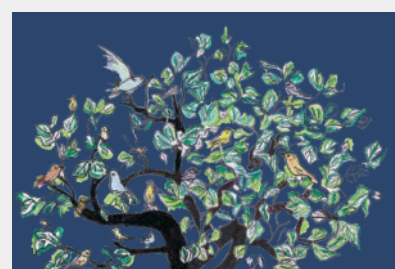
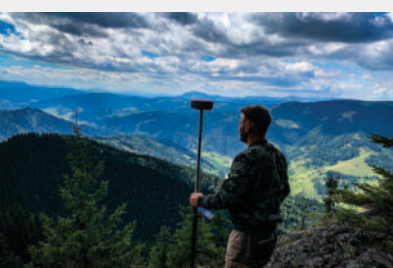




the **24th** INTERNATIONAL CONFERENCE
**LIFE SCIENCES FOR
SUSTAINABLE DEVELOPMENT**
25 - 27 September 2025, Cluj-Napoca, Romania

BOOK OF ABSTRACTS

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Organize

The 24th INTERNATIONAL CONFERENCE ”LIFE SCIENCES FOR SUSTAINABLE DEVELOPMENT”

25th– 27th September, 2025
Cluj-Napoca, Romania

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WELCOME MESSAGE

We are pleased to welcome you to the 24th 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 24th 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 24th 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 eight main sessions:

1. Agriculture & Environmental Protection
2. Food Science and Technology
3. Horticulture and Landscape
4. Economics and Rural Development
5. Animal Science & Biotechnology
6. Veterinary Medicine – Fundamental and preclinical sciences
7. Veterinary Medicine – Clinical sciences
8. 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, Food Science and Technology, and Forestry and Cadastre.

"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. Vlad MUREȘAN, PhD
Vice-rector for Research, Development
and Innovation

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, 25 th September 2025		
09:00 -11:00	Registration of participants	Hall - Aula Magna “Mihai Șerban”, UASMV Cluj-Napoca
09:30-09:45	Opening ceremony Rector, Cornel CĂTOI Vice-Rector, Vlad MUREȘAN	Aula Magna “Mihai Șerban”, UASMV Cluj-Napoca
09:45-12:45	Plenary Session Chairpersons: Sanda ANDREI, Cătălina DAN, Oana POP, Mignon SANDOR, Adriana URCAN Horia VLASIN	Aula Magna “Mihai Șerban”, UASMV Cluj-Napoca
09:45-10:15	SUSTAINABLE MICROBIAL SAFETY IN THE FOOD CHAIN	PABLO FERNANDEZ ESCAMEZ Spain
10:15-10:45	AGRICULTURAL BIOTECHNOLOGY AND PRECISION BREEDING FOR FOOD SECURITY FROM THE POINT OF VIEW OF ANIMAL BIOTECHNOLOGY	ELEN GÓCZA Hungary
10:45-11:15	WILDLIFE HEALTH MONITORING AND SURVEILLANCE IN NORTHERN ITALY: PAST EXPERIENCES AND FUTURE PRIORITIES	Rudi CASSINI Italy
11:15-11:45	CURRENT TRENDS IN ENCAPSULATION AND DIGESTION OF BIOACTIVE COMPOUNDS	ANTÓNIO VICENTE Portugal
11:45-12:15	MUTUALISTIC INTERACTIONS: HOW ARBUSCULAR MYCORRHIZAL FUNGI ENHANCE PLANT HEALTH	CLAUDIA RUTA Italy
12:15-12:45	NEW MODELING APPROACH TO ASSESS EROSION INTENSITY AND RUNOFF IN BRAZIL, MOROCCO, MONTENEGRO, SERBIA, NEPAL, AND IRAN	VELIBOR SPALEVIC Montenegro
13:00 –14:30	Lunch – Biodiversity Research Center	
15:00-18:30	Oral Sessions (sessions I-VIII) <i>For more details, please see the program</i>	
19:00-24:00	Gala Dinner (<i>Restaurant Wonderland Resort</i>)	
Friday, 26 th September 2025		
09:00-13:30	Poster Session (Presentation and Evaluation) Oral Sessions (sessions I-VIII) <i>For more details, please see the program</i>	
14:00 –14:30	Closing ceremony and Best Poster Awards	Aula Magna “Mihai Șerban”, UASMV Cluj-Napoca
Saturday, 27 th September 2025		
08:30-22:00	Post - conference tour (optional) - Transylvania Route: Mediaș-fortified churches and Apoldia Vineyard & Winery Fest	

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ORAL PRESENTATIONS

SESSION 1: AGRICULTURE AND ENVIRONMENTAL PROTECTION

SUSTAINABLE MICROBIAL SAFETY IN THE FOOD CHAIN

Pablo S. FERNÁNDEZ^{1,2*}, Ioana BODEA¹, Antonio MARTÍNEZ², Enriqueta GARCÍA-GUTIÉRREZ^{1,2}, M. Dolores RODRIGO², Alfredo PALOP^{1,2}, Paula M. PERIAGO^{1,2}, Alberto GARRE^{1,2}

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Introduction: Foodborne outbreaks of bacterial pathogens are a serious concern in the food industry. Minimally processed products are raising interest, in particular fruits and vegetables are an important part of the diet and their availability in different formats facilitate consumption. Initial process of fruits and vegetables usually start with a washing stage. Effective treatments need to be applied, but they should be sustainable and not cause harm. Chlorine is a disinfectant widely used in the food industry. However, health and possible adverse effects have been identified. Therefore, it is necessary to find sustainable alternatives that can control foodborne pathogens without negative effects.

Aims: To identify alternatives to chlorine investigating the antimicrobial effects of essential oils that can be applied for the fruit and vegetable industry, using nanoemulsions as an alternative.

Materials and Methods: Essential oil nanoemulsions (derived from aromatic plants), were prepared and used as part of washing solutions was tested. Vegetable products were contaminated with an inoculum of pathogenic microorganisms. They were then immersed in different washing solutions: water as control, chlorinated water (classical process) and nanoemulsions at different concentrations and contact times.

Results: The treatments tested proved to be efficient against different microorganisms tested, reaching a significant inactivation. The level of inactivation depended on the concentration and time of exposure of each compound. Using combined inactivation strategies can induce adaptation mechanisms in pathogenic bacteria. This adaptation is induced by stress response strategies that enhance their viability. A model has been proposed to establish the impact of acclimation in bacteria.

Conclusion: Sustainable strategies are essential in food safety. They need to consider different factors, such as nanoemulsions properties and the behaviour of microorganisms to establish adequate conditions in order to replace chemical alternatives with possible adverse effects on health and the environment.

Keywords: essential oil nanoemulsions, microbiological safety, predictive modelling.

Acknowledgements: SEQR FOOD, MSCA 101182843; NextGenerationEU AGROALNEXT PRTR-C17.I1.

PHENOLIC PROFILING OF OLIVES FROM CRETE ACCORDING TO VARIETY AND MATURATION USING NMR SPECTROSCOPY

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Introduction: Olive oil production is a very important economic activity for the greek island of Crete, which traditionally produces olive oil of superior quality that is also covered by various PDO (Protected Denomination of Origin) and PGI (Protected Geographical Indication) labels. One of the key attributes of extra virgin olive oil is its high phenolic content that includes bioactive compounds such as secoiridoids, with rich antioxidant activity and demonstrated health benefits after consumption. The phenolic content of olive oil depends on various factors, including olive tree variety, olive fruit maturation, pedoclimatic conditions, agricultural practices, processing practices during oil extraction and storage history.

Aims: The present work aims at studying the effect of olive tree variety (Koroneiki, Tsounati, Chondrolia) and olive fruit maturation on the phenolic profile and the metabolome of olive fruits grown on the island of Crete during the 2023 and 2024 production years.

Materials and Methods: Olives were collected by hand from different orchards, and freeze dried before three different extraction protocols were applied to quantify the secoiridoid, phenolic and sugar profile of the fruits using NMR spectroscopy. NMR analysis of the extracts was performed on Bruker Avance III 500 MHz and Neo 400 MHz NMR spectrometers. Spectral and statistical analysis was done using NMRProcFlow and Statistica software, respectively.

Results: It was determined that the secoiridoid and phenolic profile of olives depended mainly on differences in agricultural practices and pedoclimatic conditions affected by the location of the olive tree orchards. The phenolic load of the olives became lower as maturation of the fruit increased, but the sugar profile remained mostly constant. Cornoside was found to be a marker for Chondrolia olive fruits, while Tsounati olives contained higher amounts of verbascoside, relative to the other varieties, but had larger variability in their phenolic profile.

Conclusion: In the present research work, we demonstrated that the phenolic profile of olives as obtained by NMR spectroscopy can be used to infer olive tree variety and that agricultural practices together with pedoclimatic conditions influence heavily the phenolic profile and load of olive fruits.

Keywords: NMR spectroscopy, olive fruit, phenolic profile, variety.

MICROCLIMATIC INFLUENCES ON GRAIN YIELD OPTIMIZATION IN SUSTAINABLE AGRICULTURE SYSTEMS

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Introduction: Microclimatic parameters strongly influence crop productivity in sustainable agriculture, especially under climate variability in temperate regions (Gardner *et al.*, 2021). Understanding the relationship between microclimate and grain yield is critical for adapting agrotechnical measures to maximize production efficiency (Marta Janczak-Pieniazek and Joanna Kaszuba, 2024).

Aims: The purpose of this research was to evaluate the impact of microclimatic conditions on the yield performance of three cereal species under open field conditions.

Materials and Methods: The experimental field was placed in Jucu, Transylvania region, at the Didactic and Experimental Station of USAMV Cluj-Napoca, during the April–July, 2025 period. Six experimental variants (wheat, triticale, rye), each with three replications, were arranged in a randomized block design. Key microclimatic parameters (air temperature, relative humidity, wind speed and solar radiation) were monitored daily throughout the vegetation period. Grain yield (kg/ha) was determined at harvest by weighing the biologically mature and technologically processed grains obtained from each plot.

Results: The data revealed a significant correlation between microclimatic parameters and the yield per hectare of the tested cereal crops. Moderate temperatures and high solar radiation were favourable for wheat development, while variations in relative humidity and wind speed had a more pronounced impact on triticale and rye yields. Comparative analysis of the experimental variants indicated the superior adaptability of wheat to the local conditions in Jucu, highlighting its potential for optimizing production within sustainable agricultural systems.

Conclusion: The integration of microclimatic monitoring and crop-specific adaptation strategies is essential for optimizing cereal yields within sustainable farming systems in the Transylvanian plateau. Grain yield determination in relation to microclimate offers a practical approach to improving agricultural resilience and productivity.

Keywords: cereal crops, microclimate, microclimatic parameters, sustainable yield.

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SENSORY AND LIPIDOMIC ANALYSIS OF CHEESES FROM GREECE AND GERMANY

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Introduction: Local cheeses are an integral part of the gastronomic and cultural identity of many European countries, while a wide range of artisanal cheeses with distinct sensory characteristics are produced. White-brine cheeses and hard cheeses possess unique lipidomic composition, which is shaped, beside other facts, by the milk source, the brining, and the ripening techniques.

Aims: Characterization and comparison of selected white-brine and hard cheeses from Germany and Greece, in terms of their flavor and lipidomic profile.

Materials and Methods: The analyzed samples included a Feta cheese produced in Germany using goat and sheep milk of Greek origin, Patros Feta (PF); two German Feta-type cheeses made from cows' milk, Patros Natur and Rewe-Bio Hirtenkäse (PN, RBH); two Greek Feta-type cheeses, Paradosiako Tiri Almis and Leuko Tiri Almis (PTA, LTA) and Graviera Kritis (GK). The sensory attributes (smell and taste) were evaluated by a trained panel (n = 16) that performed Quantitative Descriptive Analysis. The lipid profile of the cheeses was analyzed by Nuclear Magnetic Resonance (NMR) analysis and Solid Phase Micro Extraction Gas Chromatography Mass Spectrometry (SPME-GC/MS).

Results: GK cheese had the most intense and piquant aroma, while the three German cheeses exhibited the dairy smells. In taste, LTA and PF were the most intense; cows' milk cheeses were creamier, and PF was notably sourer and saltier, among the cheeses tested. NMR analysis demonstrated that GK have the highest percentage of unsaturated fatty acids. RBH was the richest in butyric acid, and had the highest ratio of 1,2-diglycerides to triglycerides. LTA and PTA displayed the highest saturated fatty acids' percentage. PF had moderate values across most cheese dependent lipid profile markers. SPME-GC/MS analysis revealed key volatile compounds shaping the aroma profiles.

Conclusion: The short and even-chain free fatty acids were present in all samples, but variations in odd-chain fatty acids likely contributed to differences in taste and smell.

Keywords: Feta, Graviera, lipidomics, sensory analysis, white-brine cheeses.

Acknowledgements: We would like to thank IKY and DAAD for the financial support, though the project IKY-DAAD 2024.

CLIMATE CHALLENGES: ASSESSING THE EFFECTS OF DROUGHT AND HEAT STRESS ON *RAPHANUS SATIVUS* PHOTOSYNTHESIS AND PIGMENT CONTENT

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Introduction: High temperatures and drought impair plant growth by triggering leaf curling, dehydration, toxin and ROS accumulation, and widespread physiological disruption, ultimately reducing yields. Safeguarding food security, therefore, depends on breeding and agronomic strategies that exploit plants' innate defenses—such as osmotic adjustment, heat-shock proteins, and antioxidant systems—to enhance thermotolerance and resilience.

Aims: We investigate how plants from the Brassicaceae family respond to drought stress in conjunction with high-temperature exposure. Specifically, we focus on the responses of *Raphanus sativus* var. *Johanna* and *Helga* assessed these stressors to evaluate their impact on photosynthetic parameters and biochemical characteristics.

Materials and Methods: In this experiment, each plant experienced both drought and heat, but in two distinct sequences to assess order-specific effects. In the first regime (drought → heat), irrigation was withheld for three days to induce a moderate soil-water deficit, after which the plants were suddenly exposed to a five-minute heat pulse at 30, 40, 50, or 60 °C. In the second regime (heat → drought), the same brief heat treatment preceded the three-day drought period. Photosynthetic parameters, including net assimilation rate and stomatal conductance to water vapor, were measured using a gas exchange system for both control and treated plants. Quantitative analyses of photosynthetic pigments, including chlorophyll *a*, chlorophyll *b*, and zeaxanthin, were performed using UHPLC-DAD equipment.

Results: The photosynthetic parameters, including net assimilation rate and stomatal conductance to water vapor, decreased in plants subjected to drought and heat stress, although no cumulative or synergistic effects were detected. The concentration of photosynthetic pigments, such as chlorophyll *a* and *b* and zeaxanthin, also declined under both stress conditions, even with the short exposure duration.

Conclusion: The study demonstrates that drought and heat stress independently impair key photosynthetic functions and pigment content in *Raphanus sativus* var. *Johanna* and *Helga*, with no observed synergistic effects. These findings highlight the vulnerability of these plants to environmental stresses and underscore the importance of developing strategies to enhance stress tolerance to secure crop productivity under changing climate conditions.

Keywords: drought stress, heat stress, plant photosynthesis.

RESEARCH ON THE DYNAMICS OF CULTIVATED AREAS AND TRENDS IN GARLIC CULTIVATION IN ROMANIA

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Introduction: Garlic cultivation (*Allium sativum*) is a good source of income for many farmers, gaining ground and becoming increasingly appreciated across our country, representing an excellent source of revenue through its introduction into field crops. Global garlic production increased from 8.43 t/ha in 1990 to 13.02 t/ha in 2007, and by 2013 it reached 28.7 t/ha (Etana, 2018).

Aims: In order to determine which counties have the highest yields and cultivated areas, the article analyzes the dynamics of the cultivated areas and yields to give a national analysis of the trends of the areas cultivated with dried garlic and of the yields acquired.

Materials and Methods: This study employed a descriptive research design based on statistical data provided by the National Institute of Statistics (INS) through access to the Tempo Online database. The study analyzes the areas cultivated with garlic at the macroregional and county levels, correlated with the yields obtained, during the period 2019–2023, in comparison with the year 1990.

Results: The areas used and the production of garlic correlate with climatic influences and relief steps, this varying from one macroregion to another. The counties with the largest average area cultivated with garlic are Suceava with 683.4 ha, followed by Botosani 597.8 ha compared to the counties with the smallest cultivated areas such as Harghita 4 ha and Brasov 4.6 ha which are not helped by the relief either.

Conclusion: Although garlic seems difficult to cultivate in Romania, because it does not have easy technology and requires specific environmental conditions, with high water requirements and humidity that must be constant throughout the growing season, it has found a favorite place in our country, and farmers have begun to cultivate garlic in rotations with field crops.

Keywords: *Allium sativum*, climatic influences, production.

References

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CONTRASTING WATER-STRESS RESPONSES IN GALIUM VERUM AND HELICHRYSUM ITALICUM: PHOTOSYNTHESIS, PHENOLICS, AND VOC SIGNATURES

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Introduction: Plants frequently endure water-related stresses that disrupt photosynthesis and secondary-metabolite pathways. Clarifying how specific medicinal species respond to drought versus flooding is valuable for ecology and cultivation.

Aims: To compare the physiological and chemical plasticity of *Galium verum* and *Helichrysum italicum* exposed to two contrasting water regimes: flooding and drought.

Materials and Methods: Seedlings were grown in controlled chambers, then assigned to control, drought (soil water < 30% field capacity), or flooding (waterlogged). Net photosynthesis, stomatal conductance, and chlorophyll fluorescence were tracked weekly. HPLC analysed leaf extracts for phenolics; PTR identified head-space VOCs–TOF-MS; total polyphenols and chlorophyll were quantified spectrophotometrically.

Results: Both stresses curtailed gas exchange, yet *G. verum* kept higher ΦPSII under drought, whereas *H. italicum* withstood flooding better. Drought lowered chlorophyll 18–27 %, but flooding slightly increased it in *H. italicum*. Total polyphenols rose by up to 42 % under drought in *G. verum*, while flooding promoted phenolic buildup in *H. italicum*. VOC bouquets diverged: drought boosted sesquiterpenes, flooding enhanced green-leaf volatiles, each species showing distinct fingerprints.

Conclusion: *G. verum* and *H. italicum* deploy species-specific, multilayered adjustments—photosynthetic modulation, phenolic accumulation, and tailored VOC release—that confer tolerance to opposite water stresses, informing breeding and agronomic management of aromatic crops under variable climates.

Keywords: photosynthesis, plant stress, secondary metabolites.

Acknowledgments: This work was supported by a grant from the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0022.

EXPLORING PUBLIC PERCEPTION OF RED CLOVER'S USES IN PHYTOPHARMACY AND PHYTOMEDICINE

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Introduction: Red clover is an important perennial allogamous plant from the *Fabaceae* family that plays a significant role in agriculture, health and environmental sustainability worldwide (Muntean, 2006; Özyazici *et al.*, 2021; Petrauskas *et al.*, 2023).

Aims: This study aims to assess the public's knowledge level on the medicinal properties of red clover and their opinion on its use in medicine.

Materials and Methods: The study was carried out on respondents from Cluj-Napoca, using an online questionnaire developed in Google Forms. The survey link was randomly sent via Messenger, WhatsApp or Gmail platforms between October 1, 2024, and March 1, 2025. A total of 110 participants took part in the study.

Results: The questions from section B showed good consistency, with a Cronbach alpha of 0.723. Most respondents with high knowledge of red clover's medicinal use for cancer or menopausal affections, were from medical (10.3%) and related fields (86.3%), and they obtained their information mostly from internet (43.6%). Most respondents believe that red clover-based medicines offer health benefits (52%) and would consider using them based on a doctor's recommendation (57%).

Conclusion: Overall, many respondents knew about and expressed interest in the use of red clover, highlighting the plant's importance for health.

Keywords: *Trifolium pratense*, phytomedicine, phytopharmacy, public perception, survey.

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FROM THE FIELD TO ENERGY: A REVIEW OF BIOMASS COMBUSTION

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Introduction: Biomass is a renewable energy source which may be used directly in the process of combustion or processed for the production of heat and electrical energy (Baum *et al.*, 2013). Some estimations predict that in the future it may be possible to obtain up to half of the total energy needs from biomass (Demirbas, 2008). As it is the energy sector has a vital role in the development and in the economic growth of a country, since investments in the renewable energy sector would lead to the creation of new jobs and it would encourage innovation (Erdiwansyah *et al.*, 2024).

Aims: In this paper the possibility of using agricultural biomass as a renewable source of electricity and heat energy will be analysed and it will provide a comprehensive summary of the process of biomass combustion starting from the sourcing of the biomass and ending with the combustion.

Conclusion: In this article an abstract was provided of the information that is widely available about the solid biofuels, the sources from where they can be obtained, about their characteristics and about the preparation and the combustion of said biofuels.

Keywords: biomass, agriculture, crops, solid fuel, combustion.

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SOIL MICROBIAL AND CHEMICAL RESPONSES TO GREEN MANURE AMENDMENTS UNDER VARIABLE CLIMATE SCENARIOS

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Introduction: The use of green manures is a sustainable agricultural practice that improves soil structure, promotes microbial activity and enhances nutrient cycling. Their effectiveness depends on species composition and environmental conditions such as temperature and moisture.

Aim: This study aimed to evaluate the effect of three green manure species on organic matter decomposition, soil microbial functional diversity and nutrient availability under simulated climate conditions in a microcosm system.

Materials and Methods: Microcosms were established using luvisol soil (pH 5.5), each amended with 4 g of dry biomass from vetch (*Vicia villosa*), mustard (*Sinapis alba*) and barley (*Hordeum vulgare*). A total of 54 microcosms were incubated for 58 days under two conditions: 22°C with 10% moisture and 22°C with 20% moisture. Decomposition was assessed gravimetrically. Microbial activity was analyzed using the MicroResp method, while chemical parameters (NH_4^+ , NO_3^- , PO_4^{3-}) were determined through Visocolor tests following standardized protocols.

Results: Decomposition rates were higher in microcosms maintained at 20% humidity, confirming the role of moisture in microbial activity. The longest incubation period (T3) resulted in the greatest organic biomass loss. Leguminous species decomposed faster than barley, likely due to their lower C:N ratio and higher nitrogen content. Microbial respiration indicated enhanced activity in soils treated with green manure, especially under warmer and moister conditions.

Conclusions: Green manures accelerate organic matter decomposition and stimulate soil microbial activity, supporting nutrient release and soil fertility. These findings emphasize the importance of selecting appropriate species and adapting practices to local climate conditions to optimize the benefits of green manuring in sustainable agriculture.

Keywords: green manure, microcosm, MicroResp, microbial activity, decomposition

POLLUTION WITH LEAD AND CADMIUM IN LYMPHOTROPIC AREAS OF BAIA MARE

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Introduction: Mining activities in the Baia Mare area have had a significant impact on all components of ecosystems, including soil. Heavy metal dust resulting from processing, such as lead (Pb) and cadmium (Cd), has been released into the environment, affecting the quality of environmental factors in the long term. Their accumulation in the soil can persist for decades and poses a major toxicological risk to vegetation, fauna, and human health (Coman *et al.*, 2010a; Boros *et al.*, 2015).

Aims: The aim of this paper is to determine the current level of Pb and Cd contamination in the lymphotropic area of Baia Mare, because of long-term non-ferrous mineral mining and processing activities.

