicular and prostatic diseases among geriatric dogs, focusing particularly on the underdiagnosed landscape in Romania and Eastern Europe. Through meticulous analysis of samples using histopathological techniques, the study seeks to identify neoplastic formations, including Leydigomas, seminomas, and sertolinomas, while exploring potential age-related trends and environmental influences.

Materials and Methods: We collected and analysed samples over 4 months from the case histories of the Pathology, Necropsy Diagnosis and Veterinary Forensic Medicine Discipline. These samples represent target tissues collected from patients who underwent necropsy examination and biopsies received from various clinics in Cluj County. Samples were collected and analysed from 27 dogs with gross lesions in the target organs. Samples were collected from individuals following necropsy or biopsy examination, sectioned for better fixation, maintained in formalin and subsequently paraffin-embedded for histological examination. Patient data were taken from the records of the Discipline of Pathology, Necropsy Diagnosis and Veterinary Forensic Medicine.

Results: The findings highlight a pronounced vulnerability among aged dogs, averaging 11.4 years, with neoplastic formations emerging as statistically dominant pathologies (44.44% prevalence). Notably, Leydigomas constitute a substantial portion (58.33%) of the neoplastic cases, followed by seminomas (25%) and sertolinomas (16.66%). These findings illuminate the widespread nature of neoplastic disorders within the male reproductive system of older canines.

Conclusion: This research casts a spotlight on the pervasive influence of neoplastic formations among testicular disorders, with Leydig cell tumors emerging as a significant subtype. Prostatic disorders also garner attention, particularly prostatic hyperplasia and chronic inflammation. The average age of affected patients underscores the relevance of geriatric veterinary care. Overall, this study sheds light on an often-neglected aspect of canine health in the region.

Keywords: Geriatric dogs, testicular diseases, prostatic diseases, neoplastic formations

References

1. Amin W., & Parwani, A. V. (2009). Adenomatoid tumor of testis. *Clinical medicine. Pathology*, 2, 17–22.
2. Lai C-L, et al. Histopathological and immunohistochemical characterization of canine prostate cancer. *Prostate* 2008;68:477-488.
3. Creasy D, Bube A, de Rijk E, Kandori H, Kuwahara M, Masson R, Nolte T, Reams R, Regan K, Rehm S, Rogerson P, Whitney K. Proliferative and nonproliferative lesions of the rat and mouse male reproductive system. *Toxicol Pathol.* 2012 Aug;40(6 Suppl):40S-121S.

PREVALENCE OF THE RESISTANCE OF GASTROINTESTINAL NEMATODES TO EPRINOMECTIN ASSESSED BY THE FAECAL EGG COUNT REDUCTION TEST IN POLISH GOAT HERDS

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Introduction: Parasitic infections, especially caused by gastrointestinal nematodes (GIN), are one of the main causes of economic losses in goat farming worldwide. The widespread use of anthelmintic products has led to the emergence of drug-resistant parasite strains. One of the most commonly applied tests for the detection of anthelmintic resistance (AR), and the only one that can be done *in vivo*, is the faecal egg count (FEC) reduction (FECR) test (FECRT).

Aims: The aim of this study was to determine the prevalence of AR to eprinomectin (EPM) in the Polish goat herds by using FECRT.

Material and Methods: This cross-sectional study was conducted from April 2021 to November 2022 and enrolled 28 dairy goat herds (370 goats in total) scattered over the entire country. FECRT was performed according to the most up-to-date recommendations. Goats were treated with recommended doses of spot-on EPM. The number of animals enrolled in the treatment group in each herd varied from 10 to 21 animals depending on the herd size. FECR was calculated in percent according to the following formula: $\%FECR = 100 \times (1 - [T1/T0])$ where T0 and T1 were the means FEC in the treated group before and after treatment, respectively. The parasite population was considered resistant if %FECR was <95%. Larval cultures were prepared for each group and identified to the species level based on morphological features of the third-stage larvae (L3).

Results: The AR to EPM was detected in 25 out of 28 goat herds examined in the study (89%; 95% confidence interval: 73% – 96%). The %FECR in the herds with resistance to EPM ranged from -26% to 94%. In only 3 herds the %FECR was $\geq 95\%$ (specifically: 95%, 98%, and 100%). The main GIN species detected in 100% post-treatment faecal samples was *Haemonchus contortus*.

Conclusion and Implications: Our study shows that resistance to EPM is widespread in goat population in Poland and *H. contortus* is the main GIN species responsible for AR. The prevalence of AR to EPM assessed by the *in vivo* FECRT is consistent with results obtained from our previous studies based on *in vitro* larval development test, in which the prevalence of AR to macrocyclic lactones was 95%.

Key words: anthelmintic resistance, goats, nematodes, eprinomectin

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PARACLINICAL EVALUATION OF SALIVARY AND PLASMA MARKERS IN EXPERIMENTAL PERIODONTITIS IN RATS TREATED BY A PROTOCOL BASED ON HYDROGELS

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Introduction: The periodontal disease is a chronic inflammatory condition which affects the gingival tissue, the ligament of the tooth and it can evolve to the alveolar bone, creating a periodontal pocket which encourages the adhesion of bacteria and can generate a movement of the tooth, bone necrosis and demineralization. Thereby, this study involves the creation of an inflammatory reaction by induced periodontitis demonstrated by the levels of salivary and plasma markers.

Aims: The aim of this study is to test an experimental protocol for treating the induced periodontitis which allows a close paraclinical evaluation of all its stages and also to test the effectiveness of the implemented therapy in order to improve the associated pathological symptoms.

Materials and Methods: 36 Wistar male rats were used for the induction of experimental periodontitis. In the first day, before applying the surgical protocol, samples of blood and saliva were collected. In order to create an accumulation of plaque, a 5-0 cotton ligature was placed, provoking an inflammatory response. After 10 days the ligatures were removed in all rats. The implemented protocols were performed in three sessions for 30 rats. The samples of blood and saliva were collected one week after the second and the third session of therapy. The other 6 rats represented the control group.

Results: The results obtained showed paraclinical changes typical for acute inflammation, then the clinical aspects of healing and regenerating tissue were noticed. The used protocols had beneficial effects on systemic inflammation, as revealed by plasma and salivary values, all being proved by multiple graphics.

Conclusion: The tested procedure can provide all the key biological factors present in periodontal disease and also an option for reversing the paraclinical and pathological aspects.

Keywords: acute inflammation, chronic inflammation, periodontitis, hydrogels, biomarkers

References

1. Oz, H.S., Puleo, D.A., Animal Models for Periodontal Disease, Journal of Biomedicine and Biotechnology, 2011, 1-8.
2. Rabelo, M. de S., Gomes, G.H., Foz, A.M., Stadler, A.F., Cutler, C.W., Susin, C., Romito, G.A., Short-term effect of non-surgical periodontal treatment on local and systemic cytokine levels: Role of hyperglycemia, 2021, Cytokine 138, 155360.
3. Paredes-Sánchez, E., Montiel-Company, J.M., Iranzo-Cortés, J.E., Almerich-Torres, T., Bellot-Arcís, C., Almerich-Silla, J.M., Meta-analysis of the use of 8-OHdG in saliva as a marker of periodontal disease. Dis Markers 2018.

SYSTEMIC IMMUNE EFFECTS INDUCED BY LONG-TERM ORAL ADMINISTRATION OF IMMUNOGLOBULIN Y IN MICE

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Introduction: The hyperimmune egg is an egg with a high concentration of IgY, resulting from the vaccination of chickens with various infectious agents, depending on the therapeutic goal pursued. In most studies, the proposed mechanism of action involves binding these antibodies to the antigen epitopes present in the digestive tract. In our study, commercial preparations of IgY were administered to mice, orally, daily, for 90 days, in a non-challenge context, in which their antigens were either absent or present in insignificant amounts.

Objective: Characterization of the immunological profile of C57BL/6 mice treated with hyperimmune egg emulsion and immunoglobulin Y complex for 90 days.

Method: The experiment was performed on a number of 150 C57BL/6 mice, grouped into five groups [(M (DW) A (SPF), B (HE), C (fdHE), D (IgY)], 30 animals per each lot. The testing of IgY supplements was done under the same conditions, by calculating the equivalent dose based on body surface area (0.02 kg/0.007 m²) vs human (60 kg/1.62 m²). The levels of 30 cytokines were investigated and quantified by Multiplex ELISA. Samples were also collected at 30, 60 and 90 day intervals for histopathological, hematological and biochemical examination.

Results: Orally administered IgY induced both local and systemic immune responses, mainly Th17 and Th2, which varied by product and time of interaction with gut-associated lymphoid tissue (GALT). A greater intensity of the immune response was recorded in the 1st month and 3rd month and a significant reduction in the 2nd month of the experiment. These differences were clear between group A and groups B and C, which indicated a clear influence of normal egg components on the biological activity of IgY.

Conclusions: A significant activity of tested IgY supplements was recorded, beneficial but with systemic ramifications difficult to predict.

Keywords: IgY, mice, cytokines, immunology, hematology, biochemistry

CASE REPORT: FIRST REPORT OF *ANGIOSTRONGYLUS VASORUM* FROM ALGERIA

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Introduction: *Angiostrongylus vasorum*, also known as the French heartworm. It is found almost exclusively in Europe, South America, North America, and Africa. Since being discovered in several European nations following its description in France, the parasite is now thought to be an emerging parasite. Despite its widespread geographic distribution, *A. vasorum* appears to be patchy throughout most of its range, with foci of endemic disease surrounded by regions with sporadic cases.

Materials and Methods: In January 2022, a road-killed male juvenile jackal (*canis aureus*) was collected from Constantine locality and was submitted to the National Environmental Research Centre where it was examined by complete parasitological necropsy. Tissues from organs were conserved in formalin for histological analysis and ethanol 70% for PCR

Results: Histological examination revealed numerous transverse or longitudinal sections of nematode larvae and eggs free in the alveolar spaces. The larvae were approximately 20-30 µm in width and 80-90 µm in length with a thin basophilic cuticle and numerous deep basophilic, internal nuclei. The eggs were round to ovoid, thin walled, of approximately 50-60 µm, and contained either a larva or a morula. Within these areas, the alveolar septae were expanded by a moderate number of inflammatory cells, composed mainly of macrophages, including binucleated and multinucleated macrophages, plasma cells, small lymphocytes, and few eosinophils. Additional findings included type II pneumocyte hyperplasia, edema, and presence of hemosiderin-laden macrophages. Careful examination of arteries did not reveal presence of adult parasites, lesions of endarteritis and/or thrombosis. The PCR was in favor of *Angiostrongylus vasorum*.

Conclusion: To the best of our knowledge, this is the first report of *A. vasorum* infecting a jackal in Algeria, highlighting the importance of further studies to update the geographical distribution and its epidemiology across Algeria.

Keywords: *Angiostrongylus vasorum*, carnivores, jackal, Algeria

THE EFFICACY OF OZONE THERAPY IN THE HEALING PROCESS OF A LARGE DISTAL LIMB LACERATION REPAIRED WITH A FREE SKIN GRAFT IN A PUPPY

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Introduction: Free skin grafts are a viable option for reconstructing limb defects with extensive tissue loss. The success rate of this technique may be improved by using complementary supportive therapies. Therefore, the therapeutic efficacy of this treatment in human medicine encourages its use in veterinary patients with chronic or acute limb pathologies.

Aims: The aim of this case study is to assess the therapeutic efficiency of topical ozone treatment, applied both pre and postoperatively in a puppy with a distal forelimb degloving injury.

Materials and Methods: A 4-week-old male puppy was referred for the treatment of a large distal forelimb degloving injury. The necrotic tissue was debrided, resulting in a 27.5 cm² wound. Due to extensive necrosis, the phalanges of all four digits required excision. Ozone bagging treatment at a concentration of 60 µg/ml daily was used to treat the wound for the first 5 days. Two more sessions at a concentration of 30 µg/ml were performed 3 days apart until healthy granulation tissue was observed. On the 11th day, the free skin graft surgery was performed. The surgical procedure was followed by 4 ozone bagging treatment sessions, applied every 3 days at a concentration of 20 µg/ml.

Results: 20 days after the surgical procedure the limb no longer required bandaging and the graft acceptance rate was greater than 90%.

Conclusion: According to our knowledge, this is the first report of using ozone treatment to accelerate healing in a puppy with a distal limb laceration repaired with a free skin graft. Our findings suggest that ozone therapy may be an effective strategy to accelerate the healing process and acceptance rate of free skin grafts in puppies. However, further controlled prospective studies are required to validate these results.

Keywords: mesh skin graft; ozone therapy; puppy; wound

THE ROLE OF PROTOZOAL INFECTIONS IN THE CAUSE OF NEONATAL ENTEROPATHIES OF PIGLETS

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Introduction: Neonatal enteropathies of piglets were recognized as a serious problem of the modern pig industry. Today it is known that it is a multicausal disease caused by numerous agents of bacterial, viral and parasitic etiology (Jacobson, 2022). The aim of our work is to point out the importance of parasitic infections in this disease.