Materials and Methods: Soil samples were taken at different depths (5, 30, 50, and 100 cm) at four points, namely Baia Mare, Baia Sprie I, Baia Sprie II, and Tăuții de Sus. Chemical determinations were performed in an accredited laboratory, ICIA Cluj-Napoca, in accordance with standards (SR ISO 11464:1994 – sample preparation, SR ISO 11047:1999 – determination of heavy metals in soils by atomic absorption spectrometry, SR EN ISO 17294-2:2017 – ICP-MS analysis).

Results: The results showed a high concentration of Pb in the soil in Baia Mare, especially in the deeper horizons (e.g., values of up to 480 mg/kg at 100 cm), exceeding the legal limit by almost 10 times. Cadmium reached maximum values of 4 mg/kg at the same depth, also exceeding the maximum legal limits permitted at national level.

Conclusion: For Pb, exceedances were recorded at all sampling points in the Baia Mare area. For Cd, exceedances were recorded in the Baia Mare area at the sub-surface and depth horizons and in Tăuții de Sus at the surface horizon. Therefore, almost 20 years after the cessation of non-ferrous ore mining and processing activities in the Baia Mare Mining Basin, soil pollution with heavy metals has been proven to persist.

Keywords: cadmium, environmental impact, heavy metals, lead, soil pollution.

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THE IMPACT OF CLIMATE CHANGE ON ORGANIC MATTER DECOMPOSITION IN AGROECOSYSTEMS

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Introduction: The decomposition of organic matter is an important process for soil fertility and productivity of agroecosystems (Bastida *et al.*, 2021). This breakdown mechanism releases macro- and micronutrients that are necessary for plant growth and development (Teklayet *et al.*, 2010).

Aims: To identify and analyze research trends, interconnections, and influencing factors related to organic matter decomposition.

Materials and Methods: To investigate the relationship between organic matter decomposition and its associated factors, we have used VOSviewer, a software tool designed for constructing and visualizing bibliometric networks.

Results: By analyzing research topics and directions, we mapped multiple interconnections, focusing on organic matter decomposition, microbial dynamics, community structure and functional diversity, all reported to climate change context as key points.

Climate change-driven warming disturbs and alters microbial activity, impacting on decomposition, nutrient cycling, and soil health. Visual interconnected generated maps revealed strong linkages between microbial activity, temperature fluctuations, and release of nutrients during organic matter decomposition in agricultural fields.

Conclusion: Our study demonstrates the value of using bibliometric tools (VOSviewer) to synthesize and interpret research on organic matter decomposition.

Keywords: Climate change, decomposition, microbial communities, organic matter, software tool.

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ENHANCING SUSTAINABILITY IN FOOD COMPANIES BY INTEGRATING ENVIRONMENTAL, QUALITY, AND FOOD SAFETY MANAGEMENT SYSTEMS: A MULTIPLE-CASE EXPLORATORY STUDY

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Introduction: Food companies face increasing pressure from stakeholders to adopt sustainable practices, driven by initiatives like the EU's farm-to-fork strategy. Thus, many have implemented environmental management systems (EMS), alongside other standardized systems for quality, safety, and security. While Integrated Management Systems have been studied, the specific integration of EMS with systems like quality and food safety remains an under-explored area.

Aims: This study aimed to identify and analyze how food companies integrate environmental management systems with quality and food safety management systems to achieve overall sustainability, while also understanding the challenges and critical success factors involved in this process.

Materials and Methods: A mixed-methods approach was used, consisting of: a semi-structured literature review and a multiple-case exploratory study of 3 food companies in the Netherlands. The literature provided the theoretical foundations on adopted environmental practices, the challenges and opportunities of adoption, integration steps and strategies, and critical factors during integration, while the empirical study aimed to gain detailed insights from practice.

Results: The results showed that food companies applied a variety of environmental practices to improve their sustainability performance through practices. The main identified challenges included high implementation costs, advanced technologies, the need for skilled personnel, regulatory complexity, and resistance to change. Food companies have taken advantage of external collaborations to adopt best practices, such as partnering with institutions or universities, regulatory bodies, and industry experts. Harmonizing standards and practices, along with the transition towards digitalization, were mentioned as key steps companies undertake to align documentation and processes across these systems. Successful integration depends on critical factors, including top management support, change of management, work culture and environment, employee motivation, employee engagement with the management systems, internal auditors, and financial support.

Conclusion: This study shows that integrating environmental, quality, and food safety management systems can be an important step towards achieving sustainable operations in the food industry. By harmonizing processes, adopting digitalization, and fostering a supportive organizational culture, companies could effectively address environmental challenges while simultaneously enhancing overall performance.

Keywords: Environmental Management System, food industry, harmonization, Integrated Management System.

A COMPARATIVE STUDY OF PHYTOSANITARY CONDITION OF ABANDONED AND PROTECTED SYSTEM GRAPEVINE PLANTATIONS IN THE CENTRAL PART OF THE REPUBLIC OF MOLDOVA

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Introduction: Significant progress in protecting grapevines from harmful organisms requires a model shift toward comprehensive phytosanitary optimization in viticulture, that its resilience, is marked by frequent pest outbreaks and disease, especially monophagous and invasive ones. In recent years, the intensification of vineyard abandonment in the Republic of Moldova has generated imbalances in the structure of agroecosystems, favouring the emergence and establishment of phytopathogenic agents and harmful insect species with invasive status.

Aims: The present study aims to monitor the entomofauna and phytosanitary status associated with abandoned vineyard agroecosystems in the central region of the Republic of Moldova. The main goal of this research was to identify the complex of harmful insect species and phytopathogenic agents, with particular emphasis on invasive species and those with a high damaging potential in neighbouring vineyards.

Materials and Methods: This study employed a comparative monitoring approach across two experimental vineyard plots situated in close proximity from the central region of the Republic of Moldova, in the Călărași district. For to evaluate the diversity and prevalence of plant pathogens were used yellow sticky traps (ARBICO Organics, 1-800-825-2847); periodic sweep net sampling, conducted within both spontaneous ground vegetation and grapevine foliage; for phytopathogenic agents systematic were performed visual inspections, and collecting of plant tissues for further analysis.

Results: In this context, the research provides relevant arguments for the integration of these areas into entomological surveillance strategies and integrated disease management plans, while also contributing to the development of prevention policies against the spread of pathogens, especially monophagous and invasive ones, through a more sustainable use of grapevine plantations.

Keywords: invasive, pests, phytosanitary status, vineyards.

ANALYSIS OF INDOOR POLLUTANTS AND THEIR IMPACT ON HUMAN HEALTH

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Introduction: As people increasingly spend the majority of their time indoors, concerns regarding indoor air quality have become more pressing. Common indoor pollutants include carbon dioxide (CO₂), formaldehyde (HCHO), particulate matter (PM), and volatile organic compounds (VOCs). Elevated CO₂ levels are often recorded in poorly ventilated areas, such as crowded offices or classrooms with limited air exchange. Formaldehyde is commonly emitted by pressed wood furniture, laminate flooring, and various synthetic textiles. Particulate matter consists of fine airborne particles such as dust, smoke, mold spores, and soot from cooking or burning candles. VOCs are frequently released from products such as paints, varnishes, cleaning agents, air fresheners, and personal care items.

Aims: This study aimed to analyze the variation in concentrations of indoor air pollutants - specifically carbon dioxide, formaldehyde, particulate matter, and volatile organic compounds - across various indoor environments.

Materials and Methods: Measurements of carbon dioxide, particulate matter, formaldehyde, and volatile organic compounds were conducted in different indoor settings, including a residential environment (bedroom, living room, kitchen, bathroom), an office building, and a general retail store.

Results: The concentrations of pollutants were found to vary depending on the specific room within the residence or office, as well as the department within the retail store. Moreover, pollutant levels and profiles were influenced by both the quality of the outdoor air and the functional purpose of each indoor space.

Conclusion: The findings of this study indicate that carbon dioxide, particulate matter, formaldehyde, and volatile organic compounds are commonly present in indoor environments at varying concentrations. These variations are influenced by factors such as room function, occupancy, and outdoor air quality. The results emphasize the need for continuous monitoring and the implementation of effective ventilation strategies to mitigate exposure and reduce the associated health risks.

Keywords: Carbon dioxide, formaldehyde, particulate matter, volatile organic compounds.

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ANALYSIS OF AVIAN BIODIVERSITY IN THE ALGIERS SAHEL REGION: MEDITERRANEAN ECOLOGICAL PERSPECTIVES AND ENVIRONMENTAL PROTECTION STRATEGIES

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Introduction: Avifauna biodiversity is a valuable indicator of ecosystem health (LÓPEZ-RAMÍREZ *et al.*, 2022). The Mediterranean region, recognized as an important biodiversity hotspot, plays a vital role for birds (HAMZA *et al.*, 2023). The biodiversity of birds in Algeria is important for a better analysis of the environment (CHEDAD *et al.*, 2021a).

Aims: This study proposes an analysis of the evolution of avian biodiversity in the Algiers Sahel region, and its effect on environmental protection from 2020 to 2024, through the sampling of different environments: forests, gardens and lakes.

Materials and Methods: Three bird census methods in the Algiers Sahel region were used, namely the E.F.P., I.P.A. and quadrat methods, to study bird biodiversity.

Results: The avian community is dominated by Passeriformes, with 74 species (36.1%), followed by Charadriiformes with 47 species (22.9%). Other orders are less represented. Resident breeding species form the majority (37.4%), followed by migratory breeding species (23.2%) and winterers (17.9%). Invertivores predominate trophically, with 34 waterbird and 84 terrestrial species, while polyphagous species account for 40 species (16.3%). Statistical analyses show significant variation in species counts according to phenological status (ANOVA: $F = 3.547$; $df = 4$; $p < 0.0207$) and diet (ANOVA: $F = 9.472$; $df = 6$; $p < 2.25e-05$). The Shannon-Weaver (H') reveals variable species diversity across sites, ranging from 1.70 bits to 3.8 bits.

Conclusion: The study highlights avifaunistic biodiversity. A total of 205 bird species was recorded, belonging to 22 orders and 60 families. Among them, seven species were reported for the first time in the study area.

Keywords: Algiers, Biodiversity, Birds, Environmental protection.

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EXPLORING *CAKILE MARITIMA* AS A SALT-TOLERANT SPECIES FOR SUSTAINABLE AGRICULTURE

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Introduction: Salinity is a growing issue in agriculture, and only few species, known as halophytes, can tolerate high salt levels. *Cakile maritima*, an annual halophyte from the Brassicaceae family, thrives in coastal areas and grows best under mild saline conditions. While high salt concentrations reduce its growth and reproductive fitness, it can survive up to 500 mM NaCl. This species uses various anatomical and physiological strategies to cope with salt stress, thus making it an idoneal model to study salt tolerance in plants. Moreover, *C. maritima* has been proposed as a cash crop due to its suitable nutritional features.

Aims: In this work we studied the effects of salinity and drought on *C. maritima* vegetative and reproductive development, and evaluate its nutritional features as crop for saline agriculture.

Materials and Methods: we use different biochemical measurements to analyse *C. maritima* response to salt and drought, as well as the complete nutritional profile.

Results: we studied several biochemical responses on salt-treated plants and observed a prominent increase of proline accumulation under high salt concentrations. Other biochemical markers were not activated. Moreover, we analysed *C. maritima* nutritional profile, and observed appropriate nutritional features, including mineral and fiber composition, as well as antioxidant compounds such as Vitamin C and polyphenols.

Conclusion: in the present work we studied biochemical strategies and adaptations to salt and drought stress of the halophyte *Cakile maritima*, and showed that its nutritional profile makes it a potential crop halophyte for saline environments.

Keywords: biosaline agriculture, *Cakile maritima*, nutritional profile, pollen.

RESEARCH ON THE MITIGATION OF ENVIRONMENTAL POLLUTION BY PESTICIDES DUE TO SPRAY DRIFT BY AGRICULTURAL SPRAYERS AND UNMANNED AERIAL VEHICLES

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Introduction: The increasing use of pesticide in modern agriculture led to widespread contamination of water, soil and air, being a significant threat to ecosystems, wildlife, and human health. While essential for meeting technological and economical requirements in a modern agriculture, has been shown that plant protection products do not always reach the intended target, so these chemicals contaminate ecosystems through runoff, leaching, ambient air transport and deposition.

Aims: Ambient air transport of pesticides relates mainly with spray drift (off-target displacement of pesticide droplets through the air) from agricultural spraying equipments (that involves ground sprayers and unmanned aerial vehicles – UAVs) is a major concern of pesticide pollution. The paper studies the research status on pesticide pollution by spray drift and shows methods, techniques and practices used for its mitigation during pesticide applications by agricultural sprayers and UAVs.

Materials and Methods: Comprehensive analysis of the available scientific literature, legal framework, regulations, and international standards on the topic.

Results: The analysis show that a synergistic approach is the way to go, being highly efficient to provide built-in features for drift control, integration of precision agriculture capabilities, continuous weather monitoring and optimization, proper pesticide formulation (and the use of drift mitigation adjuvants), field management practices, operational best practices, proper regulatory framework and continuous training and certification.

Conclusion: In this paper it is analysed spray drift of pesticides due to agricultural spraying equipments bringing forward its environmental impact, but also identifying drift mitigation strategies.

Keywords: spray drift, pesticide pollution, agricultural spraying equipments.

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SUSTAINABLE ADSORPTION OF PESTICIDES FROM AGRICULTURAL RUNOFF USING BIOCHAR FROM FOOD WASTE

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Introduction: The widespread use of pesticides in modern agriculture has significantly improved crop yields and protected plants against pests and diseases. However, their excessive and sometimes indiscriminate application has led to the contamination of agricultural runoff water, which is considered one of the major sources of surface and groundwater pollution worldwide. In recent years, the adsorption has emerged as one of the most efficient and cost-effective techniques for removing pesticides from aqueous media. Among the various adsorbents investigated, biochar—a carbon-rich material obtained through the thermochemical conversion of biomass—has attracted increasing attention due to its structural characteristics and high adsorption capacity for organic and inorganic contaminants. **Aims:** This study investigated the valorisation of apple pomace and potato peels into biochar for pesticide removal from contaminated agricultural field water.

Materials and Methods: The biochar was synthesized from potatoes peels and apple pomace by calcination at 550 °C. For comparison, biochar was also prepared by pyrolysis at 450 °C, followed by a treatment with 1M FeCl₃, and re-calcination at 550 °C. The produced biochars were characterized by RAMAN, FTIR, SEM, and specific surface area. For the pesticide's adsorption tests, a stock solution of 0.01 mg/L solution containing 21 pesticides was prepared using an organochlorine pesticides mixture (LGC Standards). Sampling was achieved after 5, 8 and 24 hours and a GC-ECD analysis was performed for identification and quantification before and after adsorption.

Results: Results highlighted their high removal efficiency and potential as sustainable adsorbents. The GC-ECD chromatograms obtained for the pesticide-contaminated agricultural field water treated with biochar derived from potato peels and apple pomace clearly demonstrated the progressive removal of pesticide residues over time. Biochars effectively removed pesticides from agricultural water, with efficiency improving over 24 hours. Higher temperature (550 °C) enhanced adsorption due to increased porosity and aromatic carbon structure.

Conclusion: Biochar from apple pomace showed slightly better removal due to higher lignin and mineral content. Removal mechanisms included physical adsorption, hydrophobic partitioning, and π - π interactions. This approach supports circular economy principles while mitigating pesticide pollution in agricultural systems.

Keywords: biochar, food waste, pesticides, water.

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GROWING DEGREES DAYS REQUIREMENTS ON FENOLOGICAL PRINCIPAL GROWTH STAGES OF *RUBUS IDAEUS* CULTIVAR POLKA AND TULAMEEN IN URBAN GARDEN

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Introduction: In the current context of climate change, the research must be oriented toward testing different cultivars which tolerates wide ecophysiological ranges during the growth season.

Aims: The study aim was to assess the GDD (growing degree days) requirement for each principal phenological BBCH (*Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie*) stage and productivity of two red raspberry types respectively *Rubus idaeus* cultivar ‘Polka’ and ‘Tullamen’ grown in urban garden.

Materials and Methods: In field experiment was set up with different nutrition areas respectively maximum nutrition area of 100 cm (MaxNA), medium nutrition area 75 cm (MedNA) and minimum nutrition area of 50 cm (MinNA) and two raspberry cultivars ‘Polka’ and ‘Tulameen’. Plant phenology and productivity according BBCH scale were registered every three days during the entire growth season. The GDD and precipitation patterns were calculated from the climatic data.

Results: The cultivar Polka registered higher productivity percentages around 40% in the second decade of August in Med_NA. Tulameen had the same trend one month earlier. In the first year of acclimatization Tulameen plants survived at all nutrition areas, Polka raspberry plants have not survived in Max_NA. The average value of GDD during vegetation period was 5800°C in the MedNA for Tulameen and MinNa for Polka.

Conclusion: *Rubus idaeus* L. cultivar Tulameen recorded superior survival rate and only low productivity percentage in the accommodation year. The cultivar Polka raspberry was more sensitive and survived less, however, the productivity was more than 10 folds higher compared with Tulameen. In the urban garden, raspberry GDD requirement, precipitations determine differential phenological development and yield between the different cultivars studied.

Keywords: BBCH scale, climatic conditions, productivity, raspberry.

THE INFLUENCE OF THE SOWING TIME ON THE YIELD AND QUALITY INDICES OF SPRING WHEAT GENOTYPES DEVELOPED AT ADRS TURDA

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Introduction: spring wheat covers ~25% of the global wheat harvested area (Luo *et al.*, 2022) the main producers being US, Russian Federation and Canada (Ren *et al.*, 2019). Winter wheat is preferred to spring wheat due to its higher production capacity which is over 30% but in harsh conditions spring wheat can be a real alternative to supply the food source.

Aims: was to test the influence of early sowing date of spring wheat genotypes on grain yield and grain quality compared to normal sowing date, respectively to test the influence and efficiency of fertilizer on yield and grain quality.

Materials and Methods: 12 spring wheat genotypes were studied in a field condition at Agricultural Research and Development Station (ARDS) from Turda for their yield capacity and grain quality as effect of different sowing date. The field experiment consisted in two comparative trials in randomized complete block design with three replications in two sowing dates: S₁- optimal sowing data for our area (15 March) and S₂- early sowing date (26 February). Also, two different levels of fertilizer were applied on both sowing dates- F₁ (50 kg N ha⁻¹ s.a. applied before sowing), respectively F₂ (50 kg N ha⁻¹ s.a. applied at booting stage). At physiological maturity the spring wheat plants were harvested using Wintersteiger Plot Combine and grain yield was determined. Quality analyses were estimated using Tango FT-NIR spectrometer for protein content, wet gluten content, Zeleny test and other quality indices.

Results: yield capacity were higher in the early sowing conditions being superior to optimal sowing up to 20% in case of some genotypes. Grain quality was not significantly influenced by sowing date, highlighting some genotypes.

Conclusion: early sowing date confers the wheat plants a better growing and development conditions favouring the going through the stages in environment conditions easier than plants sown at the optimal time.

Keywords: grain quality, grain yield, sowing date, spring wheat.

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SALINITY-INDUCED CHANGES IN MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS OF LETTUCE DURING EARLY DEVELOPMENT

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Introduction: The intensive and varied use of lettuce requires both segmented and short-term studies to identify critical salinity thresholds that may pose risks during early growth.

Aims: The aim of this study was to assess lettuce physiological parameters and growth under different salinity levels.

Materials and Methods: The experiment was conducted in a growth chamber, under controlled conditions in germination pots and in soil simultaneously. Three treatments were tested in four replicates: a control and two salinity levels (50 mM (level I) and 100 mM NaCl (level II)). The assessed parameters were germination rate (GR), and capacity (GC) in germination pots and soil. Soil grown lettuce was assessed in terms of phenological development on BBCH scale, leaf relative chlorophyll content, leaf area, stomatal number, aperture, width and length.

Results: The GR differ from germination pots and soil. Higher GR seeds values were registered with salinity level II around 55% in germination pots and 40% in soil. The highest value (89%) of GC was obtained for soil grown seeds and the highest value from germination pots was with 34% lower. The first true leaf (BBCH 11) appeared in the highest percentages at the control from germination pots and at the level II treatment from soil. The relative chlorophyll content and stomata feature decrease with increasing salinity dosage. The lowest values of stomata aperture, width and length were registered at the level II treatment on the leaf tip. Leaf area was the highest in the control treatment, followed by the 100 mM NaCl treatment.

Conclusion: From GR, and GC it is clear that soil alleviates the II level of salinity stress, however it also delays the germination seen in the lettuce emergence. The lowest relative chlorophyll content values were measured in the salinity stress level II and for leaf area, and stomata features in the level I of salinity stress.

Keywords: germination, leaf area, relative chlorophyll content, stomata.

SESSION 2: FOOD SCIENCE AND TECHNOLOGY

CURRENT TRENDS IN ENCAPSULATION AND DIGESTION OF BIOACTIVE COMPOUNDS

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Introduction: There are two major problems related with the food we eat: I) ensuring people's food, health and wellbeing, and II) ensuring the health of our planet.

When answering to problem I), the future food needs to tackle malnutrition, reduce calorie density, reduce food digestibility, increase micronutrient bioavailability, control gut health, allow personalized nutrition and provide appropriate food for the elderly.

In order to answer to problem II), we need to make use a set of tools for the future: molecular biology, nanotechnology, artificial intelligence, robots & sensors, the so-called "Cellular agriculture" and search for alternative protein sources.

While these two problems have different incidences worldwide, it is a fact that there has been a significant shift in the consumers' preferences, acceptance and needs towards food products in the last ten years, which has been particularly strong in the last five years. The actual "top trends" are: Clean claims (e.g., preservatives free); Clean labels; Lifestyle enhancers (e.g., high energetic foods); Functional foods (e.g., with nutraceutical function); Minimally processed foods (e.g., using natural ingredients as much as possible) and the so-called "Green foods" (making use of the benefits of plants - e.g. replacement of animal protein by other protein sources).

Aims: This lecture will address the latest developments made by our research group towards tackling some of these challenges, in particular focusing on: 1) the methods used to design and produce encapsulation systems for bioactive compounds, aiming at imparting functionality to foods; and 2) the methods used to evaluate the behaviour of such systems in the gastro-intestinal tract, mostly aiming at determining their bioaccessibility and bioavailability.

Conclusion: The development of encapsulation systems for bioactive compounds and the corresponding evaluation of their behaviour during digestion are crucial to ensure that the functionality aimed at when using such systems in foods is effectively attained.

Keywords: *Catharanthus roseus*, bioactive compounds, encapsulation, *in-vitro* digestion, nanotechnology

HYBRID DRYING OF THE FOOD WASTE AND BY-PRODUCTS

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Introduction: There is an increasing demand worldwide in solving of the huge problem these days considering the waste generated in overall food industry. Significant amounts of the waste came also from the households, restaurants and other services where this issue is not sufficiently taken into account. It is well known how on the European level and only member states generate annually around 100 million tons of various wastes and by-products only from food industry.

Aims: However, a significant amount of generated waste contains highly valuable compounds that, through processing, can be used in human or animal nutrition. Some of them could be used for the manufacturing of completely new food products or at the end of the processing stage defined as final products (pasta in various forms) through drying processes. Besides, they could be prepared in powdered form and used in other products as functional ingredients (egg replacements, natural colorants, nutraceuticals).