Materials and Methods: In period 2017-2020 a total of 337 pigs, 2-21 weeks old, were examined. After routine necropsy, parasitological, bacteriological and viral evaluations were performed, as required to establish the cause of disease in each pig. To parasitological examination we used faecal swab, gut contents and a mucous scrape of gut which we examined with Sheathers sugar flotation and in direct smears stained with Gimsa stain.

Results: During our examination *Eimeria* sp. were detected at two week old piglet at 4.22%, *Ispora suis* at 2-4 week old piglet at 12.34% and cryptosporidial organisms were detected in the microvillus brush border in the intestine of the pigs ranged from 7-12 weeks old at 61.36%. Based on the time of onset of neonatal enteropathies, *Cryptosporidium* sp. was confirmed as the main parasitic agent of its occurrence. These results are similar to our previous research (Pavlovic et al., 2007).

Conclusion: The role of infection with cryptosporidia in the occurrence of neonatal enteropathies in piglets, because of the multiple agents, which cause this disease, has not been fully explained, but our examination indicated that cryptosporidia might act, either in itself or in concert with other agents to induce or exacerbate clinical disease.

Keywords: neonatal enteropathies, piglets, *Cryptosporidium* sp.

References

1. Jacobson, M. (2022). On the Infectious Causes of Neonatal Piglet Diarrhoea—A Review. *Veterinary Science*. 9, 422. <https://doi.org/10.3390/vetsci9080422>.
2. Pavlović I., Žutić M., Ivetić V., Savić B., Radanović O., Đukić B. (2007). Prevalence of cryptosporidial infection in piglets with clinical signs of enteropathy.- *Biotechnology in Animal Husbandry* 23 (5-6): 229-235.

CANNABIDIOL – A COMPREHENSIVE REVIEW OF PROPOSED BENEFITS AND POTENTIAL ADVERSE REACTIONS

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Introduction: Cannabidiol (CBD) is a non-psychoactive phytocannabinoid derived from the *Cannabis sativa* plant. In recent years, its popularity has been on the rise in both human and veterinary medicine due to its wide range of therapeutic benefits. CBD's main benefit is its role as an anti-epileptic agent in Dravet and Lennox-Gastaut Syndrome, two pharmacoresistant epileptic conditions found in children. Other noted benefits of CBD include its uses as an anxiolytic, antioxidant, analgesic and neuroprotectant.

Aims: The aim of this review is to highlight potential adverse events and their prevalence in both humans and animals in correlation to the benefits of the CBD molecule.

Materials and Methods: A search was conducted via three databases (PubMed, Web of Science, Google Scholar), and all relevant articles from 2005-2022 were extracted. Human and animal trials were both used.

Results: As with most other pharmacological agents, some adverse effects (AEs) are to be expected. The most common ones in human clinical trials noted are generally mild and include nausea, somnolence diarrhea, changes in appetite (increased and decreased, lethargy and changes in weight (increased and decreased). More severe effects noted include hepatic toxicity with increase of liver transaminases, convulsions, status epilepticus and upper respiratory tract infections, however these are much rarer. Serious AEs seem to occur mostly in patients with concomitant valproate or clobazam use and appear to be the result of a drug interaction. Safety studies of cannabidiol conducted on dogs showed much of the same mild adverse events occurring. Dogs appear to also show signs of decreased heart rate and hepatomegaly in males, increased ALP parameters.

Conclusions: Overall, CBD appears to be quite well tolerated in the majority of patients, especially as a concurrent treatment for epilepsy. Serious side effects appear to occur as a result of drug-drug interactions. Most of the data is based on human medicine and more studies, especially chronic ones, would need to be conducted in veterinary patients to gain a better picture of AEs in animals.

Keywords: adverse events, cannabidiol, CBD, safety

EPIDEMIOLOGY CHARACTERIZATION OF *GASTEROPHILUS* SPP.

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Introduction: *Gasterophilus* spp. larvae cause gastrointestinal myiasis in equids. This infestation negatively affects animal health and welfare. The main lesions produced by *Gasterophilus* are represented by ulceration in the gastric area followed by malabsorption. Also, the presence of *Gasterophilus* spp. in the horse's environment can raise the level of stress, affecting the welfare and immune status of animals.

Aims: The principal aim of this report is to provide information about the distribution of *Gasterophilus* species around the world and highlight the main epidemiological aspects of the infestation.

Materials and Methods: The distribution and the main epidemiological aspect of *Gasterophilus* spp. are taken from the studies present in the specialized literature.

Results: The results of our study include mapping out the distribution of *Gasterophilus* spp. and highlighting the main epidemiological aspects of the infestation. Among the nine identified species, only two of them are ubiquitous around the globe. The species met in the palearctic region are represented by *Gasterophilus flavipes*, *Gasterophilus haemorrhoidalis*, *Gasterophilus inermis*, *Gasterophilus intestinalis*, *Gasterophilus nasalis*, *Gasterophilus nigricornis*, *Gasterophilus pecorum*. Although *Gasterophilus meridionalis* is specific to the Afrotropical region, the bot fly was identified in Italy. The most common species identified Eastern Europe, is *G. intestinalis* with an incidence of 97,34% in Italy and 2,5% in Germany followed by *G. nasalis* with an incidence of 53,9% in Italy and 0,25% in Germany.

Conclusion: In conclusion, this report provides valuable insights into the distribution and main epidemiological aspects of *Gasterophilus* spp. infestation.

Keywords: Epidemiological, *Gasterophilus* spp., Mapping

REINFORCING STRUCTURES PROLIFERATED AROUND A TITANIUM IMPLANT INSERTED INTO THE FEMUR OF FEMALE RABBITS, IN A HOLE SMALLER THAN THE SCREW CORE

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Introduction: One of the basic conditions for the clinical success of osseointegrated implants is implant stability (Albrektsson and Zarb, 1993). It comprises two components, the primary stability that should be ensured at the time of insertion and the secondary stability, which gradually replaces the primary stability. The primary stability is ensured by the direct contact between the implant surface and that of the bone walls of the insertion hole. Secondary stability begins with the first position of new bone on the implant surface.

Aims: The aim of the present study was to verify the reinforcing structures proliferated around the titanium implant inserted into the femur of 5 adult female rabbits, in a groove smaller than the screw core diameter.