Materials and Methods: There are many drying options for general drying of the foods such as: Convective drying, conductive drying, solar drying and vacuum drying which are generally called traditional techniques. Yet, novel and mostly non-thermal techniques such as: Ultrasound, microwaves, pulsed electric fields and high hydrostatic pressures could be used in improvement or in combination with traditional drying techniques. In this work we used some innovative hybrid drying systems.

Results: The hybrid drying showed promising results in comparison with traditional drying considering some aspects such as: diffusion coefficient, antioxidant activity of the dried raw material, total phenols retention and rehydration coefficient

Conclusions: Hybrid drying approach could introduce semi-finished products and products with significantly improved nutritional properties, texture and color, while saving time and energy thus creating opportunities in solving of waste problem coupled with significant environmental and economic impact on society.

Keywords: food waste, by-products, hybrid drying, non-thermal technologies

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FOODOMICS AND ARTIFICIAL INTELLIGENCE: INTERCONNECTED FIELDS WITHIN FOOD SCIENCE AND TECHNOLOGY

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Introduction: Foodomics focuses on the composition, structure and functions of molecules in food, mainly including genomics, proteomics and metabolomics. Through high-throughput analysis one can obtain comprehensive high-dimensional information for screening food quality and safety. However, foodomics big data involves difficulties in selecting information and biomarkers. The utilization of Artificial Intelligence (AI) in foodomics provides new opportunities for data analysis, which makes data processing, pattern recognition and extraction of appropriate information more efficient and accurate for non-targeted analysis of putative quality or safety markers, including the discovery of new ones (Ahmer et al, 2024; Dinf et al., 2023; Shangguan al. 2025).

Aims: This review defines the concepts of Foodomics and AI, their interconnections and synergy, and mention some representative workflows, research case studies, advantages and limitations of AI-driven foodomics in screening and analysis of food.

Results: The implementation of AI techniques is revolutionizing omics data interpretation, to enhance traceability, predictive analytics, and pathogen identification across the food supply chain. Also, AI applications in food safety include contaminants detection, prediction of potential risks and monitoring of supply chains and quality control processes.

Conclusion: AI-driven foodomics can be a promising paradigm, with high application potential for analysis of food components, hazards and risks, foodborne disease diagnosis for food quality management and safety assessment. Finally, the prospects and opportunities of AI-driven foodomics strategies are discussed, providing useful, recent references with detailed applications on food science and technology.

Keywords: artificial intelligence, foodomics, food science and technology.

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RECENT STUDIES ON THE GREEN EXTRACTION, BIOACCESSIBILITY AND BIOLOGICAL ACTIVITY OF ALGAL CAROTENOIDS

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Introduction: Carotenoids are versatile compounds of great importance in agri-food, health and cosmetics. They are biosynthesized by algae and other organisms. Carotenoids and algae are important for the sustainable production of health-promoting foods.

Aims: Studies on the ultrasound-assisted extraction (UAE) of carotenoids from *Chlorella sorokiniana* and *Ulva lactuca* are summarized, as well as the effect of ultrasounds on the bioaccessibility of fucoxanthin from *Himanthalia elongata*. Health -promoting biological actions of microalgal extracts in *Caenorhabditis elegans* are described.

Materials and Methods: *C. sorokiniana* and *D. bardawil* microalgae were cultured. *H. elongata* and *U. lactuca* were gifts from Porto Muiños (Spain). *C. elegans* strains used were N2 (for the lifespan study) and GMC101 (to assess proteotoxicity). A widely used simulated static in vitro digestion methodology was used for bioaccessibility assessments. Response surface methodology (RSM) was used to optimize ultrasound conditions.

Results: The biosolvent 2-methyltetrahydrofuran (2-MeTHF) proved very efficient in the extraction of carotenoids from *Chlorella*. Ethanol and 2-MeTHF showed the highest total carotenoid extractions in *U. lactuca*. By using RSM, significant increases in carotenoids were achieved in the UAE. Similarly, it allowed for the increase in the bioaccessibility of fucoxanthin from *H. elongata*. Treatment with pure phytoene or phytoene-rich microalgal extracts protected the worm against amyloid- β 42 proteotoxicity and significantly increased its lifespan.

Conclusion: The results contribute to further exploiting algae for the production of sustainable and healthy products in the context of the Blue Economy

Keywords: bioactives, blue economy, microalgae, seaweeds, sustainability.

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EFFECT OF WATER-SOLUBLE OREGANO SUPPLEMENTATION ON BROILER PERFORMANCE AND GUT HEALTH UNDER INTESTINAL CHALLENGE

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Introduction: Coccidiosis remains a major challenge that requires alternatives to traditional chemo-prophylaxis. Phytobiotics may mitigate the effects of intestinal problems.

Aims: This study evaluated the efficacy of a water-soluble oregano-based supplement (0.5 ml/L) through an experimental trial in broiler chicken.

Materials and Methods: 252- day old- male broilers were assigned to three groups (six replicates/group): NC: an unchallenged negative control, PC: a challenged positive control and OREG: challenged group supplemented with oregano. Challenged birds were raised on reused litter and received a 10-fold dose of an anticoccidial vaccine at day 7, while NC birds were kept on fresh litter. Lipid peroxidation (MDA) was measured in the breast and thigh of 12 birds per group (d42) and intestinal samples were taken for histological and immunohistochemical analysis for Claudin-3 protein expression.

Results: OREG birds exhibited higher body weight from day 14 and average feed intake comparable to the PC group ($p < 0.05$). MDA was higher in the breast and thigh in the PC group. OREG group had significantly reduced lesion scores and oocysts in comparison to PC group. Although there were no differences in villus length (VL) but crypt depth (CD) was significantly reduced and VL: CD ratio was significantly increased in duodenal and ileal tissues in the OREG group. Additionally, Claudin-3 was weaker in PC group.

Conclusion: The findings show that oregano supplementation improves broiler health and offers a natural alternative for coccidiosis management.

Keywords: claudin-3 protein, histomorphometry, MDA, VL:CD ratio.

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INNOVATIVE AGING TECHNIQUES FOR PEAR BRANDY: EFFECTS ON VOLATILE AND PHENOLIC PROFILES

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Introduction: Accelerating the aging of natural distillates using wood fragments and physical methods offers a promising way to develop desired sensory characteristics more quickly, enhance economic value, and ensure product consistency.

Aims: The main goal was to reduce the traditional aging period of 12–24 months to just 20–60 minutes by applying electric field treatments, while improving the chemical and sensory quality of the final product.

Materials and Methods: Samples were treated with electric fields at 20V, 35V, and 50V for durations of 20, 45, and 60 minutes. Their chromatic properties were then evaluated and compared with two control groups: untreated distillates and distillates matured for three days with the same wood types, without electric treatment.

Results: The most intense color was observed in the sample treated with mulberry wood at 20V, showing nearly double the color value compared to the 3-day control. Hue values obtained with common oak under certain conditions (V20T45, V35T45, V50T45) were comparable to those reported in previous studies on barrel-aged grape marc distillates. Volatile and phenolic compound analyses showed that the electric field-assisted process promoted the extraction of relevant aroma and flavor compounds from the wood. The composition of treated samples, in many cases, closely resembled that of conventionally aged distillates.

Conclusion: These results suggest that electric field-assisted aging, in the presence of wood fragments, can replicate key effects of traditional maturation within a much shorter timeframe. The method provides precise control over extraction, reduces storage needs and evaporation losses, and supports sustainable and cost-effective production practices, all while maintaining product quality.

Keywords: electric field, pear brandy, phenolic compounds, rapid aging, volatile profile.

ROMANIAN TRADITIONAL GASTRONOMY - A NATIONAL TOURISM BRAND

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Introduction: Traditional Romanian gastronomy - rooted in centuries of multicultural influences - embodies the country's cultural identity and regional diversity. Koerich and Müller (2022) define gastronomy as a multifaceted field encompassing food culture, cooking, and organisational structures. Almansouri et al. (2022) emphasises the importance of authentic recipes, local ingredients, and knowledgeable chefs in preserving cultural heritage. In turn, Partarakis et al. (2021) highlighted the role of traditional food practices in shaping cultural identity and preserving heritage.

Aims: This paper explores the potential of traditional Romanian cuisine as a strategic tool for promoting tourism and enhancing national image. The study examines how food can create authentic and memorable tourist experiences.

Materials and Methods: literature review and an on-line survey has been addressed in order to demonstrate that Romanian Traditional gastronomy can be used as a national tourism brand, by addressing the following hypothesis "How does gastronomy create a sense of loyalty to the destination?"

Results: Drawing comparisons with countries that have successfully capitalized on culinary tourism, the research highlights the need for coordinated branding efforts. Integrating traditional gastronomy into Romania's tourism strategy not only boosts international appeal but also supports rural development, cultural preservation, and economic resilience.

Keywords: experience, gastronomy, loyalty, tourism brand, traditional.

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ROSEHIP WASTE POWDER AS A FUNCTIONAL INGREDIENT IN PORK SAUSAGE REFORMULATION: IMPACTS ON THEIR QUALITY

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Introduction: Rosehip waste powder contains high levels of fibers, polyphenols, and carotenoids (Borșa et al., 2025). Given the preservative and antioxidant properties of polyphenols, the natural coloring capacity of carotenoids, and the powder's inherently low pH (Borșa et al., 2025), this ingredient shows potential for application in meat products, either as a natural alternative to synthetic nitrites or to prolong shelf life.

Aims: This study aimed to evaluate how partially replacing raw meat with this powder impacts the quality of pork sausages.

Materials and Methods: Three sausage formulations were tested to assess rosehip waste powder as a functional ingredient: a control, and two variants with 2.7% and 5.5% powder. Physicochemical properties were evaluated during storage, along with instrumental analyses of color and texture, and a hedonic sensory test with consumers. Polyphenols and carotenoids were also determined.

Results: The incorporation of rosehip waste powder into pork sausages led to a significant reduction in both moisture and protein levels, while contributing to an increase in total carbohydrates, as well as in polyphenols and carotenoids. Furthermore, it caused a significant decrease in pH and easily hydrolysable nitrogen, indicating its preservative potential. The reformulated sausages also exhibited improved color characteristics, with enhanced red and yellow tones, and showed reduced gumminess and chewiness. Although minor changes in taste and texture were observed, overall consumer acceptance of the sausages remained at a satisfactory level.

Conclusion: The findings indicate that rosehip waste powder represents a promising functional ingredient for pork sausage reformulation.

Keywords: carotenoids, physicochemical properties, polyphenols

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ENTREPRENEURIAL UNIVERSITIES IN TRANSITION: A DECADE OF ACADEMIC SPIN-OFFS IN LIFE SCIENCES IN ROMANIA

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Introduction: In the last decade, Romanian Life Science universities have progressively shifted toward entrepreneurial models. The emergence of spin-offs, together with new institutional regulations and support infrastructures such as incubators and Technology Transfer Offices (TTOs), reflects this transition. However, operational challenges persist in procurement, conflict-of-interest management, and sustainable collaboration models.

Aims: This paper explores how spin-offs were established, supported, and integrated into Romanian academic ecosystems between 2014–2024.

Materials and Methods: This study employed a qualitative, document-based approach focused on Romanian Life Science universities (2014–2024). It included comparative analysis of institutional regulations, support infrastructures and documentation from operational spin-offs. Procurement models and legal frameworks for university–spin-off collaboration were also examined. The research was contextualized within national higher education policy and innovation governance.

Results: Institutions with structured incubation programs and internal spin-off regulations experienced greater spin-off activity. Dedicated university centers ensured better resource access and reduced bureaucratic inertia. The absence of a unified legal mechanism for simplified acquisition and conflict-of-interest management remains a major bottleneck. Universities that applied clear conflict-of-interest declarations and service contracts achieved higher operational continuity.

Conclusion: Strengthening institutional entrepreneurship in Romanian Life Science universities requires an integrated framework that balances transparency, agility, and collaborative governance. The findings offer scalable models for universities aiming to institutionalize innovation without compromising public integrity.

Keywords: academic spin-offs, entrepreneurial universities, governance, incubators, Romania.

TARGETED DELIVERY OF NATURAL ANTIMICROBIALS: ENCAPSULATION STRATEGIES FOR NEXT-GENERATION FEED SUPPLEMENTS

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Introduction: In the context of sustainable aquaculture and livestock nutrition, bioactive compounds derived from plants and marine resources represent promising alternatives to synthetic additives. However, their instability and volatility limit their direct application. This study, conducted under the Horizon Europe FEEDACTIV project (Grant No. 101086261), aims to overcome these challenges through innovative encapsulation technologies.

Aims: To develop and optimize encapsulation methods for natural bioactives with antimicrobial and antioxidant activity, enabling their integration into functional feed supplements with controlled release properties.

Materials and Methods: Selected bioactive ingredients (olive leaf, lemon peel, *Ulva lactuca* extracts, and essential oils from eucalyptus, thyme, rosemary, and garlic) were encapsulated using four complementary techniques: spray drying, electrospraying, ionic gelation, and emulsification followed by freeze drying. Natural matrices such as starch, maltodextrin, zein, collagen, alginate, chitosan were evaluated for encapsulation compatibility. Encapsulation efficiency was assessed via HPLC-DAD and GC-MS. Particle size distribution and morphology were characterized using a laser analyzer and SEM. *In vitro* release profiles were measured in phosphate buffer (pH 7.4, 37°C) and modeled kinetically.

Results: All techniques achieved high encapsulation efficiencies, with matrix–bioactive compatibility playing a critical role. Electrospraying and ionic gelation favored controlled, sustained release up to 7 days, while emulsification + freeze drying yielded balanced profiles. SEM images confirmed spherical particle morphology. Select formulations, including Alginate+Oleuropein and Collagen+Eucalyptus oil, demonstrated potential for targeted release in aquafeed applications.

Conclusion: Encapsulation enables the protection and controlled delivery of natural bioactives in feed systems. This work highlights the potential of tailored encapsulant systems to enhance feed functionality and animal health, paving the way for eco-innovative nutrition solutions.

Keywords: aquafeed, bioactive compounds, controlled release, encapsulation, essential oils.

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EFFECT OF MICROBIAL ADDITIVE BASED ON YEAST AND SPIRULINA EXTRACTS ON PRODUCTIVE PERFORMANCE, MEAT QUALITY AND INTESTINAL MICROBIOME OF QUAILS

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Introduction: The health of the population is dependent on the degree of sanitation and the nutritional potential of the consumed food. Quail meat is an important source of protein, that contains vitamins and minerals, low amounts of fat and cholesterol and is considered one of the finest and most dietary in gastronomy (Quaresma et al., 2022). The use of microorganisms as stimulators of the productive performances of birds is of interest and potential for practical use (Hamada et al., 2023).

Aims: The aims of this work was to evaluate the effect of a microbial additive based on extracts from *Saccharomyces* wine yeast and *spirulina* biomass, (coded CMP-3), on the viability, productive performance, meat quality and intestinal microbiome of quails.

Materials and Methods: The research object was 200 *Phoenix* breed quails, one day old, and the additive CMP-3. The chicks were divided into 2 groups: control group (CG) and experimental group (EG). The quails in the CG during the 60-day experiment consumed basic combined feed (BCF), and those in the EG consumed BCF supplemented with 0,5 % CMP-3.

Results: Supplementing the daily ration of quails with CMP-3 ensures the viability of chicks in EG of 98% compared to 83% in CG, statistically significantly increases the body mass of quails in EG by 12.03% compared to CG, reduces specific feed consumption by 5.53% and stimulates the beneficial intestinal microbiota of chicks. The use of CMP-3 contributes to a significant increase in the protein and water content in poultry meat by 3.9 and 3.7% respectively and a significant reduction in lipid content.

Conclusion: Thus, we can mention that CMP-3 represents an effective natural feed additive for maintaining the herd, stimulating productive performance and improving the quality of quail meat.

Keywords: body mass, meat, microbial additive, microbiome, proteins, quail.

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EFFECT OF PHYTOBIOTIC BLEND AND OMEGA-3 SUPPLEMENTATION ON BOVINE MILK FATTY ACID COMPOSITION

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Introduction: Incorporating functional feed components, such as plant derived phytobiotics, enriched with antioxidants and omega-3 polyunsaturated fatty acids has been proposed as a means to improve both the oxidative resistance and fatty acid profile of milk.

Aims: This study aimed to evaluate the effects of supplementing a mixture of oregano essential oil, dried oregano, dried sage, and flaxseeds on the fatty acid composition and lipid peroxidation of milk in 100 lactating dairy cows.

Materials and Methods: To evaluate this, a commercial Holstein herd near Trikala, Greece, was offered a concentrate fortified with the phytobiotic blend. Milk was sampled before and during the feeding trial, and fatty acid profiles were determined by gas chromatography.

Results: Gas chromatography analysis revealed a progressive reduction in total saturated fatty acids, from 79.39 % to 69.95 %, alongside increases in monounsaturated fatty acids from 18.74 % to 27.02 % and polyunsaturated fatty acids from 1.87 % to 3.03 %. In parallel, omega-3 fatty acids rose from 0.21 % to 0.64 %, omega-6 from 1.62 % to 2.38 %, α -linolenic acid from 0.18 % to 0.51 %, and EPA + DHA from 0.03 % to 0.13 %, accompanied by enhanced oxidative stability of the milk.

Conclusion: These results demonstrate that dietary inclusion of phytobiotics together with omega-3 PUFAs can effectively reshape milk lipid composition and improve its resistance to oxidation, presenting a viable approach for producing value-added dairy products.

Keywords: fatty acid profile, bovine milk, polyunsaturated fatty acids, aromatic plants

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SUSTAINABLE REFORMULATION OF CROISSANTS USING SOURDOUGH DISCARD AND PROTEIN-BASED EMULGEL

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Introduction: The overconsumption of saturated and trans fatty acids has been strongly correlated with heightened incidence of cardiovascular disorders, obesity, and other non-communicable diseases (Heitman et al., 2015). In response to growing public health and environmental concerns, reformulating bakery products with sustainable, health-promoting ingredients has become a strategic priority.

Aims: To address this need, this study investigates the techno-functional integration of sourdough starter discard and a protein-stabilized emulgel system as innovative and sustainable alternatives for conventional fat and leavening agents in laminated bakery products, specifically croissants.

Materials and Methods: Low-fat croissants were formulated by substituting traditional lamination fats with an emulgel matrix composed of sunflower oil and whey protein isolate, developed using the Emulsion-Template Method. Concurrently, sourdough discard was valorized as a fermentation agent and compared to standard yeast-based fermentation. The experimental products were assessed for physicochemical properties, textural and rheological behavior, microbial stability, and sensory acceptability.

Results: The use of the emulgel system facilitated a >40% reduction in saturated fat content while preserving structural integrity and sensory appeal. Yeast-fermented croissants demonstrated superior specific volume and crumb softness (textural force 0.95–1.10 N), whereas sourdough-fermented variants exhibited increased flavor complexity, firmer internal structure, and extended microbial stability, associated with elevated levels of lactic acid (0.73–0.96 mg/g) and acetic acid (0.33–0.40 mg/g).

Conclusion: The incorporation of sourdough discard and whey protein-based emulgel represents a viable, sustainable strategy for the nutritional and environmental optimization of laminated bakery products.

Keywords: croissant, emulgel, laminating fat, sourdough starter, sustainability.

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PSYCHOBOTIC APPROACH USING A SNACK ENRICHED WITH SEA BUCKTHORN AND *LACTOBACILLUS PLANTARUM* 229V

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Introduction: Psychobiotics are a class of probiotics capable of modulating mental health through the gut–brain axis, and have garnered growing scientific interest in recent years. Among them, *Lactobacillus plantarum* 299V stands out as a particularly promising strain due to its demonstrated neuroactive potential (Cocean and Vodnar 2024). Simultaneously, sea buckthorn (*Hippophae rhamnoides*) is recognized for its rich profile of bioactive compounds, which may exert neuroprotective effects by counteracting oxidative stress and inflammation (Wang, Xu et al. 2022).

Aims: This study aimed to develop a functional cereal-based snack bar enriched with the psychobiotic strain *Lactobacillus plantarum* 299V and sea buckthorn, included in both fresh and freeze-dried forms.

Materials and Methods: Six distinct cereal-based snack bar formulations were formulated. Phenolic compound identification and quantification were carried out using HPLC at three storage time points: days 0, 28, and 70. Further assessments included nutritional analysis, antioxidant activity, microbiological evaluation, sensory evaluation, and the viability of *L. plantarum* 299V.

Results: The total phenolic content remained stable throughout storage, indicating the effective preservation of bioactive compounds. Psychobiotic viability showed a moderate decline from 1.38×10^9 to 2.20×10^8 CFU/g over 70 days, remaining well above the 10^7 CFU/g threshold for probiotic efficacy. Sensory evaluation demonstrated high consumer acceptability, with scores ranging from 7.0 to 8.2 on a 9-point hedonic scale.

Conclusion: In conclusion, this study demonstrates the feasibility of developing microbiologically stable, sensorially acceptable, and functionally enriched cereal bars that incorporate viable psychobiotic strains.

Keywords: *Lactobacillus plantarum* 299V, psychobiotics, phenolic compounds, sea buckthorn.

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VALORIZATION OF GRAPE POMACE FOR BIOETHANOL PRODUCTION USING THE SSF APPROACH

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Introduction: The increasing demand for sustainable energy sources has prompted extensive research into the valorization of agro-industrial residues. Grape pomace, a lignocellulosic by-product of the wine industry, represents a promising feedstock for second-generation bioethanol production due to its abundance and rich composition of fermentable sugars, cellulose, and hemicellulose.

Aims: This study explores the feasibility of utilizing grape pomace for bioethanol production using the Simultaneous Saccharification and Fermentation (SSF) approach.

Materials and Methods: The SSF process integrates enzymatic hydrolysis of structural carbohydrates and microbial fermentation into a single step, improving process efficiency and reducing inhibition caused by sugar accumulation. Grape pomace was subjected to autohydrolysis in a 50 mM citrate buffer solution, followed by ultrasound pre-treatment to enhance cellulose accessibility and then SSF was performed using *Saccharomyces cerevisiae*. An automated fermentation system equipped with parallel batch fermentation vessels (500 mL), a mechanical agitation system, a thermostatic water bath, and a CO₂ measurement unit was used to monitor the fermentation process.

Results: The optimized SSF process yielded a maximum ethanol concentration of 15.0 g/L in the fermentation broth. The ethanol yield from white grape pomace was 0.21 mL bioethanol/g dry substrate. The final ethanol product shows a high purity of 92.55% (v/v), highlighting the efficiency of the SSF process and the effectiveness of the downstream purification steps. Bioethanol obtained from grape pomace has multiple potential applications beyond its primary role as a renewable energy source. As a sustainable biofuel, it can be blended with gasoline to reduce greenhouse gas emissions and dependence on fossil fuels. Additionally, due to its relatively high purity, the ethanol can be utilized as a versatile solvent in the formulation of various products, including cosmetics, personal care items, detergents, and disinfectants.

Conclusion: The results demonstrate that grape pomace is a viable lignocellulosic substrate for bioethanol production, and the SSF approach offers an effective method for its bioconversion. Bioethanol production from agro-industrial waste such as grape pomace supports circular economy principles by transforming waste streams into high-value bio-based products, contributing to both environmental sustainability and economic efficiency.

Keywords: bioethanol, biofuels, circular bioeconomy, waste management.

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ARTHROSPIRA PLATENSIS AND CHLORELLA VULGARIS CONSUMPTION ON IRON STATUS: A SYSTEMATIC REVIEW OF IN VIVO STUDIES

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Introduction: Iron deficiency anemia impacts over two billion people worldwide. Conventional iron salts have low bioavailability and are associated with gastrointestinal side effects. Microalgae, such as *A. platensis* and *C. vulgaris*, are rich in iron, making them promising alternatives for various applications (Gao et al, 2019; Bohórquez-Medina et al., 2021).

Aims: To evaluate the efficacy and safety of *A. platensis* and *C. vulgaris* supplementation on iron status in vivo, with a focus on hematological indices, antioxidant enzymes, hepcidin regulation, immune markers, and adverse events.

Methods: Adhering to PRISMA guidelines, we searched PubMed, Scopus, and Web of Science through March 2025. A total of 32 studies (7 human trials and 25 animal experiments) met the inclusion criteria. Extracted data included hemoglobin (Hb), serum ferritin, red blood cell count (RBC), superoxide dismutase (SOD), glutathione peroxidase (GPx), malondialdehyde (MDA), hepcidin expression, immune markers, and safety outcomes.

Results: Supplementation with both microalgae significantly improved iron status. *A. platensis* increased Hb by as much as 25% and RBC counts in anemic or stressed models. *C. vulgaris* enhanced antioxidant defenses, raising SOD and GPx levels by 30–45% while reducing MDA.

Conclusions: Supplementation with *A. platensis* and *C. vulgaris* is a safe and effective way to improve iron status. Large, long-term clinical trials are necessary to refine dosing and confirm sustained efficacy.

Keywords: anemia; hematology; iron deficiency; microalgae.

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EMERGING TECHNOLOGIES APPLIED IN THE MEAD PRODUCTION IN ORDER TO ENHANCE ITS SENSORY AND VOLATILE PROFILES

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Introduction: Mead, also known as hydromel, is an alcoholic beverage created by fermenting honey with water. It is one of the oldest known fermented drinks, dating back thousands of years to ancient civilizations such as the Greeks, Romans, and Vikings.

Aims: This research aims to optimize the production process and sensory profile of hydromel (session mead) made from Romanian honey, by adjusting physicochemical parameters to achieve a uniform, stable, and consumer-accepted product.

Materials and Methods: The fermentation process is carried out by yeast (*S. cerevisiae*, *S. bayanus*), which converts the honey sugars into alcohol. Malolactic fermentation is essential for a balanced sensory profile of mead. The malolactic bacteria used for mead are mainly represented by *Oenococcus oeni*, *Lactobacillus plantarum* (Mendes-Ferreira, C Barbosa 2010).

Results: Utilization of *Saccharomyces cerevisiae* var. *bayanus* strains in mead fermentation resulted in higher concentrations of aromatic compounds, particularly esters like 2-phenylethanol and phenylethyl acetate, contributing to a more complex and expressive sensory profile compared to *S. cerevisiae* var. *cerevisiae* strains.

Co-fermentation with non-*Saccharomyces* yeasts such as *Torulaspora delbrueckii* and *Kluyveromyces lactis* increased the concentration of phenethyl acetate, a compound contributing to floral and honey-like aromas, thereby enhancing the overall aroma complexity of low-alcohol meads (Ubukata Shuichiro and Seki Hiroko 2024).

Conclusion: Mead's unique chemical composition, shaped by the fermentation process and aging, offers a range of bioactive compounds that contribute to its sensory characteristics and health benefits.

Keywords: alcohol, co-fermentation, mead, *Saccharomyces cerevisiae*.

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ADVANCES IN BREAD PREFERMENTATION: A COMPARATIVE REVIEW OF TECHNIQUES AND THEIR IMPACT ON DOUGH RHEOLOGY, AROMA, AND DIGESTIBILITY

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Introduction: Prefermentation plays a key role in breadmaking, contributing to improved dough rheology, flavor, and nutritional quality. Techniques such as sourdough (liquid and stiff), biga, poolish, pâte fermentée, sponge, and hybrid methods are commonly employed to enhance fermentation performance and final product characteristics. This review focuses on their effects on dough elasticity, gas retention, aroma, and digestibility.

Materials and Methods: The Web of Science, ScienceDirect, and Google Scholar databases were accessed. Keywords such as "prefermentation", "sourdough", "biga", "poolish", "bread rheology", and "digestibility" were used for data collection.

Results: Sourdough-based preferments demonstrated superior digestibility compared to yeast-only breads, primarily due to the reduction of FODMAPs and other fermentable carbohydrates (Rizzello et al., 2019). Lactic acid bacteria and wild yeasts contributed to enhanced dough structure and more complex aroma profiles (Hu et al., 2022). However, challenges remain in terms of protocol standardization, the integration of digital monitoring technologies, and the adaptation of these techniques to gluten-free systems and alternative flours (Sözer et al., 2019).

Conclusion: Prefermentation techniques significantly improve both the sensory and nutritional quality of bread. Future research should focus on novel ingredients, unconventional fermentation strategies, and the development of reproducible, technology-assisted protocols.

Keywords: bread, digestibility, dough rheology, fermentation, prefermentation

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EXPLORING CONSUMER PERCEPTIONS, SENSORY APPEAL, AND INFORMATION BARRIERS TO NUTRACEUTICAL USE IN METABOLIC SYNDROME: A CROSS-SECTIONAL SURVEY

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Introduction: Metabolic syndrome increases cardiovascular and diabetes risk (PérezAranda A, et al., 2023). Nutraceuticals (e.g., spirulina, ginger) may offer benefits, but consumer perceptions, sensory experiences, and information barriers are underexplored (Silva V, et al., 2021).

Aims: This study aimed to assess awareness and familiarity with nutraceuticals, evaluate perceived health benefits and sensory appeal, identify primary information sources and their credibility, determine perceived barriers and motivators to use, and examine differences in nutraceutical consumption among demographic groups.

Materials and Methods: This cross-sectional survey assessed awareness, perceived benefits, sensory appeal, credibility of information sources, barriers, and demographic differences in nutraceutical use. An anonymous online questionnaire (n = 295, 18–65 years) assessed six domains using 5-point Likert scales. Statistical tests, reliability analyses, correlations were performed.

Results: 81% were aware of nutraceuticals; 39% used them. Moderate familiarity and a strong link between sensory appeal and health perceptions were observed. Healthcare professionals were the most credible sources (Hallström E, et al., 2022). Barriers (cost, safety, neophobia) were moderate. Use increased with education and peaked in ages 36–55, with no gender differences.

Conclusion: Sensory satisfaction and education level influence nutraceutical adoption. Health professionals should lead tailored education and sensory-optimized formulations to improve uptake in metabolic syndrome management.

Keywords: consumer perceptions, metabolic syndrome; nutraceuticals.

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DEVELOPING OF A PROTEIC PUFFED RICE ENHANCED WITH *LUPINUS ALBUS*

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Introduction: Lupin (*Lupinus albus*) flour is characterized by its rich nutritional composition, containing approximately 41-44% protein and 27-31% dietary fiber (Cutillo et al., 2021). The technological aspects of utilizing lupin flour in puffed rice are also noteworthy. The expanding process, commonly used to produce expanded snacks, can be optimized by adjusting the ratios of puffed rice and lupin flour.

Aims: This research focused on enhancing plain puffed rice with a mix of salt, olive oil, and lupin flour at different percentages (0%, 10%, 20%, 30%) for a higher intake of proteins and how lupin flour affects chemical and physical characteristics of puffed rice.

Material and methods: Puffed rice from long white rice was made in a puffing gun using specific technological parameters: duration (16 min), steam pressure (10 atm), and steam impregnation time (3 min). To enhance the protein content of plain puffed rice, lupin flour was added at three different concentrations (10%, 20%, and 30%), and a control sample without lupin flour was prepared using a mixture of olive oil and salt. We analyzed chemical, physical profile, and sensory analysis.

Results and Discussion: Analysis of the physical properties of puffed rice with varying ratios of lupin flour revealed changes in the texture profile, which was generally crispier and had higher fracturability (14.38-26.30) compared to plain puffed rice (8.10±0.14). Regarding chemical characteristics, the protein content increased from 7.29±0.76% for puffed rice without lupin flour to 12.8±0.01 % for puffed rice with 30% lupin flour. Samples with 10% and 20% showed similar results, 10.06±0.18 and 10.65±0.69, respectively.

Conclusion: This study demonstrated that enriching puffed rice with lupin flour led to improvements in protein. Additionally, sensory evaluation indicated that consumers accepted the inclusion of lupin in puffed rice products positively.

Keywords: fiber, lupin flour, protein, puffed rice.

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FUNCTIONAL ASSESSMENT OF PROCESSED SEA BUCKTHORN (*HIPPOPHAE RHAMNOIDES*) VARIETIES UNDER SIMULATED *IN VITRO* DIGESTION

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Introduction: *Hippophae rhamnoides* (sea buckthorn) (SB) is a nutrient-rich shrub with over 200 bioactive compounds, including flavonols, vitamins, carotenoids, and fatty acids. However, conventional drying often leads to nutrient degradation. Osmotic dehydration (OsD), a low-temperature method, has emerged as a promising strategy to retain the nutritional and functional integrity of SB. To assess SB's functional potential, this study investigated its response to a simulated gastrointestinal and colonic digestion.

Materials and methods: Three SB cultivars (Clara, Rori, Habego) were processed as fresh berries and OsD berries. Proximate analysis, phenolic profiling *via* HPLC, and a standardized INFOGEST 2.0 *in vitro* digestion model with an extended colonic fermentation model were used to evaluate nutrient composition, phenolic retention, and digestibility.

Results: OsD improved nutrient composition, with protein levels increasing up to 16.2%, lipids at 14.2%, and carbohydrates exceeding 57%. Clara fresh had the highest free phenolic content (66.95 µg/g dw), while OsD showed lower levels, though key compounds like isorhamnetin-rutinoside and quercetin-glucoside remained detectable. The results indicate that free phenolics are the dominant compounds in all analyzed samples. Also, phenotype differences were observed, suggesting that each variety has a unique phenolic profile. These results indicate that the plant's genotype plays an important role in determining the specific content and composition of phenolic compounds in various plant tissues. Additionally, notable results were observed in the osmotic treatment, where the bound phenolic values increased by 20% to 238%.

Conclusion: SB can be used as a functional food matrix due to its rich phenolic profile. Osmotic dehydration increased the amount of bound phenolics. Varietal and tissue-specific differences, particularly in Clara and Rori, highlight the importance of genotype and processing in optimizing phenolic content and digestibility.

Keywords: bioaccessibility; digestion; nutraceuticals; phenolic compounds; sea buckthorn.

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COMPREHENSIVE ANALYSIS OF PHENOLIC COMPOUNDS AND ANTIOXIDANT ACTIVITY IN DIVERSE PLANT MATERIALS: A MULTI-ASSAY APPROACH

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Introduction: Phenolic compounds from plants, including flavonoids and anthocyanins, are known for their antioxidant properties and health benefits. They play key roles in plant defense and offer therapeutic value in humans (Kiss et al., 2025). Understanding their distribution and activity is essential for developing functional and nutraceutical products. Antioxidant capacity varies across species and tissues, requiring complementary analytical approaches for comprehensive characterization.

Aims: This study analyzed phenolic content and antioxidant capacity in 32 samples, berries, fruits, vegetables, and flowers, using multiple assays. It also explored correlations between compound classes and antioxidant results.

Materials and Methods: Samples included grapes, aronia, blackberries, pomegranate, figs, purple carrots, potatoes, kale, eggplant peels, and various flowers. Phenolics, flavonoids, and anthocyanins were determined by Folin-Ciocalteu, aluminum chloride, and pH differential methods. Antioxidant capacity was measured via DPPH, CUPRAC, ABTS, FRAP, and ORAC.

Results: Berries, especially aronia, blackberries, and blueberries, had highest values. Strong correlations ($r = 0.75\text{--}0.95$) were found among assays and with phenolic and anthocyanin content, especially in purple samples.

Conclusion: This multi-assay approach reveals compound, antioxidant links, supporting the selection of plant sources for antioxidant, rich functional foods and nutraceutical applications.

Keywords: antioxidant activity, flavonoids, phenolic compounds, plant materials, spectrophotometric assays.

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CITRUS ESSENTIAL OILS NANO-EMULSIONS: ANTIMICROBIAL AND ANTI-INFLAMMATORY DUAL STRATEGY AGAINST FOODBORNE PATHOGENS

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Introduction: Bergamot (*Citrus bergamia*) and Tacle® are some of the best-known representatives of the citrus fruit class, which belongs to the *Rutaceae* family. These fruits have health benefits due to their composition, rich in proteins, fibers, sugars, minerals, and vitamins

Aims: Despite the growing interest in EO nano-formulations, there is a lack of research examining the chemical modification and biological mechanisms of bergamot and Tacle® essential oils in both pure and nano-emulsified forms. The current study examines the volatile content, antibacterial properties, and anti-inflammatory effects of bergamot and Tacle® essential oils, as well as their nano-emulsions.

Materials and Methods: Essential oils from *Citrus bergamia* and Tacle® were extracted via microwave-assisted hydrodistillation and formulated into nano-emulsions. Their composition, antimicrobial, anti-inflammatory, cytotoxic, and in silico bioactivity were evaluated through GC-MS, cell-based assays, and molecular docking.

Results: *In vitro* tests demonstrated that Tacle® nano-emulsions inhibited nitric oxide production by 78.34%, whereas bergamot nano-emulsions exhibited the highest cytotoxicity at a concentration of 91.17%. Both nano-emulsions exhibited similar efficacy against *E. coli* (1.95 µl/mL), but were ineffective against *S. aureus*. Molecular docking was used to confirm the experimental effects, revealing the interdependence between antimicrobial and anti-inflammatory mechanisms of citrus essential oils nano-emulsions and leading to findings that are worth further research from a therapeutic point of view.

Conclusion: Tacle® and bergamot nano-emulsions showed promising anti-inflammatory and antimicrobial properties, supported by in vitro and in silico evidence, particularly against *E. coli*.

Keywords: anti-inflammatory, antimicrobial, bergamot nano-emulsions, microwave-assisted extraction, tacle® nano-emulsions.

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EFFECT OF NANO TiO₂ PLASMA TECHNOLOGY ON INCREASING THE SHELF LIFE OF ORANGES

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Introduction: Postharvest losses of fruits, especially citrus fruits like oranges, pose a critical challenge in the food supply chain due to microbial contamination, moisture loss, and oxidative degradation. Enhancing the shelf life of oranges while maintaining their quality is a key objective in postharvest technology (Fernández et al., 2009).

Aim: This study aimed to investigate the effect of nano TiO₂ cold plasma technology on extending the shelf life of oranges and preserving their physicochemical and microbial quality under storage conditions

Materials and Methods: Fresh oranges were treated with Wave Tech Company's plasma nano TiO₂ coating and then exposed. Treated and control samples were stored under controlled environmental conditions for 30 days. Quality parameters, including weight loss, firmness, colour, microbial load, and chemical composition, were measured at regular intervals to assess the efficacy of the treatment.

Conclusion: The results demonstrated that the nano TiO₂ plasma treatment significantly reduced microbial growth, minimised oxidative changes, and maintained the firmness and appearance of oranges over the storage period. This combination technology shows promise as an eco-friendly and effective method for postharvest preservation of citrus fruits. (Ravishankar Rai & Jamuna Bai, 2011).

Keywords: antimicrobial, fruit quality, nano TiO₂ plasma technology, orange, postharvest preservation, shelf life.

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ROSEMARY EXTRACT IN EDIBLE BERRY COATINGS: ENHANCING SHELF LIFE THROUGH NATURAL PRESERVATION

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Introduction: The demand for natural preservation methods has increased in the food industry, prompting research into plant-based extracts with antioxidant and antimicrobial properties. Rosemary extract (RE), known for its bioactive compounds, presents a promising candidate for enhancing the shelf life of perishable produce such as berries.

Aims: This study aims to evaluate the efficacy of rosemary extract incorporated into sodium alginate-based edible coatings in extending the physicochemical quality and microbial stability of fresh berries (strawberries, blueberries, raspberries, and blackberries) during refrigerated storage.

Materials and Methods: A 2% sodium alginate solution supplemented with 9% RE was prepared and applied via spraying to fresh berries. The coated and uncoated samples were stored at 5°C, with assessments conducted at 4 and 7 days. Parameters measured included pH, moisture content, visual appearance, texture, and microbiological counts (Total Bacterial Count and Yeasts & Molds Count). Statistical analysis involved two-way ANOVA with Tukey's tests to determine significance.

Results: The RE-based coatings significantly improved moisture retention in fresh berries, especially blueberries, with moisture loss reduced by approximately 73% compared to controls. Microbial growth was moderately retarded, with reductions of around 25-30% in bacterial and yeast/mold counts in coated samples. The coating was effective on fresh berries, which showed minimal moisture retention and microbial control. The pH remained stable over storage, indicating minimal chemical changes.

Conclusion: RE incorporated into alginate-based coatings effectively enhances moisture retention and provides moderate microbial suppression in fresh berries, thereby extending their shelf life. These findings support the potential development of natural, clean-label berry preservation solutions, with a future focus on formulation optimization and commercial scaling.

Keywords: alginate, edible films, rosemary.

Acknowledgements: This research was funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101007783-FRIETS.

MATHEMATICAL MODELING OF REFRACTANCE WINDOW DRYING OF DAIRY PRODUCTS

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Introduction: Refractance Window drying is a novel technology with the potential to obtain dried dairy products. Mathematical modelling is a powerful tool for dryers design and optimization. Few works report the drying of dairy products using this technology, and no reports have been found on the mathematical modeling of the operation.

Aims: A mathematical model for coupled heat and mass transfer in two dimensions of Refractance Window drying of whole bovine milk, a commercial semi-skimmed yoghurt and Greek yogurt was developed

Materials and Methods: Experimental drying tests were performed at 40, 60, and 80 °C, and with product thicknesses of 0.001, 0.002, and 0.003 m, in a Refractance Window dryer. The effective moisture diffusion coefficients were established from the moisture content experimental curves, and the convective heat and mass transfer coefficients were obtained from the minimization of the error with the predicted values. The model was solved by the finite element method using FreeFem Software.

Results: A model was obtained to predict the moisture content and temperature of the product during drying. Lin's concordance correlation coefficient validated the model. The model was found to be suitable, showing concordance coefficients greater than 0.900. Heat and mass transfer coefficients of 5.2–10.5 W m⁻² K⁻¹ and 0.011–0.095 m s⁻¹, respectively, were obtained.

Conclusion: In the present research work, we developed a mathematical model of drying suitable for the design of refractance window dryers for obtaining dehydrated dairy products.

Keywords: drying, heat transfer, finite element method, mass transfer, milk, model.

HANSENULA ANOMALA YEASTS AS ANTIFUNGAL AGENT WITH PLANT GROWTH-PROMOTING PROPERTIES

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Introduction: Fungal diseases of plants present a significant threat to global food security by reducing the quality of cereal crop yields and contaminating plant production with toxins (Jain, 2019). Biological control of fungal plant diseases is emerging as an alternative to chemical pesticides. The use of bioproducts from yeasts is of increasing importance with the potential to develop a viable fungicide and natural solutions for plant protection and food security.

Aims: The aim of the research was to evaluate the antifungal potential of the yeast strain *Hansenula anomala* CNM YS-07 and to establish the effect of yeast mannoprotein preparation on the growth of some cereal crops.

Materials and Methods: In the given experiments, *Avena sativa* L. (oat) and *Zea mays* (maize) seeds were pretreated with mannoproteins biopreparation derived from yeasts *Hansenula spp.* The determined plant growth parameters were seedling length, seedling biomass, and root biomass.

Results: *Hansenula anomala* CNM YS-07 yeast strain can efficiently prohibit the growth of fungi *Aspergillus spp.* and *Fusarium spp.* The obtained biofungicide exhibits both antifungal and plant growth-promoting effects. Thus, mannoprotein preparation from *Hansenula anomala* has led to a maximum increase in maize seedling length of 97.3%, seedling biomass of 226.0%, and root biomass of 144.0% compared to the control. The maximum increase in oat seedling length was 178.2%, in oat seedling biomass was 101.1% and in root biomass – 173.0% compared to the control.

Conclusion: Thus, the development of a biofungicide based on the *Hansenula anomala* CNM YS-07 strain represents a promising solution for protecting valuable cereal crops, offering an efficient and environmentally friendly alternative to conventional pesticides.

Keywords: biofungicide, food security, fungal disease, mannoproteins, yeasts

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VALORISATION OF AGRO-FOOD WASTES FOR OBTAINING OF NATURAL BIOACTIVE YEASTS PREPARATIONS WITH THE PHYTOSTIMULATORY EFFECT

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Introduction: The management of agro-food wastes has great beneficial impact on the environment and ensures a more sustainable food safety policy. Eco-friendly and effective microbial biofertilizers are important for enhancing food security by improving plant productivity and increasing the good quality of crop production. According to Ahuti *et al.* (2021), agro-food wastes can serve as the valuable source of biologically active compounds.

Aims: Taking into consideration that organic biofertilizers are considered safer than inorganic due to the benefic effect on the environment and human health, this research aimed to study the effect of bioactive yeasts preparation on the base of agro-food wastes on plant growth.

Materials and Methods: The wastes of beer production and carrot processing were reused to obtain yeasts bioactive preparations. In the given experiments wheat seeds were pretreated with microbial preparations derived from yeasts. The assessed plant growth parameters were seedling length, seedling biomass, and root biomass.

Results: Various bioactive preparations from yeast *Rhodotorula mucilaginosa* has contributed to the increase of wheat seedlings biomass with 8,5-43,7% and of root biomass with 40,6 – 78,1% compared to the control. Proteins preparation from *Hansenula anomala* has contributed to an increase of wheat seedlings biomass with 78,0-168,0% and of root biomass with 30,6 – 57,1% compared to the control.

Conclusion: In the present research work the possibility of effective utilization of agro-food wastes in microbial biotechnology for the obtaining of yeasts biopreparations for the stimulation of plant growth was proved.

Keywords: agro-food wastes, bioactive preparations, plants, yeasts.

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CHEMICAL COMPOSITION AND CHARACTERIZATION OF SOME BIOACTIVE PROPERTIES OF ELDERBERRY (*SAMBUCUS NIGRA L.*)

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Introduction: *Sambucus nigra L.* (elderberry) is valued for its high anthocyanin and antioxidant content, making it a promising natural alternative to synthetic food dyes.

Aim: This study aims to identify the most effective storage methods and optimal harvest areas for preserving elderberry's bioactive compounds and antioxidant potential.

Materials and Methods: Elderberries harvested from two regions with differing pollution levels were preserved by freeze-drying, freezing, and drying. The samples were analyzed for total phenolic content (TPC), total flavonoid content (TFC), organic acids, carbohydrates, anthocyanins, heavy metals, and minerals.

Results: Freeze-dried samples showed the highest carbohydrate and phenolic acid content. Citric acid was the dominant organic acid. Seventeen phenolic compounds were identified, with 3-caffeoylquinic acid being the most abundant and caffeic acid-glucoside the least. Freeze-dried samples retained significantly higher levels of key compounds compared to frozen and dried forms.

Conclusion: Freeze-drying is the most effective method for preserving the nutritional and functional qualities of elderberries, enhancing their potential use in health-promoting and food-coloring applications.