Materials and Methods: The biological material used was represented by 5 rabbits, females, common breed, aged one year old and an average weight of 4 kg. Orthopedic screw implants with a diameter of 2 mm and a core of 1.5 mm were inserted into the femoral bone.

Results: The results suggested that inserting the titanium implant into a hole with a smaller diameter than the screw core produces excessive pressure on the bone, which is felt up to a distance from the bone-implant interface. Consequently, mechanical strength of the bone is decreasing and proliferating bone consolidation formations appears on both periosteum and endosteum areas. Additionally, it was observed that newly proliferated bone extends laterally from the interface to a great distance, causing thickening of the bone wall. The observed structures were represented by branched bone trabeculae and bony protrusions into the medullary cavity, together with bone reshuffling processes with the appearance of numerous osteons, most of which are present at the level of the wall opposite the insertion area.

Conclusion: Inserting the titanium screw into the hole smaller than the screw core exerts excessive pressure on the bone, which is felt up to a distance from the bone-implant interface. One of the consequences is the decrease in the mechanical strength of the bone, so the body makes efforts to restore the resistance it had before the intervention, by proliferating bone consolidation formations.

Keywords: bone proliferation, strengthening structures, titanium implant

References

1. Albrektsson T, Zarb GA., 1993, Current interpretations of the osseointegrated response: clinical significance. *Int J Prosthodont*: 6: 95–105.

THE INTERACTION BETWEEN HF-EMF RADIATIONS AND BEES' BEHAVIOR - A LITERATURE ANALYSIS OF THE IMPACT ON THEIR HEALTH AND ECOSYSTEM

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Introduction: Bees, as key pollinators in the terrestrial ecosystem, play an essential role in maintaining biodiversity and ensuring sustainable food production. Electromagnetic radiation generated by current technology (mobile phones, 4G/5G wireless antennas) can affect the behavior and health of bees (consequences on the ecosystem-food chain).

Aims: The aim of the paper was to highlight the importance and relevance of the impact of non-ionizing electromagnetic radiation on bees, monitoring which becomes essential to understand the potential threats to their health and the ecosystem as a whole.

Materials and Methods: To explore the impact of electromagnetic radiation on bees, we took into account publications accessible in scientific databases published between 2007-2023. Data were collected from more than 100 publications and finally 83 studies were considered.

Results: The study authors highlighted the effect on bees exposed to non-ionizing electromagnetic radiation (changes in flight behavior, orientation and inability to identify the food source), highlighting the relationship between exposure to electromagnetic radiation and the decline of bee populations (*Collony Colapse Disorder*).

Conclusions and Future Directions: Studying the influence of non-ionizing radiation on bees has wider implications for ecology and the environment, as bees play a crucial role in pollination and maintaining ecosystems. The interaction between bees and electromagnetic radiation is a complex and multifactorial issue, with many variables (radiation intensity, frequency and duration of exposure, types of radiation, etc.) that may explain the diversity of conclusions in the available studies. Therefore, studies are needed in Romania to better understand the connection between non-ionizing electromagnetic radiation and bees.

Keywords: bees, biodiversity, behavior, environment, electromagnetic radiation

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COMPARATIVE HISTOLOGICAL ANALYSIS OF CAROTID BODY IN DOG, CAT, SHEEP, GUINEA PIG

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Introduction. The carotid body (CB) also named glomus carotid, inter-carotid, glandula carotica and carotid ganglion, is included in the group of chemoreceptor organs (aortic and carotid bodies). CB is localized at the bifurcation of the common carotid artery, embedded in the adventitia. The essential structure of the carotid body includes 4 basic components (1) clusters of neuroendocrine cells (organized as glomoids or glomeruli, considered the functional part of the carotid body), separated by (2) blood capillaries and supported by (3) fibrous connective tissue enriched by (4) sympathetic and parasympathetic nerves. The morphological unit of CB includes 2 types of cells named: "Cells type I" and "Cells type II"

Materials and methods. The samples were collected from the following species: cat, dog, sheep, and guinea pig. The procedure was performed according to the standard protocol. Histological results were presented. The three-chrome method was also used for the determination of special structures of CB.

Results. CB in the dog. The structure is mono-lobular, and the blood supply is ensured through 4 vessels that originate from the common carotid artery, (ACC) the occipital artery, (AO), the external carotid artery (ACE).

CB in cat. The structure mono-lobular, blood supply is formed by 4 vases with reach from the Occipital ascending pharyngeal trunk, Occipital artery(OA), Ascending pharyngeal artery(APA), External carotid artery (ECA).

CB in sheep. The structure is presented by 3 lobes that are located above the occipital artery and irrigated only with a single vessel which takes a rise from the occipital artery (OA).

CB in guinea pig. This structure is presented by one single lob. The blood irrigation remains to be determined in future research. The following histological results will be presented in images. Also would be attached below the schematic representation and comparative analysis of blood irrigation of CB in dogs, cats, sheep, and guinea pigs.

Conclusions. The morpho-functional structure is similar in mass and volume. While the structure of the lobes, position, and blood irrigation, show differences between the branches that can influence the predisposition to certain pathologies.

Keywords: carotid body, dog, cat, sheep, guinea pig

References.

1. Meuten, D. J. (Ed.). (2020). Tumors in domestic animals. John Wiley & Sons.
2. Clarke JA, Daly D. B, Ead HW, Kreclovi G. A morphological study of the size of the vascular compartment of the carotid body in a non-human primate (*Cercopithecus ethiopus*), and a comparison with the cat and rat. *Acta Anatomica* 1993;147:240–247
3. McDonald DM, Mitchell RA. The innervation of glomus cells, ganglion cells and blood vessels in the rat carotid body: A quantitative ultrastructural analysis. *J. Neurocytol.* 1975. p. 177–230.
4. Prabhakar, Nanduri R., et al., Cardiovascular alterations by chronic intermittent hypoxia: importance of carotid body chemoreflexes. *Clinical and experimental pharmacology and physiology* 32.5-6 (2005): 447-449.

IDENTIFICATION OF PREGNANCY IN MARES USING INFRARED THERMOGRAPHY IMAGING TECHNOLOGY

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Introduction: Infrared thermography (IRT) imaging technology has proven to be an effective non-invasive method to assess a series of physiological and pathological processes in veterinary medicine. Pregnancy increases uterine metabolic demands, which results in increased blood flow and temperature. Pregnancy diagnosis using IRT was successfully used in wild species. With an increase in the interest towards animal welfare it has gained popularity in the field of animal production. Attempts were made to use the technique for the diagnosis of pregnancy in wild horses (1, 2).