Keywords: anthocyanins, dye, extractions, *Sambucus nigra L.*

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ENHANCED STABILITY AND CONTROLLED RELEASE OF EUCALYPTUS ESSENTIAL OIL VIA ULVAN-BASED MICROPARTICLES FOR FUNCTIONAL FISH FEEDS

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Introduction: Phytobiotics, such as eucalyptus essential oil, boost farmed fish immunity, but their volatility limits feed use. Ulvan, a sulfated polysaccharide from *Ulva lactuca*, microencapsulates bioactives to enhance stability and delivery.

Aims: This study developed ulvan–lecithin microparticles for stabilizing and controlling the release of EEO in functional fish feed formulations.

Materials and Methods: The emulsion of ulvan (5% w/v), EEO (10% w/w), and lecithin (1% w/w) was homogenized (15,000 rpm, 10 min), ultrasonicated (5 min), and freeze-dried. Particle size was measured with DLS. Encapsulation efficiency was assessed via hexane extraction and GC-MS. FTIR and DSC were used to characterize the structural and thermal properties. *In vitro* release and kinetic modeling were performed in PBS (RT, 100 rpm, 24 h). 1.7 mm pellets with 0.1% w/w microparticles were aged at 45 °C, 70% RH for 28 days. Feeds were analyzed for moisture, protein, lipids, antioxidants, and phenolics.

Results: Microparticles showed $76.4 \pm 1.2\%$ encapsulation and 145 μm mean diameter. FTIR confirmed stable polymeric interactions; DSC showed T_g shifts due to lecithin (+22.6 °C) and oil (−17.3 °C). Release followed Korsmeyer–Peppas kinetics, with 63.9% at 6 h and 90.2% at 24 h. Encapsulated feeds showed lower moisture gain (9.8% vs 12.0%), protein loss (−1.65% vs −3.5%), lipid degradation (−4.17% vs −12.5%), and better antioxidant (−13.5% vs −29%) and phenolic retention (−16% vs −34%).

Conclusion: Ulvan–lecithin microparticles enhanced the stability and controlled release of eucalyptus oil, improving the shelf life and functional quality of aquafeeds. This green system supports sustainable fish nutrition and the valorization of marine biomass.

Keywords: Aquafeed, Eucalyptus essential oil, Microencapsulation, Ulvan

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OPTIMIZING BLUEBERRY PRESERVATION BY ENHANCING BIOACTIVE RETENTION AND SUSTAINABILITY THROUGH OSMOTIC DEHYDRATION AND FREEZE-DRYING

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Introduction: Blueberries are rich in health-promoting bioactive compounds. However, conventional drying processes often degrade these compounds, which negatively impacts the fruit's nutritional value and sensory quality. Developing effective preservation methods that retain functional properties while enhancing shelf life and promoting environmental sustainability is crucial.

Aim: This study aimed to evaluate the effects of osmotic dehydration pretreatment followed by freeze-drying (ODFD) on the quality of processed blueberries.

Materials and Methods: Fresh blueberries were osmotically dehydrated using concentrated apple juice prior to FD. Comparative analyses were conducted on fresh, FD, and ODFD samples. Total phenolics, flavonoids, anthocyanins and antioxidant activity were quantified using spectrophotometric and HPLC methods. Microbial stability, sensory attributes, and life cycle assessment were also assessed.

Results: ODFD samples had lower moisture content compared to FD and enhanced microbial stability. While FD retained the highest total phenolic and flavonoid content, ODFD samples showed superior anthocyanin stability and increased levels of quercetin. Sensory analysis revealed improved sweetness and overall acceptability for ODFD samples. Environmentally, ODFD showed a reduction in carbon footprint and lower processing costs compared to FD.

Conclusions: Osmotic dehydration prior to FD significantly improves anthocyanin retention, microbial stability, and sensory appeal of blueberries while reducing environmental and economic costs. ODFD is a promising strategy for producing high-quality products.

Keywords: antioxidants, berries, dehydration, sustainability.

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MICROORGANISMS AS FORTIFYING TOOLS IN BIOTECHNOLOGICAL APPLICATIONS

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Introduction: Microorganisms (*Propionibacterium* spp., *Chlorella* spp., *Lactobacillus* spp., *Arthrospira* spp., *Aspergillus* spp.) are widely utilized in biotechnology for the sustainable biosynthesis of essential micronutrients (e.g., vitamins B12, B2, K; iron; organic acids). Their capacity to fortify substrates offers a promising avenue for addressing nutritional deficiencies through functional food development. Fermentation-based biofortification serves as a strategic intervention against conditions like pernicious and iron-deficiency anaemia. In this context, selected food-grade strains can efficiently produce key micronutrients under optimized fermentation conditions, supporting resource valorisation within the circular bioeconomy. This study explored their potential as biofortifying agents in disease-related applications.

Materials and methods: The microorganism was cultured in selective media with nutrient supplementation under controlled conditions. Metabolite and micronutrient production was enhanced by adjusting key parameters, and bioactive compounds were identified *via* LC-MS/MS and HPLC-RID.

Results: The fermentation process increased nutrient concentration, as confirmed by chromatographic and spectroscopic analyses. Elevated levels of key metabolites and micronutrients reflect enhanced metabolic activity and bioconversion efficiency. These results underscore the strain's potential for producing bioactive compounds and its suitability as a functional food ingredient.

Conclusion: This study demonstrates the capacity of microorganisms to enhance micronutrient content across various fermentation substrates. The observed elevation in metabolite levels supports the feasibility of this approach for developing biofortified functional foods targeting micronutrient deficiencies.

Keywords: anaemia, biofortified, micronutrients, sustainable.

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PROBIOTICS AND ANTINUTRIENTS: MECHANISTIC INSIGHTS INTO *IN VIVO* MODULATION OF NUTRIENT ABSORPTION

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Introduction: Antinutrients such as phytic acid form insoluble complexes with minerals like iron, zinc, and calcium, which decrease their absorption (Schlemmer et al., 2009). Probiotics can counter this effect through phytase activity and by modulating beneficial gut microbiota.

Aims: This meta-analysis examines whether probiotic supplementation can mitigate the effects of dietary antinutrients and improve mineral absorption in humans and animals.

Materials and Methods: A systematic review following PRISMA guidelines (2005–2025) was conducted on *in vivo* studies involving probiotics in diets rich in antinutrients. Studies included controlled probiotic interventions with outcomes related to mineral bioavailability, antinutrient degradation, gut microbiota, or nutritional status. Twenty-seven studies were included (14 rats, 11 mice, 2 chickens).

Results: Probiotic supplementation improved mineral status across different species. In chickens, probiotics have been shown to increase iron absorption and bone mineralization (Tako et al., 2020; Wang et al., 2014). In rodents, probiotic phytase enhanced iron and zinc uptake and improved feed efficiency. Additionally, probiotics enriched beneficial gut bacteria, such as *Lactobacillus* and *Bifidobacterium*, reduced pathogens, and improved gut health, immunity, and bone mineral density.

Conclusion: Probiotics support mineral absorption by reducing antinutrients through enzyme action and gut microbiota modulation. Pairing them with low-phytate or fortified foods may enhance this effect, though more human studies are needed.

Keywords: antinutrients, mineral absorption, probiotics.

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EFFECTS OF HYBRID PECTIN/ROSEMARY OIL-LOADED SOLID LIPID NANOPARTICLES FILMS ON THE QUALITY OF READY-TO-EAT MEAT

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Introduction: Ready-to-eat (RTE) meat products have gained popularity due to their appealing taste, time efficiency, and the convenience of fast, healthy meals. However, their shelf life is limited by the microorganism spoilage under refrigeration conditions. To increase the shelf life of RTE meat products, wrapping in edible films could be a proper solution. Edible films may contain bioactive ingredients such as essential oils, which could delay the growth of spoilage bacteria.

Aims: This study aimed to evaluate the effects of hybrid pectin/rosemary oil-loaded solid lipid nanoparticles (PE/RO-SLN) films on the microbial and sensorial quality of RTE chicken breast stored under refrigeration conditions (4 ± 1 °C) for 7 days.

Materials and Methods: Pieces of RTE chicken breast were packaged in commercial plastic bags with a zip, with or without PE/RO-SLN films. Microbiological and sensorial analysis were performed to analyse the samples.

Results: On day 7, the unwrapped sample with PE/RO-SLN films exceeded the acceptability limit, with a count of 6.61 log₁₀ CFU/g, whereas wrapped samples with PE/RO-SLN films delayed microorganism growth and had 3.65 log₁₀ CFU/g. Regarding sensory quality, on day 7, the sample without film had the lowest scores for all evaluated parameters. In contrast, the pectin/RO-loaded SLN films maintained all analysed sensorial parameters at levels higher than the lower limit of acceptability.

Conclusion: Considering the microbial and sensorial analysis, hybrid PE/RO-SLN films have the potential to be used for increasing the shelf life of RTE chicken breast under refrigeration conditions.

Keywords: edible film, nanoparticles, pectin, ready-to-eat meat, shelf life.

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PHENOLIC-RICH JONATHAN APPLE POMACE – ASSESSMENT OF ITS PREBIOTIC, ANTIOXIDANT, AND ANTIPROLIFERATIVE PROPERTIES

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Introduction: Apple pomace, a major by-product of juice production, is rich in phenolic compounds like chlorogenic acid and procyanidins. Its antioxidant and fiber content are well known, but data on its prebiotic and antiproliferative properties remain limited.

Aims: This study aimed to assess the functional potential of apple pomace by evaluating its antioxidant activity after *in vitro* digestion, prebiotic effects during probiotic fermentation, and antiproliferative effects on Caco-2 cells.

Materials and Methods: Apple pomace was subjected to *in vitro* digestion and used as a carbon source in 48-hour fermentations with *Lactobacillus plantarum*, *Lactobacillus casei*, and *Saccharomyces boulardii*. The prebiotic index (PI) was calculated using matrices of apple pomace, glucose, and FOS. Antiproliferative activity was evaluated via MTT assay on Caco-2 and Hs27 cells.

Results: *In vitro* digestion increased antioxidant activity by 15%. Fermentation confirmed the prebiotic potential of apple pomace (1.15 ± 0.20), with the highest value for *S. boulardii* at 1%. MTT assay showed selective antiproliferative effects, more pronounced in Caco-2 cells than in Hs27 cells.

Conclusion: Apple pomace shows promising antioxidant, prebiotic, and antiproliferative properties, supporting its use as a sustainable functional ingredient. Further research should optimize processing and validate these effects in clinical studies.

Keywords: antiproliferative effect, *in vitro* digestion, prebiotic potential.

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HAWTHORN (*CRATAEGUS MONOGYNA*) EXTRACT AS A NATURAL FUNCTIONAL INGREDIENT IN BEEF BURGERS: PHYTOCHEMICAL AND TECHNOLOGICAL INSIGHTS

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Introduction: Consumers are increasingly demanding clean-label meat products free from synthetic additives. Wild plants rich in bioactive compounds represent promising sources of natural preservatives and functional ingredients (Shah et al., 2022). *Crataegus monogyna* is a spontaneous species known for its high bioactive compounds (Kowalski et al., 2021). Moreover, several studies have reported its antimicrobial potential against common foodborne pathogens. (Ozturk et al., 2020).

Aims: This study aimed to evaluate the potential of hawthorn extracts as natural functional ingredients in beef burgers, focusing on their phytochemical composition, antioxidant and antimicrobial activities.

Materials and Methods: Hawthorn plant materials were harvested from three different ecological areas. Extracts were obtained using hydroalcoholic solutions and analyzed for total polyphenols, flavonoids, tannins, vitamin C, mineral content, antioxidant capacity and antimicrobial activity against selected foodborne pathogens. Selected extracts were incorporated into beef burger formulations. The burgers were analyzed for physicochemical parameters microbial load, and sensory attributes during refrigerated storage.

Results: The hawthorn extracts, especially those obtained from rural areas, significantly enhanced the oxidative stability of burgers and reduced microbial growth. Sensory acceptability remained within acceptable limits throughout storage.

Conclusion: Hawthorn extract represents a valuable multifunctional ingredient for the reformulation of beef burgers, offering natural antioxidant and antimicrobial protection.

Keywords: antioxidant activity, beef burger, *Crataegus monogyna*, functional meat product, natural preservative.

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STUDY ON OPPORTUNITIES FOR THE VALORIZATION OF WASTE AND BY-PRODUCTS IN THE AGRO-FOOD VALUE CHAINS

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Introduction: Up to 2.5 million tons of food waste are generated every year in Romania, as stated by Eurostat. In this situation, the development of companies valorizing the waste is crucial for a circular bioeconomy transition. This article presents a business model in the agri-food sector with food waste or by-products as input material for value-added products.

Materials and Methods: For this paper, a hypothetical business model was developed, with main object the collection of food and vegetable waste from restaurants, markets and households. The purpose of the business is to transform this organic waste into quality compost and biomass, thus contributing to reducing food waste and promoting a local circular economy.

The model analysis was carried out using the Business Model Canvas tool, which allowed a clear structuring of the essential components of the business: value proposition, customer segments, distribution channels, key resources, strategic partners, revenue and cost streams.

Results: The proposed model highlighted a real potential for integrating circular economy principles into a local business in the agri-food sector. From an economic point of view, this model emerges as a feasible model, with moderate operational costs and a diversified revenue structure, coming from the sale of organic compost, biomass briquettes and potential institutional collaborations.

From a social perspective, the model makes a significant contribution at the community level, through job creation, collaborations with small farmers and educational initiatives on composting and reducing food waste. These actions strengthen a local network of sustainable practices, creating a collaborative ecosystem between the business environment, civil society and local authorities.

From an environmental point of view, simulation outcomes show the avoidance of around 10 tons/month of organic waste destined for landfill. The utilization of the ensuing compost allows the regeneration of farming soil, and biomass items can be substituted for conventional fuels either in the household or small-scale farms. The business thereby offers a closed loop of asset valorization, lessening the carbon footprint in addition to enabling a regenerative approach.

Conclusion: The application of a circular model in the agrifood sector can reduce environmental impact, create green jobs and sustainable rural development. However, a coherent national strategy that binds food chain players together and supports innovation in the bioeconomy is required.

Keywords: business model, circular bioeconomy, compost, food chain.

STUDY OF THE ENZYMATIC ACTIVITY OF MICROMYCETES ISOLATED FROM THE LAKES OF CHISINAU MUNICIPALITY

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Introduction: Aquatic micromycetes are known to have an enormous and inexhaustible biotechnological potential, due to their ability to produce extracellular proteins in large quantities, such as enzymes, including cellulase, lipase, catalase, amylase, etc. (Akinfemiwa et al., 2024). The use of micromycetes in enzyme production is due to the simplicity of the processes and short production time, recovery, purification, and low costs. Thus, they offer unique opportunities for obtaining enzymes needed in various fields, such as the food industry, medicine, pharmacology, agriculture, etc. (Chin et al., 2024; Hyde et al., 2019).

Aims: Evaluation of the enzymatic potential of micromycetes isolated from the lakes of Chişinău municipality.

Materials and Methods: The enzymatic activity of 164 micromycete strains, isolated from three lakes in Chişinău municipality — La Izvor, Valea Trandafirilor, and Valea Morilor — was evaluated. The evaluation of enzymatic activities (amylase, catalase, cellulase, and lipase) was performed by express methods.

Results: As a result of the evaluation of the enzymatic potential (amylase, cellulase, catalase, and lipase) of 164 micromycetes strains, it was found that strains from the genera: *Penicillium*, *Talaromyces*, *Aspergillus*, *Trichoderma*, are the most active. Of the 164 strains studied, 12.2% showed similar activity for all four enzymes, with strains isolated from the sediment and water samples of Lake La Izvor being more active.

Conclusion: Aquatic micromycetes exhibit a remarkable potential for biotechnological interest in obtaining bioactive substances intended for various industries, including food, medical, and agricultural.

Keywords: amylase, catalase, cellulase, lipase, micromycetes.

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THE APPLICATION OF ADVANCED BIOTECHNOLOGIES IN THE DEVELOPMENT OF ECO-FRIENDLY PACKAGING FOR IMPROVING THE QUALITY AND SAFETY OF FOOD PRODUCTS

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Introduction: Conventional food packaging, mainly petroleum-based plastics, poses significant environmental challenges due to poor biodegradability and recycling limitations. Consumer and regulatory pressure promotes sustainable alternatives that ensure food safety, prolong shelf life, and reduce environmental impact. Advanced biotechnologies, especially biopolymer composites derived from agricultural waste, offer promising solutions aligned with circular economy principles (Goyal et al., 2024).

Aims: The work aims to develop eco-friendly food packaging materials utilizing advanced biotechnologies, with a focus on chitosan-based composites derived from Romanian agricultural waste, to enhance food quality, safety, and shelf life while reducing environmental impact.

Materials and methods: Literature review across Scopus, Web of Science, and Science Direct using keywords like “biodegradable packaging”, “chitosan composites”, and “agricultural waste valorisation”.

Results: Chitosan-based films from crab shells and fungal fermentation show strong antimicrobial activity and extend strawberry shelf life by at least 30% compared to plastic packaging (Yadav et al., 2020). The inclusion of olive pomace extracts enhances the antioxidant and antimicrobial functions of these films, while cellulose nanocrystals from sunflower husks and wheat straw improve mechanical strength and moisture barrier properties.

Conclusion: Advanced biotechnologies enable the creation of eco-friendly packaging from Romanian agricultural waste. These innovations improve food safety and shelf life while addressing environmental concerns, signalling a sustainable transition from conventional plastics.

Keywords: agricultural waste valorisation, food safety biotechnology, chitosan-based packaging.

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ENHANCING SOUR BEER FUNCTIONALITY THROUGH APPLE POMACE INTEGRATION AND DUAL FERMENTATION APPROACHES INVOLVING *LEVILACTOBACILLUS BREVIS*

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Aims: This study investigates the integration of apple pomace in sour beer through pre-fermentation and co-fermentation with *Levilactobacillus brevis* and *Saccharomyces cerevisiae*, focusing on fermentation dynamics and the resulting functional and sensory attributes.

Materials and Methods: Apple pomace from “Golden Delicious” and “Topaz” varieties was added during wort boiling in ratios of 1:3, 1:5, and 1:10. Fermentations were carried out at lab scale using both pre-fermentation and co-fermentation strategies. Physicochemical parameters were monitored throughout.

Results: Sour beers with apple pomace exhibited lower pH levels (up to 3.60) and higher titratable acidity (maximum 5.04 g/L lactic acid), particularly in pre-fermented variants. Alcohol levels were slightly reduced in these samples (6.31% ABV), while colour lightness increased (from 13–15 EBC to 8–9 EBC). Polyphenol content reached 0.459 mg GAE/mL in co-fermented beers. Volatile profile analysis revealed distinct aroma differences associated with fermentation mode and the addition of pomace.

Conclusion: Apple pomace enhances both the acidity and nutritional profile of sour beer while promoting sustainable practices. The dual fermentation strategies offer varied outcomes, highlighting the need for tailored processing to optimize product quality.

Keywords: apple pomace, fermentation strategies, functional beverage, *Levilactobacillus brevis*, sour beer.

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DRYING OPTIMIZATION, NUTRITIONAL COMPOSITION AND BIOACTIVE POTENTIAL OF WINE LEES FOR SUSTAINABLE VALORIZATION IN THE CIRCULAR ECONOMY FRAMEWORK

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Introduction: The wine industry generates large quantities of by-products, among which wine lees represent a promising resource for recovery and reuse under principles of a circular economy.

Aims: This study investigates the potential of wine lees as a nutrient-rich and antioxidant-active biomass for food-related applications.

Materials and methods: Three drying methods – spray drying, freeze-drying, and conventional oven drying – were evaluated for their impact on nutrient preservation and bioactive content. The samples were analyzed for proximate composition (moisture, protein, lipid, ash, carbohydrates), B-vitamin profile (B1, B2, B3, B6, B7, B9) *via* high-performance liquid chromatography (HPLC), total phenolic content (TPC), and antioxidant capacity (DPPH and CUPRAC). Phenolic profiling was further conducted on the most promising samples, along with toxicology assays.

Results: Spray drying showed superior preservation of B vitamins and phenolic compounds (e.g., TPC up to 2.21 mg GAE/g dry matter, antioxidant activity up to 1.41 mM Trolox equivalents), compared to freeze-dried and oven-dried counterparts. Notably, vitamin B2, B3, and B7 were the most abundant (up to 2.967, 1.703, and 7.908 mg/g, respectively), while B1 and B6 appeared in lower amounts, and B9 was found in trace concentrations. The antioxidant activity correlated strongly with TPC values, supporting their bioactive relevance.

Conclusion: These findings suggest that properly processed wine lees can serve as a functional ingredient source for food and feed systems, with spray drying offering the best retention profile and scalability. The study contributes to sustainable food development by advancing efficient valorization strategies for winemaking by-products.

Keywords: agro-food innovation, green processing technology, nutraceutical potential, yeast, waste valorisation.

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PHYSICO-CHEMICAL PROPERTIES AND SENSORY ANALYSIS OF REFORMULATED WAFFLES

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Introduction: Plant-based diets are considered more sustainable and healthier for the consumers (Galanakis, 2018). Aquafaba (AF) is the by-product obtained from chickpea bean cans and presents foaming, emulsifying and gelling properties (He et al., 2021).

Aims: The present study aimed to correlate the physico-chemical properties of the dough with those of reformulated waffles, obtained with AF, an oleogel (OG) obtained with 5% glycerol monostearate (GM) and sunflower oil, and gluten-free oat flour, and to preliminary assess the sensory preference of consumers on reformulated and control waffles.

Materials and Methods: Ingredients were bought from the local stores and GM from Thermo Fisher Scientific. Eight samples of waffles were obtained using a 2-level 3-factorial experimental design (DesignExpert), varying the whipping time of aquafaba (3 and 9 minutes) and its concentration (7% and 14%), and the presence of oleogel or oil in the formulation. The analyses performed were the instrumental analysis of texture and colour, ash content and total protein content. A 7-point scale hedonic test and a preference test were performed to assess consumers' perception regarding the conventional or reformulated waffles.

Results: The dough with higher values for adhesiveness and hardness resulted in waffles with reduced hardness. In principal component analysis of physico-chemical attributes PC1 explained 60.2% of the variance and PC2 24.4%. Additionally, waffles formulated with oleogel showed lower values for hardness (e.g., 23.61 ± 0.93 N) as compared to those formulated with sunflower oil (e.g., 42.2 ± 7.72 N) due to the higher degree of saturation of the oleogel. However, the differences between samples were not statistically significantly different ($p > 0.05$). Control samples with wheat flour and egg white showed higher values for hardness, namely 52.07 ± 1.18 N and 81.78 ± 0.44 N respectively. The preferred sample was the sample formulated with wheat flour.

Conclusion: The present work demonstrated that AF can be used in waffle production and reformulated samples were more appreciated than the control, indicating that consumers are willing to accept such products. The type of flour influenced the consumers' decision, as well as the textural properties of waffles.

Keywords: aquafaba, oleogel, waffles.

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STRUCTURED LIPIDS IN PASTRY PRODUCTS: FUNCTIONAL EVALUATION AND ENHANCEMENT WITH BIOACTIVE COMPOUNDS

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Introduction: As consumers are more aware of the relationship between diet and health, developing innovative food products with improved lipid profiles—without compromising quality—has become essential. Oleogelation represents a novel method for structuring liquid oils into semi-solid fats, offering the potential to lower the saturated and trans fat content in food, thereby enhancing their nutritional value. It is also important to consider the possibility of delivering bioactive compounds through these structured lipids.