Aims: The aim of this study was to assess the reliability of an accessible IRT camera to diagnose pregnancy in mares.

Materials and Methods: Ten mares thoracic-abdominal area were evaluated using an IRT camera from a lateral view. Results were correlated to a trans rectal palpation and ultrasonography performed after the IRT scan. Pregnant and non-pregnant mares highest and lowest temperature points were then evaluated to detect any specific patterns of pregnancy.

Results: A pattern of increased temperature was observed in 4 out of 5 pregnant mares. 1 mare was falsely positive. The rest of 5 non-pregnant mares were correctly identified as non-pregnant.

Conclusion: IRT shows promising results in detecting pregnancy in a controlled environment.

Keywords: IRT, mare, pregnancy

References

1. Bowers, S., Gandy, S., Anderson, B., Ryan, P., & Willard, S. (2009). Assessment of pregnancy in the late-gestation mare using digital infrared thermography. *Theriogenology*, 72(3), 372-377.
2. Maško, M., Witkowska-Piłaszewicz, O., Jasiński, T., & Domino, M. (2021). Thermal features, ambient temperature and hair coat lengths: Limitations of infrared imaging in pregnant primitive breed mares within a year. *Reproduction in Domestic Animals*, 56(10), 1315-1328.

AN ATIPICAL CASE OF VIRAL ENCEPHALITIS IN A PET RABBIT

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Introduction: This study presents the clinical case of a 2 kg, approximately 2-year-old female Lionhead rabbit (*Oryctolagus cuniculus*) exhibiting recurrent seizures. The seizures, characterized by sudden onset, short duration (5-30 seconds), and high frequency (15-15 minutes), prompted a comprehensive diagnostic evaluation. The clinical manifestations, diagnostic procedures, treatment modalities, and subsequent outcomes of the case are systematically described.

Materials and Methods: A thorough clinical examination was conducted on the rabbit, encompassing physical assessment, blood analysis, and computed tomography (CT) brain scan. The medical intervention included administration of midazolam, meloxicam, and phenobarbital to address the seizures and manage pain. Environmental modifications were made to optimize the patient's well-being. Concurrently, treatment strategies targeting gastrointestinal stasis were implemented. Histological examination of brain tissues and consideration of potential differential diagnoses were undertaken.

Results and Discussion: The clinical examination revealed signs of depression, disorientation, and uveitis. The CT brain scan unveiled the presence of a hemorrhagic spherical mass within the left parietal lobe. Hematological analysis displayed leukopenia, lymphopenia, anemia, and thrombocytopenia. The primary differential diagnoses encompassed hematoma, abscess, and neoplasia. Despite the treatment regimen, the rabbit's condition progressively deteriorated, culminating with his death within three days. Histological analysis of brain tissues yielded indications suggestive of viral encephalitis, with herpesvirus infection being a plausible etiological candidate. Other differential considerations involved encephalitozoonosis, rabies, and rabbit hemorrhagic disease.

Conclusions: The case highlighted the challenges of diagnosing and treating neurological symptoms in rabbits. Viral causes, including herpes simplex encephalitis, should be considered even though they are rare. Prevention measures, such as limiting close contact with owners with herpetic infection, can be crucial. This case underscores the need for comprehensive diagnostic investigations and emphasizes the importance of expanding the understanding of potential viral causes in rabbits. Further research and clinical vigilance are warranted to enhance our understanding of these entities in rabbits.

Keywords: herpes virus type 1, *Oryctolagus cuniculus*, rabbit, seizures, viral encephalitis

References

1. Alessandro Mellilo (2007). Journal of Exotic Pet Medicine, Vol 16, No 3, pp 135-145
2. F. B. Knotts. Et al. (1973), J Exp Med (1973) 138 (3): 740-744
3. F. M. Harcourt-Brown, H. K. R. Holloway (2003). Veterinary Record (2003) 152, 427-431.
4. Millicent Eidson MA et al., (2005), Journal of the American Veterinary Medical Association 15, Vol. 227, No. 6, Pages 932-935

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RESTORING LOST STRENGTH: THE ROLE OF BIOMATERIALS IN MUSCULOSKELETAL REGENERATION AFTER VOLUMETRIC MUSCLE LOSS

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Introduction: Volumetric Muscle Loss (VML) refers to a specific type of muscle injury defined by the significant loss of muscle tissue in a three-dimensional volume. Currently, there is a lack of established clinical guidelines for addressing VML wounds, leading to limited treatment options and necessitating innovative approaches to restore function.

Aims: This review article aims to provide a comprehensive overview of the role of biomaterials containing bioactive glass (BG) in addressing VML, highlighting their potential in facilitating muscle regeneration and treating musculoskeletal defects.

Methods: A comprehensive search was performed on PubMed and Web of Science databases using combinations of the following keywords: 'Biomaterials', 'VML', 'Muscle Regeneration' and 'Bioactive glass'. Our focus was on experimental studies and subsequent literature; therefore, reviews were excluded.

Results: Numerous researchers have conducted studies exploring the efficacy of scaffolds loaded with bioactive molecules in facilitating the process of skeletal muscle regeneration in VML injury models. Despite their desirable features, scaffolds without cells or growth factors have not shown effective recovery of VML. The question raised is whether BGs, that have garnered significant attention for their ability to promote bone cell proliferation and establish robust bonds with both hard and soft tissues is capable to promote muscle regeneration. This effect is mostly attributed to the release of ions, which in turn activate gene expression.

Discussions: BG have not been widely studied for muscle regeneration following VML due to their stiffness, fragility, and limited ability to take different shapes.

Conclusions: Overall, the use of polymers with bioactive glasses for muscle regeneration holds significant promise in future testing trials for improving functional recovery after substantial muscle loss.

Keywords: Bioactive glass, Muscle regeneration, Volumetric muscle loss

ANTIMICROBIAL EFFECT OF ORGANIC ACIDS TO INHIBIT THE GROWTH OF *LISTERIA MONOCYTOGENES* INTO THE READY-TO-EAT PRODUCTS

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Introduction: The food safety concern in relation with *Listeria monocytogenes* (LMO) represents a reality and the purpose of this article is to highlight that using the organic acids represent a useful measure to inhibit the growth of LMO into ready to eat products during of shelf life. LMO infection is a foodborne zoonoses that affect humans as mild illness (the gastro-enteric form or non-invasive form) or as severe illness (the invasive form), in relation to the physiological condition of the individual. LMO could contaminate ready-to-eat products, both of animal and non-animal origin, due to its special behavior in relation to environmental conditions. The prevention of this disease is a continuing concern, hence the use of organic acids to preserve the RTE is a good food safety measure.

Aims: In this paper, we are presenting the antimicrobial effect of organic acids to inhibit or limit the growth of LMO in RTE products based on mayonnaise throughout the shelf life of the product. One of these is the dry buffered vinegar which contains acetic acid that has an important antimicrobial with strong antagonistic action against LMO.

Materials and Methods: In order to evaluate the antimicrobial effect of dry buffered vinegar (BactoCEASE® NV DRY, Kemin) added to Boeuf salad (salad with mayonnaise) it was conducted a research to LMO identification and counts of LMO during the shelf life. For this purpose were made a challenge test for 3 batches of RTE treated with dry buffered vinegar (Boeuf salad with chicken breast) that evaluate the growth potential of LMO during the shelf life (15 days).

Results: The highest growth potential for these three batches is 0.04. Values for *Listeria monocytogenes* to be achieved by the product on the following days after production so as not to exceed 100 cfu/g on the last day of storage.

Conclusion: Following the microbiological analyses carried out, it can be stated that growth of *Listeria monocytogenes* is not possible in the tested samples. The highest value of the obtained growth potential is less than 0.5 and it is 0.04.

Keywords: LMO, dry buffered vinegar, food safety, shelf life

References

1. Osman Erkmen, T. Faruk Bozoglu, Food microbiology, Principles into practice , vol I Microorganism related to foods , Foodborne diseasesand Food spoliage
2. ISO 20976-1:2019 Microbiology of the food chain — Requirements and guidelines for conducting challenge tests of food and feed products — Part 1: Challenge tests to study growth potential, lag time and maximum growth rate
3. Commission Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs

THE DISTRIBUTION OF VARIOUS FAMILIES OF SYNANTHROPIC NON-BITING FLIES COLLECTED FROM ROMANIAN PIG FARMS DURING OUTBREAKS OF AFRICAN SWINE FEVER VIRUS

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Introduction: African Swine Fever (ASF) remains one of the most serious threats to the European pig farming industry, along with the population of wild boars. Several studies suggest the potential implications of non-hematophagous dipterans in the spread of ASF in pig farms due to the identification of the virus DNA.

Aims: Our study aims to demonstrate, while additionally maintaining the focus on previous assessments, and enhance awareness with the support of our data that suggest the implications of non-hematophagous insects in the mechanical transmission of ASF between farms.

Materials and Methods: Insects were collected from 68 farms according to a risk scoring criteria. Standard entomological traps have been used to sample flesh flies, blow flies, sweat flies, house flies, peacock flies. The collected insects were morphologically identified using literature's key of identifications.

Results: This study, in both years (2020 and 2022), sampled 68 different farms. Out of this, only 66 localities have been positive for the collection of the insects. In 2020, two outbreak farms were negative for catching flies. In total, both years, we obtained 464 pools, or 1562 non-biting flies.

Conclusion: Our study, bring solid evidence to the presence of most common synanthropic flies near to domestic pig farms. This concern highlights the importance in the strengthening the biosecurity measures and to provide tight protocols for prevention of the insect life cycle and distribution.

Keywords: African Swine Fever, dipterans, domestic pigs

BAT ECTOPARASITES IN THE GRAND MAGHREB: A LITERATURE REVIEW AND NEW DATA

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Introduction: Arthropods parasites of bats play a crucial role in both ecological and public health contexts, as they have the potential to transmit zoonotic agents. The study aims to identify the distribution, and host-parasite associations of bat ectoparasites in the Grand Maghreb region (Mauritania, Morocco, Algeria, Tunisia, and Libya), which has been largely understudied.

Aims: to increase our understanding of bat ectoparasite community in the Maghreb region, we have performed a systematic literature review and used the extracted data to update the knowledge on the diversity, distribution and host association of these parasites.

Materials and Methods: We conducted a thorough analysis of published records as well as gathered our own field data.

Results: The checklist reveals a comprehensive total of 43 ectoparasite species, encompassing a range of taxa. Notably, the list comprises nine tick species, eleven mite species (including a chigger-mite), eleven bat fly species, three species of bugs, and nine species of fleas. Extensive research efforts uncovered a remarkable 141 host-parasite associations. Notably, our data presents ground-breaking records, documenting for the first time the presence of *Carios vespertilionis* and *Raymondia huberi huberi* in Tunisia, and *Ixodes simplex* and *Spinturnix plecotinus* in Algeria.

Conclusion: By compiling and analysing available information, we have provided for the first time an up-to-date checklist of bat ectoparasites and their host associations in the region. This knowledge contributes to a better understanding of the epidemiological implications associated with bat ectoparasites, emphasizing their ecological and public health importance. The study's findings call for continued investigations and monitoring of bat ectoparasites to mitigate potential risks and safeguard both human and animal populations.

Keywords: *Argasidae*, fleas, *Ischnopsyllidae*, *Ixodidae*, North Africa, *Nycteribiidae*

SESSION 10: GEODESY, FORESTRY AND APPLIED EXACT SCIENCES

GENERATIVE AND VEGETATIVE PRODUCTION OF *Castanea sativa* SEEDLINGS

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Introduction: The European chestnut (*Castanea sativa* Mill.) is a species of the Fagaceae family, abundant in southern Europe and Asia. It is the only autochthonous species of the genus in Europe (Conedera *et al.*, 2016). It is known that chestnut is difficult to propagate generatively by seeds, and vegetatively by grafting or cuttings (Corredoira, 2017).

Aims: The study aimed to investigate the generative and vegetative reproduction of the chestnut, taking into account the genetic variation within the species. The germination of seeds has been investigated, and methods to improve germination and seedling emergence have been tested.

Materials and Methods: Viable fruits (and thus seeds) were harvested from plus trees selected from Baia Mare provenance (Romania), a forest area registered with valuable populations of *C. sativa*. The seeds were classified into three categories, according to their weight: less than 5 g; between 5 and 8 g; more than 8 g. The seeds were sown in edaphic substrates composed of different ratios of humus, peat, and sand. Separately, the vegetative production of seedlings obtained through cuttings was analysed. For vegetative propagation, the cuttings were made in distinct categories of diameters and heights. Depending on the diameter, the cuttings were of two categories: under 0.5 cm, and between 0.5-1.0 cm. For both categories of diameters, three heights were used (20 cm, 30 cm, and 40 cm).