Aims: The study investigated the potential of oleogels as fat replacers in pastry products and their functional enhancement for bioactive compound delivery.

Materials and Methods: Dimodan was used as structuring agent to obtain oleogels in concentration of 7.5% and 10%. The oleogels were analysed in terms of texture, rheology, oil loss and microstructure. After studying the results, the oleogel with 10% Dimodan was chosen to test the use of curcumin on physical properties. Thus, the oleogel was improved by adding 0.1%, 0.5% and 1% curcumin. Both the doughs and the finished products were analyzed.

Results: The sample with 10% Dimodan (OG_10%D) exhibited a hardness value of 34.69 N, indicating a well-structured liquid oil matrix; moreover, its storage modulus (G') increased progressively with frequency in the range of 0.1–10 Hz, and microscopic analysis showed that higher Dimodan concentrations contributed to a more compact and uniform microstructure. The incorporation of curcumin affected the textural properties of both the doughs and the finished products, leading to increased values upon its addition.

Conclusion: It is possible to reformulate pastry products by completely replacing conventional fats with oleogel without affecting the physicochemical properties of the product, but improving the nutritional profile.

Keywords: curcumin, oleogel, reformulated products, structured lipids.

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SUSTAINABLE VALORIZATION OF SUSHI WASTE VIA SEQUENTIAL FERMENTATION WITH *ASPERGILLUS TERREUS* AND *BACILLUS SUBTILIS*

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Introduction: Valorizing food waste through microbial fermentation aligns with circular economy principles. This study investigates the bioconversion of sushi by-products (OFS) containing rice, crustacean remnants, and plant-based residues, using *Bacillus subtilis* for enzymatic hydrolysis and *Aspergillus terreus* for itaconic acid and succinic acid biosynthesis.

Aims: This study aimed to investigate the potential of OFS as a nutrient-rich substrate for solid-state fermentation and to evaluate the impact of axenic and sequential microbial fermentations using *B. subtilis* and *A. terreus* on the production efficiency of organic acids, particularly itaconic and succinic acid.

Materials and Methods: Five fermentation strategies (A. *A. terreus*, B. *B. subtilis*, C. non-inoculated control, D. pre-fermentation with *B. subtilis* followed by *A. terreus*, and E. pre-fermentation with *B. subtilis*, autoclaved, then inoculated with *A. terreus*) were tested. Biochemical analysis (HPLC, pH, rheology, and colorimetry) and statistical validation (ANOVA and Tukey's test) were conducted over 14 days.

Results: *B. subtilis* pre-treatment (Batch D and E) significantly enhanced glucose availability (99.35 ± 0.21 mg/g_{dw}) and improved substrate hydrolysis. Batch D (non-autoclaved co-culture) yielded 31.77 ± 0.78 mg/g_{dw} succinic acid, while itaconic acid production peaked in Batch E (autoclaved) at 5.23 ± 0.11 mg/g_{dw}. Co-cultivation modified metabolite profiles, with succinic acid favored over itaconic acid due to microbial competition. The optimal pH for acid production was around 6.

Conclusion: OFS is a cost-effective fermentation substrate. Sequential fermentation with *B. subtilis* and *A. terreus* enables the targeted production of organic acids, supporting the sustainable bioprocessing of food residues.

Keywords: *Aspergillus terreus*, *Bacillus subtilis*, bioconversion, itaconic acid, succinic acid.

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INVESTIGATING THE POTENTIAL OF MINERAL-ENHANCED PROBIOTICS

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Introduction: Magnesium deficiency remains a widespread health concern, with significant implications for metabolic and neurological health (Fiorentini et al. 2021). As a result, strategies to improve magnesium bioavailability are increasingly relevant in the context of functional nutrition. Recent attention has turned to the use of mineral-enhanced probiotics.

Aims: This study investigates the potential of mineral-enhanced probiotics by examining the viability, metabolic activity, and magnesium bioaccumulation capacity of selected probiotic strains when exposed to different organic magnesium salts.

Materials and Methods: Three probiotic strains, *Saccharomyces boulardii* MYA 796, *Lactobacillus rhamnosus* ATCC 53103, and *Lactobacillus fermentum* LC-40, were subjected to in vitro fermentation with four magnesium salts: bisglycinate, malate, citrate, and taurate. Viability was assessed through CFU enumeration and pH monitoring. Metabolite profiling was conducted using HPLC, and intracellular magnesium accumulation was quantified.

Results: Each strain exhibited distinct responses to magnesium supplementation. *S. boulardii* showed the highest magnesium uptake, particularly with magnesium taurate and citrate, reaching intracellular levels up to ~700 µg/g DW. Magnesium citrate elicited the most diverse metabolic activity in *L. fermentum*, enhancing production of lactic, acetic, citric, and malic acids. *L. rhamnosus* maintained consistent high lactic acid output across all conditions, suggesting robust acidification potential regardless of the magnesium form.

Conclusion: The findings highlight the strain-specific and salt-specific interactions that influence probiotic performance and magnesium bioaccumulation. The pairing of certain probiotic strains with specific magnesium salts holds promise for enhancing both mineral delivery and functional outcomes, offering a new direction for synbiotic product development.

Keywords: bioaccumulation, fermentation, magnesium salts, nutraceuticals.

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THE CARPATHO-DANUBIAN DIET- TRADITION, NUTRITION, AND SUSTAINABILITY

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Introduction: The Carpatho-Danubian Diet (CDD) is a balanced nutritional model rooted in Romanian food traditions, integrating Mediterranean and Nordic dietary concepts (Hâncu, 2020). Developed for the Carpatho-Danubian region, this approach reflects a historical synthesis of local biodiversity and external influences, where cereals, vegetables, dairy products, and livestock products played a central role (Hâncu and Bala, 2024).

Aims: This review explores the CDD's evolution, characteristics, and health and sustainability potential as a regionally adapted nutritional framework for Romania and neighboring countries.

Materials and Methods: A narrative review explored historical, ethnographic, and nutritional sources, including anthropological data and dietary practices.

Results: The CDD is characterized by a high consumption of whole grains, seasonal vegetables, legumes, and fermented foods, along with a moderate intake of animal-based products, including dairy, fish, and lean meats. It incorporates traditional preparation methods (e.g., fermentation, boiling, slow cooking) and promotes sustainability through local food systems and the use of minimally processed ingredients. The food composition of the CDD is strongly associated with benefits for metabolic health, improved body composition, and the prevention of non-communicable diseases.

Conclusion: The CDD is a sustainable, culturally adapted model rooted in regional traditions. Combining traditional and modern principles, it offers a healthy alternative to Mediterranean and Nordic diets. Its focus on plant-based, seasonal, and minimally processed foods supports both health and biodiversity. Further research is needed to validate its health benefits and inform policymakers in developing effective public health strategies.

Keywords: CDD, healthy eating model, sustainable diet, romanian nutrition.

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DEVELOPMENT OF AN INNOVATIVE FROZEN DESSERT BASED ON TAHINI FROM OLEAGINOUS SEED KERNELS

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Introduction: The rising demand for plant-based alternatives, driven by veganism, lactose intolerance, and health concerns, has sparked greater interest for non-dairy ice cream alternatives (Sipple et al., 2022).

Aims: The current study explores the potential of developing vegan frozen desserts, formulated without synthetic emulsifiers, using oleosomes extracted from sunflower seed kernels as natural stabilizers (Ntone et al., 2023).

Materials and Methods: Ingredients (sunflowers, dates) were bought from local stores and tahini was prepared by roasting the seeds and grinding for 2 h in Mully Top mill. The process involved the aqueous extraction of oleosomes, followed by the formulation of the emulsions with tahini, date paste and water, with the addition of 0–25% oleosomes. Viscosity of the emulsions was evaluated at 5°C with Anton PAAR MCR302 rheometer, with shear rates varying between 0.01-100 1/s. The emulsions were aged for 24 h/4°C then frozen. The overrun, stability, melting behavior, color (CIELab) and textural parameters (TPA) of the products were analysed. Sensory evaluation was carried out through a hedonic test.

Results: The emulsions exhibited pseudoplastic behavior, and viscosity increased with higher oleosome content. The products presented a moderate energy value (207 kcal/100 g) and a balanced profile of fats, carbohydrates, and proteins. Results demonstrated that higher oleosome content enhanced melting resistance, improved texture smoothness and emulsion stability, and had only a minor impact on color. Sensory evaluation indicated a clear preference for the pumpkin seed tahini variant, which scored higher in taste, aroma, and overall acceptability, showing lower variability among evaluators.

Conclusion: The findings confirm the feasibility of developing stable, nutritious, and sensory appealing plant-based frozen desserts, aligned with current consumer preferences for clean-label, health-oriented products.

Keywords: frozen desserts, oleaginous seeds, oleosomes.

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SESSION 3: HORTICULTURE AND LANDSCAPE

MUTUALISTIC INTERACTIONS: HOW ARBUSCULAR MYCORRHIZAL FUNGI ENHANCE PLANT HEALTH

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Introduction: In both natural and agricultural ecosystems, plants are regularly colonized by beneficial and pathogenic microorganisms, primarily bacteria and fungi. Both can play a key role in plant growth, health, and nutrient acquisition through various direct and indirect beneficial mechanisms. For this reason, they are also used as biofertilizers to inoculate cultivated soils and improve plant productivity. Fungi can form symbiotic associations with plants, known as mycorrhizae, in which the interaction occurs between the fungal mycelium and plant roots. The mycorrhizal association is widespread and can colonize nearly 80% of angiosperms and all gymnosperms. Both partners benefit from the association: plants experience enhanced uptake of mineral nutrients, such as nitrogen and phosphorus, from the soil, while fungi obtain carbon compounds synthesized by the plant through photosynthesis.

Aims: This study reports the experimental results of research on the application of arbuscular mycorrhizal fungi to the growth of several agriculturally important species, to the acclimatization of in vitro propagated plants in nurseries, to the influence on the production and composition of bioactive compounds in medicinal and aromatic plants, and the role of the symbiosis in soils contaminated by heavy metals or emerging pollutants.

Materials and Methods: The effects of arbuscular mycorrhizal inoculation were evaluated in greenhouse on the growth of tomato and melon seedlings and artichoke offshoots; during the acclimatization stage of micropropagated plantlets of melon, artichoke, oregano, Spanish bloom and olive; on the production and composition of essential oils of thyme, sage, oregano and stevia; in soils contaminated by heavy metals or emerging pollutants on the behaviour of heliopsis and artichoke. Moreover, the role of the symbiosis was also considered after the transplant of micropropagated and mycorrhizal in the field.

Results: All experiments underline the beneficial effects of the symbiosis between plants and AM fungi.

Conclusion: The mutualistic interaction plants x AM fungi confirm its value for sustainable agriculture and environmental applications.

Keywords: biofertilizers, plant–fungus symbiosis, sustainable agriculture

POMOLOGICAL AND GENETIC ANALYSIS OF SOME ESTERHÁZY PERSIAN WALNUT GENOTYPES FROM HUNGARY, AUSTRIA, AND SWITZERLAND

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Introduction: The esteemed Persian walnut (*Juglans regia* L.) genotype ‘Esterházy II’ was prominent during the 19th century in the Austro-Hungarian Monarchy and can still be found in backyard gardens and small orchards in German-speaking regions today. Unfortunately, vegetatively propagated progenies of the original ‘Esterházy II’ are no longer available in Hungary, as walnut grafting began after this cultivar's ascendance. While various accessions labelled as ‘Esterházy’ can be found in nurseries, determining their authenticity is quite challenging.

Aims: This study compares the phenological, nut morphological, and genetic characteristics of an ‘Esterházy II’ specimen from our gene bank with standard Hungarian-bred cultivars and ‘Chandler’ as a control.

Materials and Methods: Key traits examined include bud break, blossom time, dichogamy, ripening time, and nut and kernel features. We also used SSR fingerprinting to establish genetic identities and connections with other Hungarian walnut cultivars.

Results: Our results indicate that all characteristics, except bud break, align with existing descriptions. Notably, the examined ‘Esterházy II’ genotype closely resembles the "original" variant detailed in the literature.

Conclusion: In the present research work, the traditional phenological observations and modern methods were combined to re-identify an old genotype.

Keywords: early spring phenology, kernel, shell characteristics, specimen, walnut phenology

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SENSORY NEXUS: A NEW APPROACH OF WINE SENSORY EVALUATION IN THE CONTEXT OF TARGETED CONSUMER BEHAVIOR

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Introduction: This paper introduces the "Sensory Nexus" concept, a multisensory wine evaluation framework. It explores how all senses: sight, smell, taste, touch, sound and the environment, contribute to the wine experience, integrating insights from wine neuroscience to understand sensory information processing and perception formation in the brain. The paper emphasizes the individuality of sensory perceptions, highlighting that visual, olfactory, and gustatory experiences are unique to each person due to genetic predispositions, past experiences, and brain differences.

Aims: The aim of this paper is to enhance sensory evaluation techniques and inform targeted consumer marketing strategies in the wine industry by exploring how all senses contribute to the wine experience and how external visual cues influence consumer perception.

Materials and Methods: Wine tasting sheets with a new scoring model in which all senses are scored with identical ratings, questionnaires, interpretation, and analysis of wine packaging and labeling.

Results: The research, "Sensory Nexus" concept, a multisensory framework for evaluating wine. shows that the experience is a blend of all senses and is highly individual. The study used new tasting sheets and analyzed wine packaging. Results show that the visual sense is dominant, influencing how the brain perceives smell and taste. Olfaction (smell) is critical for wine appreciation and is unique to each person. Taste and the tactile sense (texture, body) are also essential. Beyond the wine itself, external visuals are a major factor. A wine's label, bottle, and cork all convey messages that build first impressions and set expectations before a person even takes a sip. Ultimately, the "Sensory Nexus" proves that the wine experience is deeply personal and multisensory. Understanding how the senses interact, combined with the significant impact of external visuals, is crucial for better evaluation and smarter marketing in the wine industry.

Conclusion: The "Sensory Nexus" concept demonstrates that the wine experience is profoundly multisensory and highly individual. Understanding how visual, olfactory, gustatory, and tactile senses interact, along with the significant impact of external visual cues, is crucial for developing enhanced sensory evaluation techniques and effective targeted consumer marketing strategies in the wine industry.

Keywords: consumer, marketing, wine tasting

EXISTING TREES ASSESSMENT IN TULCEA FOR URBAN FOREST AND SUSTAINABLE MATRIX PLANNING BASED ON THE NATIVE VEGETATION IN NORTHERN DOBROGEA

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Introduction: This study addresses the implementation of urban forest principles and planting matrices based on native vegetation in the Northern Dobrogea area. The planting strategy is based on an extensive analysis of existing tree species in the central area of Tulcea according to the green space registry.

Aims: The purpose of the study was to establish a planting strategy based on urban forest principles and planting matrices using native species, specific to the area.

Materials and Methods: Data on urban trees were extracted from the records and files of the green space registry of Tulcea. Were analyzed specialized scientific studies that extensively treated the native vegetation of Northern Dobrogea, with a focus on the Tulcea Hills. Tree species and plant associations were selected based on native floristic compositions in correlation with local urban constraints.

Results: The diagnosis revealed a structural imbalance, with urban biodiversity thresholds recommended by the specialized literature being exceeded. An adaptive species palette was generated, excluding overrepresented taxa and promoting native associations. The chosen plant associations reflect the ecological identity of the Tulcea region, being composed of native species characteristic of local habitats (91AA – *Ponto-Sarmatian xerothermophilous* forests, 62C0 – *Ponto-Sarmatian* steppes and 40C0 – deciduous shrubs): association for tree and shrubs: *Paeonio peregrinae* - *Quercetum pubescentis*, *Paeonio peregrinae* - *Carpinetum orientalis*, *Cotino* - *Quercetum pubescentis*. For the matrix planting, the results lead to the following associations: *Stipetum joannis*, *Stipo ucrainicae* - *Festucetum valesiaca*, *Koelerio lobatae* - *Thymetum zygoides*, *Jurineo arachnoideae* - *Stipetum lessingiana*, *Agropyro pectinatae* - *Tanacetum millefoliae*, *Chrysopogonetum grylli*. Recommendations include preserving existing trees, avoiding oversaturation with dominant genera (*Tilia*), respecting the *Enhance* criterion of urban forests (max. 10% species, 20% genus, 30% family).

Conclusion: The conclusions highlight the need for detailed analyses, capitalizing on existing trees, reducing floristic imbalances and increasing the degree of canopy cover. The proposed plant associations ensure functional diversity, climate resilience and aesthetic value. The results support a sustainable urban landscape model, with predictable evolution over time and ecological and cultural reconnection to local identity.

Keywords: associations, canopy, habitat, matrix planting, trees, urban forest

PERFORMANCE OF 'NERO' CHOKEBERRY IN A LOW INPUT SYSTEM UNDER THE AGRO-CLIMATIC CONDITIONS OF CLUJ-NAPOCA

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Introduction: *Aronia melanocarpa* (Michx.) Elliott, commonly known as black chokeberry, is a perennial shrub valued for its high content of bioactive compounds, particularly polyphenols and anthocyanins (Gurčík *et al.*, 2023). In recent years, interest in chokeberry cultivation has increased in Europe due to its adaptability, resilience to pests and diseases, and potential for production in marginal environments.

Aims: The main aim of this study was to evaluate the growth, yield, and fruit quality of 'Nero' chokeberry grown under low-input conditions, without fertilization or artificial irrigation, under the agro-climatic conditions of Cluj-Napoca, Romania.

Materials and Methods: The measurements were carried out on 5-years old plants regarding their growth (height, spread, canopy volume, number of canes), yield (berry weight, yield/plant) and fruit quality (soluble solids, pH, acidity and Vitamin C content).

Results: 'Nero' chokeberry plants performed well under low-input, rainfed conditions, with a survival rate of 100% over the evaluation period. Average plant height increased from 85.3 cm to 130.5 cm over two years, while canopy diameter expanded proportionally. Mean yield per bush in the second year of study reached 1.35 ± 0.27 kg, corresponding to an estimated 2.68 t ha^{-1} . Fruit quality parameters remained high despite the absence of fertilization and irrigation. Mean fruit weight was 0.61 ± 0.05 g, soluble solids content averaged 17.2 ± 0.4 °Brix, and Vitamin C concentration 31.12 ± 0.89 mg 100 g^{-1} fresh weight.

Conclusion: The results indicate that *Aronia melanocarpa* 'Nero' can be successfully cultivated under low-input, rainfed conditions in the agro-climatic environment of Cluj-Napoca. No significant pest or disease problems were observed. These findings support the suitability of 'Nero' for sustainable berry production in similar temperate continental regions, offering an alternative crop option for low-input agricultural systems.

Keywords: *Aronia melanocarpa*, fruit quality, rainfed conditions, yield

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BIOART - A PLANT BIOTECHNOLOGY PERSPECTIVE

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Introduction: The functional use of bioart elements and scientific research through art included in plant biotechnology projects is done for the benefit of new understanding of life science domain. Plant biotechnology is usually about using molecular biology, genetics, and tissue culture techniques to improve crops, understand plant physiology, or produce useful compounds. Bioart, on the other hand, is an artistic practice that uses living organisms (including plants, microbes, and biotech methods) as a medium.

Aims: The reasons plant biotechnology uses bioart relate to elements such as visualization of processes allowing invisible plant processes (like gene expression, tissue growth, or symbiosis with microbes) visible in new, creative ways. Sometimes art-driven experiments lead to new research tools or insights. Another reason would be the attempt to explore beyond utility. It is well known that plant biotechnology focuses on applications (better crops, medicines, biofuels), but bioart allows researchers to explore open-ended questions to, for example, what does it mean to engineer life or how do humans and plants relate beyond agriculture? Since many people find biotech intimidating, abstract, or controversial, bioart installations can make research accessible, sparking curiosity and discussion about GMOs, synthetic biology, or conservation.

Results: As interdisciplinary innovation, an artist working with plant tissue cultures might pioneer novel ways of growing or displaying cells, which biotech researchers can then adapt. Thus, art-driven experiments may lead to new research tools or insights. And finally, since biotechnology is a controversial domain as ethical and philosophical reflection, by blending art and biotechnology, researchers can question the ethics of genetic modification, bioprospecting, or biodiversity loss in a way that data alone cannot capture.

Conclusion: Plant biotechnology might use bioart not only for practical research visualization, but also to expand imagination, communicate with society, and reflect critically on the role of biotechnology in shaping life. Our paper presents the activity of BioArt Student Group at Faculty of Horticulture and Business in Rural Development of the last 20 years of interactive workshops and exploratory exhibitions.

Keywords: bioart, BioArt Student Group, plant biotechnology

EVALUATING LATE SPRING FROST DAMAGE IN CHERRIES AND APPLES IN BISTRITA FRUIT REGION, NORTHERN TRANSYLVANIA, ROMANIA

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Introduction: Changing climate patterns especially in spring negatively influences the flowering process, hence the fruit yields in stone and pome fruits. The climate strongly restricts fruit species distribution and productivity (Chitu *et al.*, 2016; Jakab-Ilyefalvi *et al.* 2021), therefore the zoning and microzoning of the fruit species, and the continuous update and research of different cultivar-rootstock combinations behavior in different pedoclimatic conditions is a necessary task in the fruit growing field.

Aims: In the present study we investigate the effects of frost on flower buds of ‘Tamara’, ‘Kordia’, ‘Lapins’ cultivars grafted on ‘Gisela 3,5,6’ rootstocks and in different combinations of several autochthonous (‘Cociuvas’, ‘Tentant’, ‘Superb’, ‘Severin’, ‘Adreiași’, ‘Spectral’, ‘Daria’, ‘Lodovan’, ‘Romaria’, ‘Jubileu 30’) and foreign cultivars (‘Sweatheart’, ‘Bigareau Burlat’) grafted on ‘IPC5’ and ‘IPC7’ rootstocks, as well as on apple cultivars ‘Wiltens Star Red Jonaprince Select Eco’/‘B9’ and ‘Golden Reinders’/‘M9’.

Materials and Methods: The study was carried out in the experimental fields of FRDS Bistrita (in North, in the Transylvania Plateau; 47°09'58.9"N 24°29'41.0"E) using meteorological data obtained from Adcon Telemetry Agrometeorological weather station corroborated with visual observations and by means of stereomicroscopy.

Results: Investigations showed that more than 98 % of cherry buds were severely affected by late spring frost, late ripening cherry cultivar ‘Tamara’ grafted on ‘Gisela 3’ and ‘5’ rootstocks although faced heavy frost during several days, in the present assay resisted slightly better than other cultivars, followed by ‘Regina’/‘Gisela5’. The warming tendency during the winter period especially in February-March caused a decrease in frost resistance. The damage caused in apple trees had the same pattern, over 95% of floral buds were severely affected.

Conclusion: The complex planting system, cultivars, rootstocks, location of the orchard, the age of trees, influenced the different frost resistance of cultivars and species.

Keywords: apple, cherry, late spring frost, negative temperatures

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STUDY OF PHENOTYPIC VARIATION OF THREE DIFFERENT VARIETIES OF MULBERRY AND THEIR GROWTH RESPONSE TO CLIMATIC FACTORS IN BĂNEASA BUCHAREST REGION

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Introduction: This study, conducted at SCDP Băneasa, Bucharest, investigates the phenotypic variation of three *Morus alba* L. cultivars under local climatic conditions. Mulberry, valued for fruits, leaves, and adaptability, is increasingly affected by climate change (Nikolova and Jekova, 2017), influencing growth, pest incidence, and product quality.