Results: The best results regarding the germination capacity were recorded for the seeds with an average weight of more than 8 g. The results confirm that seeds with the highest weight usually provide better germination, emergence, and a higher percentage of seedlings, probably correlated with their resources available for the first stages of growth. The best result for seedling viability and their traits (i.e., length, diameter, number of leaves) was recorded for seedlings obtained from seeds that weighing between 5 and 8 g. Regarding propagation through cuttings, the best results were noticed within cuttings with diameters between 0.5-1 cm and a height of 20 cm, with 50% sand + 35% perlite + 15% peat as soil substrate.

Conclusion: The current results may have theoretical and practical importance for the future *C. sativa* breeding programs in Romania, increasing the efficiency in the production of forest reproductive material, and also for the afforestation programs.

Keywords: European chestnut, forest reproductive material, germination capacity, substrate

References

1. Conedera M., Tinner W., Krebs P., de Rigo D., Caudullo G. (2016). *Castanea sativa* in Europe: distribution, habitat, usage and threats. European Atlas of Forest Tree Species.

SPATIAL ANALYSIS OF THE GÂRDA FOREST MANAGEMENT AREA USING GEOGRAPHIC INFORMATION SYSTEM

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Introduction: Climate change is one of the important challenge of this century. The proper management of the forest can combine the ecological aspects of forest with the need of development of the rural areas that depend of wood exploitation Kauppi *et al* (2022).

Aims The aim of this paper is to design a GIS that will allow the monitoring of the forest are from Gârda village by spatial analysis that will allow a proper management of the studied forest area.

Materials and Methods: The starting point was the topographical maps that was georeferencing and digitizing in the designed GIS. For the control points and other field information were used BackCountry and Mobile Topographer. All spatial data and descriptive data were included in a geographical information system that can be used from back office or on the field by web maps application.

Results: The geodatabase created by GIS can manage a large amount of information including on the classical forestry management system. Usually each parcel hide large amount of information about the age of the trees, the composition of the forest, origin, vitality, the proposed works, etc. For each aspect the design GIS allow creating the thematic maps and the analysis of that maps were performed.

Conclusions: Due to the dynamics of forest management, a geographic information system represents a spatial decision support that can also be accessed online through the web application.

Keywords: forest management, 3D analysis, GIS

References:

1. Kauppi P.E., Stål G., Arnesson-Ceder L., Hallberg Sramek I., Hoen H. F., Svensson A., Wernick I.K., Högberg P., Lundmark T., Nordin A. (2022). Managing existing forests can mitigate climate change. *Forest Ecology and Management*. 513:1-9

A STUDY OF BEECH ACORN USING FT-IR SPECTROSCOPY

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Introduction: In the last year, FT-IR spectroscopy has been introduced as a very efficient and non-destructive analytical tool for the reliable identification of principal components of samples. The biological activity and the pharmaceutical properties of plants are strongly dependent on their structure. Beech nuts are tasty nutrient-dense nuts produced in the fall by beech trees (*Fagus s.*) The non-extractable components in bark include polysaccharides (cellulose, hemicellulose and pectic substances), phenolic polymers (lignin and high-molecular-weight tannins) and cross-linked polyesters (cutin and suberin) (El-Bahy, 2005). The beech acorn contains omega 6 and omega 3 which have been shown to have medicinal properties.

Aim: In this work with it was investigated a principal components of beech acorn powder using FT-IR technique.

Materials and Methods: The sample from FT-IR spectrum was obtained from 0,2 mg powder of beech acorn from *Fagus sylvatica* (Romania site). Fourier Transform Infrared (FT-IR) spectra were performed in the absorbance with a spectrophotometer FT-IR-4100 Jasco, using KBr pellet technique. Spectral resolution was set at 4 cm⁻¹ and all spectra were acquired over 256 scans. The spectral data were analyzed using Origin 6.0 software.

Results: Analyzing the two spectra of beech seed shells and acorns one can observe a difference between the spectrum.

The band characteristic for the lignin is located at 1508-1510, 1603-1608 cm⁻¹ and these bands are present in all the extraction products. The band attributable to the hemicellulose is showed at 11736 cm⁻¹ assigned to the C=O stretch of acetyl and carbonyl groups.

Conclusion: FT-IR spectroscopy could provide quantitative information concerning the functional groups of tree components.

Keywords: beech (*Fagus sylvatica*) acorn, FT-IR (Fourier transform infrared)

References:

1. El-Bahy, G. M. S. (2005). FTIR and Raman spectroscopic study of Fenugreek (*Trigonella foenum graecum* L.) seeds. Journal of Applied Spectroscopy, 72, 111-116.

THE IMPACT OF DEBRIS FLOW ON CONCRETE TORRENT DAMS, FROM UPPER STREI WATERSHED

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Introduction: Debris flows are rapid type of mass movements on slopes or in steep torrential channels. They are multiphase (at least two-phase) flow of water (fluid phase) and debris (solid phase) of different sizes (clay or sand to boulders) and in some cases vegetation (tree trunks and branches). Besides the degradation of the landscape in the hydrographic basin, these torrential processes have resulted also in partial or total damage, or the decommissioning of existing torrent correction works.

Aims: In order to achieve the proposed goal, we considered the following aspects, which also constituted the objectives of these researches: - studying the hydrological regime of torrential floods; - tracking the effects of torrential floods on dams, the efficient operation of spillways and energy dissipators;

Materials and Methods: The research on the hydrological regime were carried out on the main course the upper Strei River as well as on its left and right tributaries, areas covered by transversal works of torrent correction. The well represented hydrographic network led to a strong fragmentation of the landscape. Among its most representative tributaries one can mention valleys: Rea, Gruîşoara, Jigoreasa, Strâmba, Jigoroşiţa; and streams: Leucuş, Pravăţ, Copăciosu, and Rovina Leului. The slope of silt deposition in alluvial deposit is significantly lower than the natural slope of the riverbed, which reduces the flow rate of water leakage or transported solid flow during floods.

Results: It is to be mentioned that very dangerous it is the rains that extend over a period of 24 hours and which wet the soil exhausting its infiltration and water retention capacity. The analysis of the granulometric composition of samples proves that the predominant gravel fraction is 70-85%, and the percent of boulder and rock is 15-30%.

Conclusion: In the Upper Strei forest basin, torrential processes occur annually affecting mainly the transport network by clogging or embankment washing, by blocking culverts drainage section or dislocation of their decks and roads supporting walls.

On torrential valleys from the superior basin of Strei River, subsidence of sides occurred and on the forest slopes landslides occurred due to the large amount of precipitation and the geological brittle substrate. In alterations formed the slope with the lowest recorded works downstream slope and higher values are distributed upstream work.

Keywords: dangerous rains, debris flow, torrent works

THE ECOLOGICAL RECONSTRUCTION OF INAPPROPRIATE FOREST STANDS FROM LECHINȚA EXPERIMENTAL BASIS

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Introduction: The Experimental Base (formerly Forest District Experimental) Lechința, is located within the Bistrița-Năsăud county and it was established in 1974, the main objective declared as a research problem being the identification of solutions to restore the degraded stands of the Transylvanian Plain and bring them to the fundamentally natural type, simultaneously with the increase of their value both from an economic and ecological. By destructured (inappropriate) forests we mean forests that have an improper structure from a functional and biodiversity point of view, and by degraded forests we mean forests affected by phenomena of degradation of health, productivity.

Aims: Considering the historical situation of the forests in the studied area, affected by technical mistakes in the past and currently subject to biocenosis succession trends due to climate changes, it was to desired to capture the extent of the phenomenon of structural and functional degradation of the forests from the area by making a classification according to the current state and the type of intervention required, simultaneously with an analysis of the spatial distribution of the types of degradation and the performance of qualitative and quantitative assessments for stands where various methods and technologies regarding restoration and replacement were previously applied

Materials and Methods: In general, existing poorly productive stands can be classified, from a scientific and practical point of view, into several categories, taking into account the following criteria or particularities: the functions they have to perform; the natural conditions in which they are found; their structure according to function of the specific composition, age, consistency.

Results: Within the location have been identified 6 categories of stands that can currently be categorized as inappropriate (unproductive/destructured) and occupy 872 ha. The most numerous are the non-productive black locust stands installed in unfavorable locations (315 ha).

Conclusion: The potential of the forest site at the level of the analyzed area for the basic species shows large variations from one place to another (often on small areas), which determines large qualitative and productive variations recorded at the level of stands.

Keywords: ecological reconstruction, inadequate forests, structural and functional degradation

References:

1. *** Forest General Management Plan Lechința Experimental Basis (2016).

THE INFLUENCE OF SUBSTRATE AND THE MAIN ABIOTIC STRESS FACTORS ON *Abies alba* GERMINATION

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Introduction: Silver fir (*Abies alba* Mill.) is acknowledged as a valuable forest species due to its numerous uses (Todea *et al.*, 2020). It is among one of the most widespread tree species in Europe, particularly in Central and Eastern Europe (Ancuceanu *et al.*, 2023). However, managing its genetic resources and effectively conserving them, faces challenges in the current state of climate change, while germination of the species is known to be problematic.

Aims: The study objective was to investigate the germination of silver fir seeds collected from selected plus trees identified at the Garda Seaca provenance (Romania), as certificated forest reproductive material (FRM) for population of *A. alba*.

Materials and Methods: Two experiments were conducted to assess seed germination. The first one involved varying treatments applied to seeds (exposure to different temperatures), while the second focused on different substrates in order to assess germination. In this regard, seeds were subject both to heat and cold for specific intervals (having three treatments), and three substrate types, with distinct compositions (peat, humus, and perlite, in distinct proportions) were tested.

Results: The findings of the germination tests conducted in the study unveiled substantial variability. The application of thermal shock to the silver fir seeds was found to be more effective for enhancing germination. Statistical analysis confirmed significant differences among the proposed variants, demonstrating that germination was indeed influenced not only by substrate composition, but also by the external stress applied to the seeds prior to germination (heat/cold).

Conclusion: It can be concluded that seeds exposed to the most extreme temperatures tested hereby seeds kept at 45 °C for two hours, thereafter stored at -20 °C for two hours, then seeded and watered, along with substrate composed of peat (60%), sand (30%), perlite (10%), resulted in the best germination of *A. alba* seeds.

Keywords: abiotic stress, climate change, germination, silver fir, substrate

References

1. Todea I. M., González-Orenga S., Boscaiu M., Plazas M., Sestras A. F., Prohens J., ... & Sestras R. E. (2020). Responses to water deficit and salt stress in silver fir (*Abies alba* Mill.) seedlings. *Forests*, 11(4), 395.
2. Ancuceanu R., Hovaneț M. V., Miron A., Anghel A. I., Dinu M. (2023). Phytochemistry, Biological, and Pharmacological Properties of *A. alba* Mill. *Plants*, 12(15), 2860.

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BIODIVERSITY MAPPING TROUGH IDENTIFICATION AND VALIDATION FOR USE IN AUTOMATIC ALGORITHM RECOGNITION OF VEGETATION IN SATELLITE IMAGES. CASE STUDY: BAI A MARE AREA

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Introduction: In recent years, the classification of plant communities through satellite data through in-field observations for algorithm classification validation is a seldom effort (Kluczek *et al.*, 2022). Also, the plant phenology annual variations will make this process difficult as yearly variations will provide different results (Madonsela *et al.*, 2021).

Aims: This study aims to identify the best methods for biodiversity mapping, in order to be used for automatic algorithm recognition of vegetation in satellite images. This activity was included in a larger goal, that aimed to provide an automatic and accurate land use and land cover LULC classification into five major categories: forests, marshes, water bodies, herbaceous vegetation, and agricultural land (including a detailed classification of biodiversity).

Materials and Methods: The biodiversity mapping followed at first the main European protected habitats, including forests, wetlands and herbaceous meadows and pastures. After the algorithm classification results, the field research focused on larger area habitats with prevalence of the determinant species. For this, the transects method proved to be the best method, with the quadrant method being useful for areas larger than 20x20m.

Results: The best results were obtained in large homogenous areas, with one or few prevalent species. The validation of the algorithm classification shows consistent results when compared with field investigations.

Conclusion: The homogeneity of the vegetation, regarding both the prevalence of the determinant species and the size of the area are crucial for obtaining high accuracy algorithm classification. Also, the plant phenology annual variations play a decisive role for multiannual algorithm classifications.

Keywords: biodiversity, plant phenology, remote sensing, software algorithms, vegetation indices

References:

1. Kluczek M.; Zagajewski B.; Kycko M. Airborne HySpex Hyperspectral Versus Multitemporal Sentinel-2 Images for Mountain Plant Communities Mapping. *Remote Sens.* 2022, 14, 1209.
2. Madonsela S.; Cho M.A.; Ramoelo A.; Mutanga O. Investigating the Relationship between Tree Species Diversity and Landsat-8 Spectral Heterogeneity across Multiple Phenological Stages. *Remote Sens.* 2021, 13, 2467. <https://doi.org/10.3390/rs13132467>

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