Aims: To assess cultivar performance under Băneasa's climatic and soil conditions and to evaluate suitability for orchards dedicated to fruit production and sericulture.

Materials and Methods: In 2024, three cultivars ('Kinriu', 'Kokuso 21', 'No. 24') were planted in a randomized block, with 30 trees for each cultivar each, equally split between bush form and semi-tall trunk systems. Soil properties were analysed at multiple depths over consecutive years. A µMETOS 300-USW weather station monitored climatic parameters. In September 2024, biometric measurements (stem diameter, height, number of new shoots, shoot length) were recorded for both training systems.

Results: In the 2025 growing season (March–September), mean air temperature was 17.1 °C, total precipitation was 347 mm, relative humidity was 69.8 %, and sunshine exceeded 1,520 h. Growth varied among the studied cultivars and training systems: bush form favoured shoot elongation, while semi-tall trunk promoted stem thickening.

Conclusion: Cultivar choice and training system significantly affect mulberry growth under Băneasa conditions, suggesting orchard designs should match production goals, maximizing biomass for sericulture or enhancing structural growth for fruit production. The 'Kinriu' cultivar trained in the semi-tall trunk system showed the highest vegetative growth, while the bush form, especially in 'No. 24', resulted in the lowest performance.

Keywords: cultivars, diameter, growth, mulberry, shoot length

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DEVELOPMENT AND VALIDATION OF AN INSTRUMENT FOR ANALYZING GARDENING ACTIVITY - "GARDENING AND QUALITY OF LIFE QUESTIONNAIRE"

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Introduction: Gardens represent a significant part of the natural environments where people have the opportunity to experience in their everyday lives. Through gardens, people have the opportunity for direct contact with nature, outdoor activities, and food production, all of which provide additional benefits to their quality of life.

Aims: This study aimed to develop and validate an instrument, respectively the gardening and quality of life questionnaire (GQLQ), for assessing gardening activity among adults.

Materials and Methods: A cross-sectional study was carried out from October 5, 2022, and November 28, 2022 among students from University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca. A printed questionnaire, originally created in Jotform online platform, was distributed and completed by hand. The GQLQ consists of 6 questions related to different characteristics of gardening, a Likert scale for 15 items associated with gardening activity, and demographics details. The questions were constructed based on literature review, focus group and expert opinion. The assessment of construct validity of the 15-items scale was performed along with testing for reliability.

Results: A total of 30 students completed GQLQ. The Cronbach alpha value of 0.898 indicated very good internal consistency reliability for the 15 items-scale. Exploratory factor analysis revealed 2-factor loadings with 56.3% of the variance, whereas the Kaiser-Mayer-Olkin value was 0.71 and the Bartlett value was lower than 0.001.

Conclusion: The 15-items scale associated with gardening activity showed consistent responses and good internal consistency.

Keywords: gardening, nature, questionnaire

IN VITRO GERMINATION AND MULTIPLICATION OF ROMANIAN CULTIVARS OF *OCIMUM BASILICUM* L.

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Introduction: Sweet basil (*Ocimum basilicum* L.) belongs to the Lamiaceae family and it is one of the most widely cultivated aromatic herbs worldwide. It has a high economic value due to its uses in traditional medicine, pharmacology, and culinary applications, especially in Mediterranean and Asian cuisine (Camlica and Yaldiz, 2023; Spence, 2024).

Aims: The study aims to assess the *in vitro* germination capacity and multiplication potential of six Romanian varieties of sweet basil: ‘Macedon’, ‘Mir roșu’, ‘Tulsi’, ‘Patriarhie’, ‘Bulatum’, ‘Aromat de Buzău’, from The Plant Genetic Resources Bank for Vegetable, Floriculture, Aromatic and Medicinal Plants, Buzău, Romania.

Materials and Methods: Seeds were surface sterilized and inoculated on 3 variants culture mediums with different composition and concentrations of salts and vitamins – Murashige et Skoog (MS), Gamborg medium (B5) and modified MS medium with B5 vitamins (MSM). Multiplication experiments were carried out either on hormone-free mediums or MS medium with BAP, IAA and GA₃. Rooting was successfully achieved on hormone-free medium or medium with auxins (IBA and IAA).

Results: ‘Patriarhie’ cultivar recorded the highest germination speed, with an average of 97.37% after 5 days. Overall, seeds that germinated on B5 showed the best germination, with an average of 83.33%, followed by seeds cultivated on MSM and MS medium. The highest growing parameters were also recorded on the same medium variants. The multiplication rate varied greatly depending on the cultivar and culture medium variant, with the lowest of 2.29 explants in ‘Mir roșu’ cultivar on MS medium and the highest of 28.67 explants in ‘Macedon’ cultivated on medium with 1 mg/L BAP, 0.5 mg/L IAA and 0.1 mg/L GA₃. Rooting was successful on all medium variants, including on mediums without auxins.

Conclusion: The present study demonstrates an efficient protocol for *in vitro* germination and multiplication of Romanian cultivars of basil, focusing on the influence of the mineral composition of the medium.

Keywords: basil, medicinal plants, micropropagation

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STUDIES ON THE SENSORY PROFILE OF WINES OBTAINED FROM AUTOCHTHONOUS GRAPE VARIETIES CULTIVATED IN THE VITICULTURAL REGIONS OF HISTORICAL MOLDOVA

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Introduction: Wines obtained from autochthonous grape varieties represent a valuable component of Romania's viticultural heritage, reflecting the identity of the terroir and the oenological tradition of the region. Historical Moldova, through its well-established viticultural areas offers diverse climatic and soil conditions, which significantly influence the sensory profile of wines. The aim of this study was to highlight the sensory particularities of wines obtained from autochthonous grape varieties produced in these regions, based on a rigorous organoleptic evaluation.

Aims: The aim of this study was to highlight the sensory particularities of wines obtained from autochthonous grape varieties cultivated in the viticultural regions of Historical Moldova, through the application of a standardized organoleptic evaluation method. The study also seeks to contribute to the promotion of regional wine identity and to the development of specific sensory assessment criteria for traditional romanian grape varieties.

Materials and Methods: The sensory evaluation included a total of 49 wine samples obtained from autochthonous grape varieties: Fetească albă, Fetească regală, Fetească neagră, and Băbească (Rară) neagră. The wines were collected from wineries located in the viticultural regions of historical Moldova and originated from different vintages, ranging from 2018 to 2023. The tasting was conducted by a panel of 15 trained evaluators, using standardized forms for the assessment of olfactory and gustatory characteristics.

Results: The sensory evaluation of 49 wine samples revealed distinct profiles across grape varieties and regions. Fetească regală and Fetească albă showed fruity and floral notes, while Fetească neagră and Băbească (Rară) neagră displayed balanced tannins and complex aromas. Regional origin influenced the sensory expression of the wines.

Conclusion: The sensory analysis highlighted the value of autochthonous wines from historical Moldova, demonstrating that regional diversity contributes to their taste complexity and identity.

These results emphasize the importance of preserving native grape varieties and support their promotion in national and international markets.

Keywords: historical Moldova, organoleptic profile, sensory analysis, traditional wines

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A FIRST STEP IN CONSERVING NUCLEAR-STOCK PLUM VIA SHORT-TERM SEED ENCAPSULATION

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Introduction: *Prunus domestica* L. represents an economically significant fruit species, with Romania ranking as the world's second largest producer. An integrated germplasm conservation strategy consists of pathogen-free pre-basic plum cultivars maintained *ex situ* under insect-proof conditions, all together with *in vitro* conservation.

Aims: The multiplication potential of ten plum cultivars explants during initiation and multiplication stages, combined with the germination and regrowth capacity of plantlets derived from shoot tips encapsulated seeds, developed under different conditions and carbon source was assessed. The present study was done with the regard of their applicability for short-term conservation potential.

Materials and Methods: Following *in vitro* culture establishment, explants were multiplied on different culture medium supplemented with various growth regulators. Two experimental approaches were applied for short-term conservation, as follows: for the first experiment, the encapsulated shoot tips were supplemented with 3% sucrose, sorbitol, or mannitol, and stored at 4 °C in darkness. The encapsulated seeds were maintained for 90 days and regenerated every 30 days. For the second one, explants were encapsulated in 3% sucrose and part of them were exposed to dehydration treatment in 0.5 M sucrose solution for three hours and stored either at 22 °C or 4 °C under 16/8 h photoperiod. These encapsulated seeds were preserved for eight weeks, and the regenerative capacity was evaluated at two-week intervals.

Results: The multiplication stage ensured vigorous shoot formation for all ten studied cultivars, proving good adaptability and development under *in vitro* conditions. In the first conservation experiment, 'Geta' and 'Gras ameliorat' cultivars demonstrated successful regeneration into viable plantlets, with the best results obtained when sucrose was used as the carbon source. In the second experiment, for the same cultivars, the highest regeneration rate was recorded at 4 °C over several weeks.

Conclusion: Seed encapsulation technology, combined with optimized storage conditions, can ensure short-term conservation for some plum cultivars while maintaining high regenerative potential. Refinement of the conservation methodology will be addressed in future research for the other plum cultivars.

Keywords: conservation, encapsulated seed, micropropagation, plum cultivars, sucrose

SESSION 4: ECONOMICS AND RURAL DEVELOPMENT

ECONOMIC VIABILITY OF SMALL FARMS IN MOUNTAIN AREAS

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Introduction: Economic viability is a modern term and an attractive concept today. But historically, the situation is different. The term has been neglected by economic science for a long period of time. Its use in scientific publications has been noticeable for only one or two decades. And often perversely, simply as a new way to present long-known views. There is no common understanding, and there is no single definition. The topic of farm viability is very important and widely discussed in scientific studies. It is important not only for the farms themselves, but also for all agricultural entities. Its relevance is based on the EU's Common Agricultural Policy 2014 – 2020, which recognizes increasing the viability of small and medium-sized farms as one of its priority objectives. Increasing the viability of farms is sought by promoting entrepreneurship among farms, creating new jobs and taking measures against the decline of the rural population, rather than increasing the size of farms.

Aims: The aim of this paper is to investigate the level of economic viability of small farms in mountain areas.

Materials and Methods: For the purposes of this survey, the Net Farm Income per farm (FNI) indicator is used for small farms in disadvantaged areas, which makes it possible to take into account the cost of own land and non-borrowed assets. For the classification of individual small farms in the mountain less-favoured areas thus defined, the variance analysis developed by P.L. Fischer (ANOVA - Analysis of Variance) was used, analysing the relationship between two random variables – dependent and independent (also called the factor).

Results: During the 2007-2020 period under review, the economic viability of small farms was relatively stable or, more specifically, increased slightly. There is significantly lower economic viability in mountainous disadvantaged areas, which show greater dependence on current subsidies, including payments to disadvantaged areas, a higher share of unpaid labor, lower production and higher costs per unit of output. Subsidies to disadvantaged areas, including agri-environmental payments, constitute a significant support and income stabilizing element for small farms and maintain their economic viability. In terms of the specialization of farms, the group of pasture farms is the most vulnerable. According to the results obtained, one third of which farms are threatened with non-viability. These are mainly the smallest farms (from 2-4000 euros SO). Relatively successful are the group of farms specializing in milk, regardless of which type of disadvantaged area they are in.

Conclusion: Data shows that, overall, small farms in disadvantaged areas (mountain and submontane areas) are characterized by lower levels of viability and are at risk for their survival and sustainable development.

Keywords: economic viability, less-favored areas, small farms, variance analysis

PUBLIC AUCTIONS IN THE EU AGRI-FOOD AND WILD FOREST SECTOR: ANALYSING EFFICIENCY AND EQUITY

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Introduction: Public auctions remain a vital institution within the European agri-food and wild forest products sector, historically underpinning transparent price discovery and market access for both producers and buyers.

Aims: This study provides a critical assessment of the efficiency and equity of these auction mechanisms in the contemporary European landscape. It traces their evolution from traditional physical marketplaces to modern digital platforms and block chain-integrated systems.

Materials and Methods: Utilizing policy analysis, case studies, and empirical data, the study evaluates how auction design, regulatory frameworks, and technological uptake collectively influence efficiency and fairness. It further examines the impact of recent EU legislative reforms, particularly sustainability and transparency mandates, on auction operations.

Results: Recent policy innovations, including reverse auctions for climate mitigation and targeted support programs, aim to redress these inequities; however, empirical evidence reveals mixed results concerning both equity gains and overall market efficiency.

Conclusion: The analysis ultimately emphasizes the necessity for context-sensitive, integrated strategies that harmonize cost-effectiveness with broad-based participation, ensuring public auctions effectively contribute to resilient, equitable, and sustainable agri-food systems across Europe.

Keywords: agri-food sector, equity, public auctions, market efficiency, small producers

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FOOD SYSTEM FRAMEWORK AND THE ROLE OF SMALL PRODUCERS

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Introduction: The global food system is increasingly under pressure from climate change, economic inequality, and resource depletion (FAO, 2018; IPCC, 2019; Béné *et al.*, 2019). In Romania, where small producers dominate agriculture, these challenges are intensified by fragmented structures and limited systemic integration. A Food System (FS) approach provides a comprehensive lens to analyse these interconnected issues and identify sustainable pathways forward.

Aims: This article explores the framework of FS implementation in Romania, with a focus on scoping the role of small producers in contributing to a sustainable, inclusive, and resilient FS. It aims to identify enabling policy conditions, systemic barriers, and leverage points for integrating smallholders more effectively into FS transformation.

Materials and Methods: A mixed-methods approach was used, comprising literature and policy review, secondary data analysis, and a questionnaire designed to profile small producers. These methods allowed for a multi-layered understanding of Romania's agri-food system.

Results: The research highlights the disproportionate challenges faced by Romania's small producers, who account for over 90% of agricultural holdings yet remain marginalized in governance, finance, and innovation systems. However, they also offer untapped potential for fostering biodiversity, supporting rural livelihoods, and enabling short food chains.

Conclusion: A shift toward a systemic, inclusive FS transformation must actively scope and support the role of small producers. Strengthening their position requires targeted policy instruments, improved coordination, and participatory governance mechanisms. Empowering smallholders as agents of change is essential to achieving sustainable FS aligned with EU and global commitments.

Keywords: food system approach, small producers, sustainability, food system transformation

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NAVIGATING AGRICULTURAL RISKS: SMES RESILIENCE IN NORTHWESTERN ROMANIA

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Introduction: Agricultural SMEs play a central role in Romania's rural economy, yet they regularly face disruptions linked to climate change, market volatility, and institutional uncertainty. Romania hosts nearly one-third of EU farms, most of them small and under-resourced for managing external risks. These vulnerabilities are especially visible in the North-West, where agriculture contributes significantly to rural incomes. Though SMEs growing awareness of agricultural risks are shown (Barducz and Jitea, 2024), while many still lack formal risk management systems, making them prone to repeated crises and financial loss.

Aims: This research explores how agricultural SMEs in Northwestern Romania perceive risk and respond to crises. It assesses the link between structured mitigation measures and resilience, while identifying key barriers to implementation, based on established risk management models.

Materials and Methods: A structured survey was conducted among 60 agricultural SMEs across six counties. Participants rated risk likelihood, described crisis experiences, estimated financial impact, and assessed resilience on a Likert scale. Data were collected via email and phone outreach and analyzed using descriptive statistics and Excel-based correlation formulas.

Results: Preliminary data indicate that market and climate risks are seen as the most likely. Four in five respondents reported recent crisis experiences, mainly tied to production and price volatility. Financial losses ranged widely, with some exceeding 30% of turnover. Most enterprises rated their resilience as moderate, and early patterns suggest a possible link between structured mitigation and stronger resilience perceptions.

Conclusion: The initial results highlight a need for tailored risk management frameworks and support systems that enhance the adaptive capacity of SMEs in volatile agricultural environments.

Keywords: agriculture, resilience, risk

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RESEARCH ON TOURISM AS A FACTOR OF RURAL DEVELOPMENT

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Introduction: Rural areas have a variety of natural, cultural and human resources that can be exploited through tourism. In recent decades, tourism has become not only an economic activity, but also a strategic tool for revitalizing disadvantaged rural areas, encouraging entrepreneurship and preserving local identity (Garcia and Rodriguez, 2023; Hernandez and Zhao, 2023).

Objectives: The objective of this paper is to analyze the role of tourism in the economic and social development of rural areas, with a focus on its ability to generate income, diversify activities and reduce rural depopulation.

Materials and Methods: Scientific databases such as Web of Science, Google Scholar and national statistical platforms were consulted, using keywords such as "rural tourism", "sustainable rural development", "tourism economy" and "rural regeneration". The research was based on qualitative and quantitative methods, field observations and case studies in rural localities with tourism potential.

Results: The results highlight that tourism contributes significantly to rural economic growth by creating jobs, attracting investment in infrastructure and stimulating the local economy. It also supports the preservation of local traditions, crafts and gastronomy. At the same time, the research highlights challenges such as seasonality, limited infrastructure and the need for sustainable tourism planning.

Conclusion: Tourism proves to be a key factor in the integrated development of rural communities. With appropriate strategies and local involvement, it can contribute to increasing the quality of life and increasing the attractiveness of rural areas, ensuring long-term sustainable development.

Keywords: development, local economy, rural regeneration, rural tourism, sustainability

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BUSINESS MODELS FOR REGENERATIVE CIRCULAR AGRICULTURE IN ROMANIA AND REPUBLIC OF MOLDOVA

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Introduction: Regenerative Circular Agriculture (RCA) is an emerging paradigm that integrates Regenerative Agriculture - focused on restoring soil fertility, biodiversity, and ecosystem resilience - with Circular Economy principles that emphasize waste valorisation, nutrient recycling, and resource efficiency. Together, approaches seek to redesign agri-food systems so that they not only minimize harm but actively regenerate natural capital while creating viable business opportunities.

Aims: The objective of this review is to map and assess existing business models of Regenerative Circular Agriculture (RCA) documented in Romania and the Republic of Moldova. Specifically, the study aims to: (1) identify categories of enterprises and cooperatives applying RCA practices; (2) analyse how circular strategies (e.g., composting, biogas, nutrient recovery) and regenerative techniques (e.g., crop diversification, agroforestry, reduced tillage) are combined in viable economic models; (3) highlight enablers and barriers for scaling; and (4) formulate insights into how these models can contribute to sustainable food system transitions in Eastern Europe.

Materials and Methods: A literature review was conducted covering 2015–2024, drawing from peer-reviewed publications, national policy reports, and project case studies in Romania and Moldova. Sources were analysed according to business model components (value proposition, resources, partners, cost/revenue structures) and their environmental and social outcomes.

Results: Three main archetypes of RCA business models were identified: (1) Compost and biofertilizer enterprises that transform agricultural and agro-industrial waste into valuable inputs, reducing chemical fertilizer dependency; (2) Agroecological cooperatives and community-supported agriculture models that combine regenerative practices with short supply chains, local branding, and social inclusion; (3) Bioenergy and nutrient recovery initiatives that valorise manure and crop residues through biogas or biochar, closing nutrient loops and reducing greenhouse gas emissions. Evidence shows benefits such as reduced input costs, improved soil health, diversified incomes, and stronger community resilience. However, adoption is constrained by fragmented land ownership, insufficient access to finance, and knowledge transfer gaps.

Conclusion: The review demonstrates that Regenerative Circular Agriculture (RCA) models are emerging in Romania and Moldova, yet remain at niche scale. Targeted policies, de-risking financial mechanisms, and knowledge-sharing hubs are essential to accelerate wider adoption. Regional clusters and cooperatives could play a pivotal role in pooling resources, scaling innovations, and aligning with European sustainability agendas.

Keywords: bioenergy, business models, circular economy

ECONOMIC DIVERSIFICATION IN THE RURAL mountain AREAS OF BIHOR COUNTY

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Introduction: The mountain region of Bihor County, located in northwestern Romania, exhibits a diverse rural economy shaped by its geographic isolation and natural resources. Traditionally reliant on agriculture and forestry, these communities have increasingly turned to tourism and small-scale services as pathways for economic diversification (Mihăilescu, 2018).

Aims: The aim of this paper is to analyze the socio-economic development of the mountain region of Bihor County by evaluating key indicators related to tourism, infrastructure and local economic activity, in order to identify patterns and opportunities for sustainable rural growth.

Materials and Methods: This study is based on secondary data for selected mountain communes in Bihor County. Key socio-economic and tourism indicators were obtained from national statistics and local administrative sources. The data were analyzed using descriptive statistics and comparative methods to assess development levels and identify disparities across the region.

Results: In the mountainous area of Bihor County, the communes of Bulz, Șuncuiuş, and Bratca collectively account for 61.1% of accommodation capacity, with Bulz alone representing 33.3% (INS, 2025). This spatial distribution reflects a tourism model anchored in natural assets such as karst formations and waterfalls, underscoring the emergence of a localized tourism core within a selectively developed rural landscape.

Conclusion: The mountain region of Bihor County reveals a concentrated pattern of tourism development, driven by natural attractions and uneven infrastructure. Socio-economic disparities persist, highlighting the need for balanced territorial planning.

Keywords: mountain region, rural development, sustainable growth, tourism

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REVIEW ARTICLE: PERSPECTIVES REGARDING RECLAIMED WATER USE IN ROMANIA'S AGRICULTURAL IRRIGATION

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Introduction: Increase of drought frequency in Romania puts an enormous toll on agricultural yields and climate forecasts show a worsening situation to come in already water stressed regions (Ministry of Agriculture and Rural Development, 2016). Romanian Waters National Administration forecasts a doubling of the water consumption in agriculture by 2029, in comparison with 2024 (Nițu, 2025). The resilience of the Romanian agricultural sector, with the highest share of the gross value added in national GDP among the EU countries (European Commission: Eurostat, 2024), is especially important for the economic development of the rural area in Romania, where agriculture is the main occupation.

Aims: Measures that can be taken to increase the resilience of agriculture to climate changes include: changing to less water intensive crops, investing in new irrigation systems, switching the irrigation method from surface and sprinkling towards drip irrigation and using alternate water sources for irrigation such as reclaimed water. Irrigation with reclaimed water is a relatively new concept in Romania's agriculture and implications are not evident yet.

Materials and Methods: A relevant literature review has been undertaken in order to assemble a SWOT analysis of using reclaimed water in agricultural irrigation in Romania.

Results: A series of aspects have to be taken in consideration when considering the use of reclaimed water for agricultural irrigation, including: decrease of pressure on freshwater resources, availability of a relatively fix amount of water in all seasons, possibility of recycling nutrients, regulation (EU) 2020/741 on minimum requirements for water reuse assuring harmonized minimum requirements at EU level and cost-effectiveness of irrigating with reclaimed water.

Conclusion: In the present work we synthesized the state of the art of the research and knowledge related to the perspective of reusing reclaimed water for irrigation in Romania's agriculture. Further research is needed at regional and local scale as basis for investment decisions.

Keywords: agricultural irrigation, drought, reclaimed water, treated wastewater reuse

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CHALLENGES AND OPPORTUNITIES IN ROMANIA'S ORGANIC MILK VALUE CHAIN: A QUALITATIVE STUDY

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Introduction: Organic milk production in Romania represents a growing niche within the organic agriculture sector, benefiting from the country's natural pasture resources and increasing consumer interest in healthier and environmentally friendly products. In light of the European Green Deal objectives, understanding the value chain organization of the organic milk sector is essential to identify measures for its development and long-term sustainability.

Aims: The paper aims to conduct an analysis of the value chain of organic milk in Romania. The study includes mapping the chain, identifying the governance mechanisms, assessing the main barriers, and outlining potential levers to support the organic milk sector development.

Materials and Methods: This research used a qualitative approach, involving key stakeholders in the organic milk value chain in Romania. Data were collected through semi-structured interviews and analysed using content analysis techniques.

Results: The findings indicate that the organic milk value chain in Romania is developing with a relatively simple structure. Major barriers include insufficient collection infrastructure, limited domestic demand and lack of trust in organic certification. Stakeholders indicated several potential levers: strengthening farmer cooperatives, consumer education campaigns to increase awareness and demand, and stable and supportive public policies to encourage long-term investment in the sector.

Conclusion: The study concludes that while the organic milk sector in Romania has promising natural and economic potential, it is currently constrained by market-related barriers. Addressing these through targeted investments, improved coordination among actors, and increased consumer engagement is essential for unlocking the sector's value and supporting its growth in line with EU sustainability goals.

Keywords: barriers, mapping, organic milk, Romania, value chain

Bridging Governance Gaps in Romanian Protected Areas: Participatory Management for Sustainable Rural Development

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Introduction: Participatory management is increasingly recognised as a vital component of sustainable natural resource governance, especially in contexts where rural livelihoods intersect with conservation goals. In Romania, where over 20% of the national territory falls under protected areas, an inclusive approach could play a key role in supporting both biodiversity and local socio-economic resilience. However, participatory practices remain inconsistently implemented across national and natural parks.

Aims: This study aims to explore the current state of participatory management practices in Romanian protected areas.

Materials and Methods: Academic and institutional sources were selected to identify key stakeholder groups, governance challenges, and emerging practices. The analysis highlights the role of local communities, tourism operators, NGOs, and park administrations in shaping collaborative decision-making.

Results: Findings indicate limited institutional capacity and fragmented legal frameworks as persistent barriers to effective stakeholder participation. However, isolated initiatives - such as local ecotourism partnerships and community consultation efforts - suggest a potential for participatory models. By linking governance practices to rural development outcomes, such as job creation, cultural valorisation, and ecosystem protection, the value of inclusive approaches in achieving integrated sustainability goals is emphasised.

Conclusion: Strengthening participatory management in Romania's protected areas could encourage rural revitalisation and improved conservation. Policymakers and park administrators are encouraged to prioritise transparency, local empowerment, and cross-sector collaboration. Further empirical research is needed to assess the long-term impact of participatory governance on rural economies.

Keywords: participatory management, protected areas, rural development, stakeholder engagement

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DEVELOPMENT AND IMPLEMENTATION PROPOSAL FOR THE “PASTURE PRODUCT” CERTIFICATION SCHEME IN ROMANIA

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Introduction: Grazing practices in Romania offer significant potential for revitalizing rural economies, preserving biodiversity, and restoring degraded grasslands. This research introduces a new certification, "Produs de pe Pășune" tailored for Romanian grazing products, emphasizing sustainability, animal welfare, and cultural heritage. The project leveraged European certifications as a benchmark and adapted them to the Romanian context through research and focus group discussions.

Aims: The certification aims to foster trust between producers and consumers, offering high-quality grazing-derived products while supporting local farmers. Through collaboration with AgroTransilvania Cluster and USAMV Cluj-Napoca, this initiative ensures alignment with agroecological principles, climate resilience, and efficient resource use. By promoting this certification, Romania can gain access to premium markets, while preserving traditional grazing systems and fostering economic growth.

Materials and Methods: Brainstorming as a Method for Comparative Identification, Focus Group AKIS Members, Thematic Analysis with Grazing Experts at EU level, Expert Interview (Pro Weideland).

Results: Key certification criteria include a minimum of 120 grazing days per year and six hours of daily pasture exposure. The German "Pro Weideland" served as a model, and a customized logo was developed for product identification and marketing. Furthermore, the certification includes a comprehensive marketing strategy and an analysis to support implementation.

Conclusion: "Produs de pe Pășune" is an initiative for pasture-raised products in Romania that sets a strong foundation for promoting sustainable agricultural practices. The research conducted so far provides a robust framework, positioning the certification as a future benchmark for high-quality, pasture-raised products within the country.

Keywords: grazing, livestock, pasture, rural development, quality certification

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THE CONTRIBUTION OF SMALL FARMS TO SUSTAINABILITY: A SYSTEMATIC LITERATURE REVIEW BASED ON PRISMA 2020

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Introduction: Small farms and family-run holdings are essential for sustainable food systems, providing over 80% of the food consumed in many regions of the Global South (Lowder *et al.*, 2016). With around 500 million farms under 2 hectares worldwide, they significantly contribute to food security and poverty reduction (Gong *et al.*, 2019).

Aims: This paper presents the results of a systematic literature review aimed at evaluating the effectiveness of the European Union's CAP Strategic Plan in supporting small farms, with a focus on their contribution to sustainability. A sample of 12 experts in agribusiness, rural development, and agricultural economics provided a list of 67 relevant terms, which were processed and synthesized into a final list including terms such as: “EU agricultural policy”, “food security”, “rural development”, “small farms” and “sustainable agriculture”.

Materials and Methods: The study was conducted in accordance with the PRISMA 2020 guidelines, ensuring a rigorous process of identifying, selecting, evaluating, and synthesizing scientific articles published between 2014 and 2025.

Results: A total of 781 articles were identified and analyzed based on a predefined grid, which included: reference, journal, research objective, methodology, geographical area studied, type of farm, indicators analyzed (economic, social, environmental), and main conclusions.

Conclusion: The analysis highlights the essential role that small farms play in ensuring rural resilience, biodiversity conservation, food security, and sustainable agricultural practices. The results reinforce the importance of CAP measures dedicated to small farmers, promoting inclusive and ecologically sustainable rural development.

Keywords: EU agricultural policy, food security, PRISMA 2020, rural development, small farms, sustainable agriculture

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THE COMMON AGRICULTURAL POLICY AND THE AGROECOLOGICAL TRANSITION IN LIVESTOCK FARMS

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Introduction: The agro-ecological transition refers to a change to more resilient and sustainable food and agricultural systems by incorporating ecological concepts. It aims to establish more sustainable and equitable systems through a series of interrelated changes at technological, social, and political levels (Sachet *et al.*, 2021). In the last programming period, Common Agricultural Policy (CAP) became greener, but its efficacy to respond to the EU Green Deal goals, the climate policy or the nature restoration law are still questionable (European Court of Justice, 2024).

Aims: The CAP is about to start the reform process for the upcoming budgetary period. The budgetary structure and future CAP ambition have been made public by the EU Commission. In the future, steps will be taken to address regional demands and difficulties, reducing the policy's financial load, while strengthening the pledges made for the shift to agro-ecology. The purpose of this research is to evaluate how present policy measures are tailored or not to this objective.

Materials and Methods: A multifactor framework was used to evaluate the current measure's applicability to the agro-ecological transition of grazing farms. Focus groups of 5–8 stakeholders from the Romanian AKIS group in the Grazing4Agroecology network were consulted, and inputs from written and online sources were synthesized using a context-analysis approach.

Results: Current agro-environment payments do not support the agro-ecological transition in livestock farms, as high-nature value grasslands are maintained mainly through mowing schedules rather than grazing, without measuring outcomes such as indicator species.

Conclusion: Future CAP measures have to be better tailored to support tangible results and the agro-ecological transition of farming systems and agricultural production.

Keywords: agroecology, farming systems, greening

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MAPPING COMMUNICATION CHANNELS USED BY GRAZING FARMERS TO ACCESS KNOWLEDGE IN ROMANIA

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Introduction: Despite advancements in research and technology, effectively communicating agricultural knowledge and innovations to farmers and rural communities continues to be a significant challenge (van den Pol *et al.*, 2020). In order to address the pressing need to close the gap between knowledge providers and end users, ongoing efforts are required to better understand local demands. The adoption of best practices may be enhanced by a multi-channel strategy that incorporates more communication channels, which in the long run contribute to the sustainable use of resources.

Aims: To determine the most effective communication channels tailored to the needs of farmers from the grazing sector in Romania.

Materials and Methods: Data were collected through an online questionnaire targeting farmers, advisors, and other stakeholders. Descriptive statistics and hypothesis testing were used for analysing the data, with statistical significance set at $p < 0.05$.

Results: Key knowledge areas relevant to farmers are particularly animal husbandry practices, financial information, and grazing management. Respondents perceived as most effective the peer-to-peer learning, face-to-face interactions, and internet-based sources for acquiring relevant and practical information needed for their activity.

Conclusion: The findings provide significant insights for policymakers and practitioners aiming to enhance the AKIS in Romania. It highlights the importance of reaching farmers through appropriate communication channels tailored to their needs. Improving peer-to-peer learning, face-to-face advice, and access to digital resources can strengthen knowledge uptake in the Romanian grazing sector.

Keywords: AKIS, dissemination tools, information sources, grazing

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CLIMATE-SMART FARMING IN VEGETABLE GREENHOUSES: TOOLS, MANAGEMENT PRACTICES, AND ECONOMIC INSIGHTS

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Introduction: Vegetable production is increasingly challenged by climate change, which affects water availability, pest dynamics, and production costs (FAO, 2025). Climate-Smart Agriculture (CSA) provides an integrated framework for improving resilience, optimizing resource use, and reducing greenhouse gas emissions, thus aligning agronomic performance with environmental and economic sustainability.

Aims: This literature review analyses climate-smart tools and methods for greenhouse vegetable production, with a focus on management and economic implications.

Materials and Methods: A review of international organization reports (FAO, IPCC), European project deliverables, and peer-reviewed studies was conducted. Practices were assessed across four domains: water-efficient irrigation and resource planning, crop and soil management, integrated pest and disease control, and controlled-environment innovations. For each, technical feasibility, management requirements, and potential economic impacts were evaluated.

Results: Efficient irrigation systems such as drip irrigation combined with soil moisture-based scheduling reduced water use by up to 25% in tomato production without yield loss. Heat-tolerant cultivars, optimized planting schedules, and mulching improved resilience and marketable yields under extreme weather. Smart greenhouses powered by renewable energy (solar PV, geothermal) with automated climate control achieved 15–30% reductions in energy costs while stabilizing production and quality.

Conclusion: Climate-smart greenhouse practices offer a “triple win” by improving productivity, lowering environmental impact, and enhancing economic viability. Adoption requires integrated management strategies, targeted investments, and supportive policy frameworks to overcome capital cost barriers and ensure sustainability.

Keywords: climate, farming, horticulture, smart

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FROM PROMOTION TO PARTICIPATION: REFRAMING TOURISM MARKETING THROUGH STRATEGIC STORYTELLING

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Introduction: The COVID-19 pandemic accelerated *the digital transformation of the tourism sector, advancing online marketing and governance platforms*. However, in Romanian rural communities, especially in peri-urban zones such as the Cluj–Turda corridor, the shift toward digitalization exposed severe inequalities in infrastructure, visibility, and digital communication capabilities.

Aims: This study aimed to explore the role of *strategic communication in supporting tourism resilience and adaptation* in rural Romania. Guided by Ketter's (2021) theory of strategic storytelling, it investigated how locally authored digital narratives can contribute to sustainable development and economic recovery post-COVID-19.

Materials and Methods: The research employed a mixed-methods approach combining document analysis of national tourism policies, digital platform monitoring, and semi-structured interviews with 26 stakeholders, including rural entrepreneurs, local officials, and cultural mediators. Data were coded and thematically analysed to identify structural communication patterns and capacity gaps.

Results: Findings indicate that while urban centres like Cluj-Napoca rapidly adopted AI-enhanced tourism tools and immersive platforms, rural areas such as Turda lagged due to low digital literacy, minimal integration in smart ecosystems, and a lack of coherent storytelling strategies. This disconnect hinders economic resilience and deepens spatial disparities in tourism recovery. Data were coded and thematically analysed to identify structural communication patterns and capacity gaps.

Conclusion: The study concludes that digital infrastructure alone is insufficient to ensure tourism sustainability in rural areas. Instead, fostering narrative capacity and local participation through strategic storytelling offers a systemic approach to sustainable tourism. The research urges policy interventions that promote ethical branding, digital literacy, and inclusive communication planning aligned with EU development goals.

Keywords: communication, digital divide, rural tourism, strategic storytelling, sustainability

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INVOLVEMENT OF LOCAL COMMUNITIES IN RURAL DEVELOPMENT THROUGH LOCAL ACTION GROUPS

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Introduction: The economic development of rural areas has become a central concern at the European level due to its role in maintaining ecological balance, preserving cultural heritage, and providing food resources (Popescu, 2020). Local Action Groups (LAGs), through the participatory approach promoted by the LEADER program, have become an essential mechanism for sustainable local development (European Commission, 2020).

Aims: The aim of this research is to provide a clear and up-to-date overview of how rural development can be supported through local initiatives and efficient access to funding.

Material and Method: Scientific articles from Web of Science, Google Scholar, and Science Direct were analyzed, along with classical bibliography. The most relevant articles were selected following the documentation analysis for the elaboration of this study.

Results: The study found that local action groups have various funding sources that they can channel into rural development projects. Local development strategies act as promoters of innovative projects. The paper includes a review of the main funding sources available to LAGs, with a focus on relevant measures from the NRDP (National Rural Development Program) and CAP SP (Strategic Plan under the Common Agricultural Policy).

Conclusions: The local development strategies of local action groups play an essential role in energizing the rural economy. The study concluded that greater community involvement in strategy formulation is needed. At the same time, developing their administrative capacity is a starting point to improve the coherence between European priorities and local needs. A key decision-making factor in this interpretation is the strengthening of entrepreneurial education in rural areas.

Keywords: rural development, local development strategy, impact, local action group

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PRINCIPLES AND PRACTICES OF REGENERATIVE AGRICULTURE IN ROMANIA AND REPUBLIC OF MOLDOVA

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Introduction: The farming method of regenerative agriculture works to establish sustainable agricultural ecosystems through its innovative practices. The essential principles of regenerative agriculture consist of reducing soil disturbance and keeping soil coverage intact while integrating livestock operations into farming systems. stakeholder collaboration to achieve its complete advantages.

Aims: The aim of this research was to deepen the understanding of the concept of regenerative agriculture and to analyse the policies and initiatives implemented in Romania and the Republic of Moldova in this field.

Materials and Methods: The research methods used are qualitative and quantitative methods, including synthesis, analytical analysis, comparative analysis, case study, and statistical data analysis.

Results: The adoption rate of conservation agriculture techniques, including no-till farming, is similar in both Romania and Moldova.

Romanian farms that have practiced no-till for more than 5-10 years report the return of earthworms, better soil life, less compaction, and stable yields even in the bad years. Similarly, Moldovan farms, with the assistance of NGOs, have been able to rehabilitate degraded lands using permaculture and agroforestry and have observed significant soil improvements in 3-5 years in terms of reduced erosion and improvement of soil.

Conclusion: Through funding and regulatory measures the EU supports regenerative agriculture to establish sustainable practices. The measures implemented in this paper aim at mitigating the negative impacts of conventional farming and making farms more resilient to climate change.

Keywords: circular economy, practice models, regenerative agriculture.

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THE ANALYSIS OF FACTORS INFLUENCING THE INTENT OF USAMV CLUJ-NAPOCA STUDENTS TO PRACTICE IN RURAL AREAS

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Introduction: Rural development is considered the second pillar of the common agricultural policy. Education is crucial in achieving sustainable development. Specialized universities train students to acquire knowledge and skills for a sustainable profession and guide them to practice in rural areas.

Aims: The purpose of this research is to identify the factors that influence the intention of USAMV CN students to practice in rural areas.

Materials and methods: An online and physical survey was applied between 04.12.2024-23.01.2025 to a number of 505 students. It includes aspects related to demographic data, library use and asks students to assess to what extent will they practice in rural areas in the next 5 years, using a Likert-type scale from 1 to 5, where 1 means unlikely and 5 means very likely. The target population referred to students enrolled in the library and Romanian citizenship. The number of responses received was 161. The collected data were analyzed using regression analyses.

Results: Of the total respondents, 57.76% are female and 42.24% are male, 52.80% come from rural areas and 47.2% from urban areas. Students want to work in rural areas with an average of 3.20. Within the faculties, above this average are students of the Faculties of Horticulture and Business in Rural Development and Agriculture. The statistical results show that the factors that influence the decision to practice in rural areas are the environment of origin ($\beta_{\text{rural}}=0.897$, $\beta_{\text{urban}}=-0.110$, $p<0.05$), male gender ($\beta=0.948$, $p<0.05$) and belonging to the Faculties of Horticulture and Business in Rural Development and Science and Food Technology ($\beta_{\text{HBRD}}=0.560$, $\beta_{\text{SFT}}=-0.461$, $p<0.05$).

Conclusion: Students intend to practice in rural areas with an average of 3.20. This intention is positively influenced by coming from a rural environment, gender and belonging to the Faculty of HBRD and negatively by coming from an urban environment and belonging to the Faculty of SFT.

Keywords: rural career, rural development, student intention

ENTREPRENEURSHIP BETWEEN EDUCATION AND OPPORTUNITY

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Introduction: Entrepreneurial education influences how a business is run, for example its level will determine business aspirations, market entry strategy and business performance. Specifically, opportunistic entrepreneurs are characterized by lower levels of satisfaction, reduced returns to education, lower performance, and shorter periods of entrepreneurship than educated entrepreneurs. At the macro level, opportunistic entrepreneurs and those with entrepreneurial education appear to have a differential impact on economic growth, job creation and aspirations.

Aims: Considering the current socio-economic context, the present study aims to investigate why some people take initiative and assume personal and financial risks associated with starting a new business, while other people do not possess these capabilities.

Materials and Methods: The research method used was the interview, organized with over 60 entrepreneurs who benefited from the implementation of projects with non-reimbursable financing in the field of rural development, in the last 5 years, in the North-West Region of Romania.

Results: The study shows that the implementation of entrepreneurial education in different educational institutions and at different levels, whether it is pre-university or university education, has a positive impact on the development of entrepreneurship. Entrepreneurial education is what supports young people to establish social enterprises or new businesses that bring profit, to develop new concepts or products, to develop their professional insertion capacity, to demonstrate a strong entrepreneurial spirit in their work, etc.

Conclusion: Education seems important for stimulating entrepreneurship because it provides individuals with a sense of autonomy, independence and self-confidence, makes people aware of alternative career choices and broadens the horizons of individuals, thus creating people better prepared to perceive market opportunities. At the same time, education provides knowledge that can be used by individuals to develop new entrepreneurial opportunities.

Keywords: educated entrepreneurship, opportunity entrepreneurship, rural entrepreneurship

DEVELOPMENT OF A FUNCTIONAL FOOD PRODUCT WITH SCOPOLETIN TO REDUCE MUSCLE PAIN IN ATHLETES

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Introduction: Muscle pain caused by intense or eccentric exercise impairs athletic performance and recovery. Functional foods that support anti-inflammatory and antioxidant defenses are of increasing interest in sports nutrition. Scopoletin, a bioactive coumarin found in noni (*Morinda citrifolia*), has shown anti-inflammatory, antioxidant, and analgesic potential in preclinical models.

Aims: The aim of this work is to explore the feasibility of developing a functional food enriched with scopoletin to reduce exercise-induced muscle soreness.

Materials and Methods: A thorough review of literature was conducted on the pathophysiology of muscle pain, the bioactivity of scopoletin, and its delivery formats. Scopoletin's pharmacokinetics, safety profile, and potential formulation techniques were evaluated to guide product development.

Results: Scopoletin reduces inflammatory cytokines (e.g., TNF- α , IL-6), oxidative stress (via SOD and catalase activation), and pain behaviors in animal models. It modulates NF- κ B and COX-2 signaling and supports immune resolution without immunosuppression. Absorption is moderate and depends on formulation. Encapsulation and juice-based delivery may enhance bioavailability. Noni-based products containing scopoletin are already consumed with acceptable safety margins.

Conclusion: A scopoletin-based functional food could serve as a supportive nutritional strategy in athletic recovery. With careful formulation, standardization, and safety validation, such a product has potential in sports performance contexts.

Keywords: athlete recovery, functional food, *Morinda citrifolia*, muscle soreness, scopoletin

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SESSION 5: ANIMAL SCIENCE AND BIOTECHNOLOGIES

OPTIMIZING CATTLE FEED RATIONS THROUGH ESSENTIAL AMINO ACID SUPPLEMENTATION: FROM PRODUCTION IMPROVEMENT TO ENVIRONMENTAL PROTECTION

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Introduction: The optimization of processes and techniques for the breeding, maintenance and exploitation of farm animals is the most beneficial approach for the animal production sector, which can improve the quality and quantity of animal production obtained, in relation to a minimum production cost. The twenty-first century is characterized as a period in which human society is undergoing continuous development and demographic growth, which increases the demand for food of animal origin. To meet these requirements, farmers and food industry processors are increasingly implementing various digital systems and techniques that help ease human labor and industrialize the processes of obtaining and processing raw materials.

Aims: A practical and useful approach that has attracted the attention of researchers and livestock breeders regarding better quality and quantity of production is the optimization of cattle feed rations by using essential amino acids to compensate for the lack of these amino acids in the animals' diets.

Materials and Methods: This review paper provides both a general overview of the 20 essential and non-essential amino acids and a detailed examination of the effects of supplementing cattle feed rations with various amino acids on the quality and quantity of meat and milk production, as well as on the welfare of cattle. The paper also includes an analysis of the impact on the natural environment of supplementing cattle feed rations with certain amino acids.

Results and conclusions: As a result of numerous researches in this field, it has been reported that supplementation with protected L-tryptophan improves milk quality by increasing milk protein content, improves the level of adaptability of cows to heat stress and increases the level of melatonin released in milk, while supplementation with protected methionine, threonine, isoleucine and leucine results in improved efficiency of nitrogen utilization and increased milk protein.

Keywords: optimization, amino acids, supplementation, protected tryptophan, melatonin.

FROM HIVE TO HOPE: PURIFIED MAJOR ROYAL JELLY PROTEINS EXHIBIT ANTIPROLIFERATIVE ACTIVITY IN MELANOMA CELLS

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Introduction: Major royal jelly proteins (MRJPs) are the predominant protein components of royal jelly (RJ) and have been associated with diverse biological activities, including regulation of cell proliferation. While the anti-melanogenic effects of RJ and 10-hydroxy-2-decenoic acid were demonstrated on murine melanoma cell lines, the specific effects of purified MRJPs on the human melanoma cell line A375, remain largely unexplored. This research gap highlights the need for targeted investigations into the potential therapeutic properties of MRJPs against this type of skin cancer.

Aims: The aims of the present study were to isolate and purify two MRJP₁ isoforms, namely oligoMRJP₁ and monoMRJP₁, MRJP₂ and to copurify MRJP₃ and MRJP₅ from fresh RJ, and assess their biological activity as treatments on A375 cells.

Materials and Methods: Protein isolation and purification were carried out *via* cation exchange chromatography. Individual protein fractions were identified using SDS-PAGE, combined, concentrated, and final protein concentrations were determined through UV spectroscopy. A-375 cells were cultured under standard conditions. To prepare the treatments, MRJPs were diluted in culture media to obtain concentrations of 0.2%, 1%, and 2%. Lastly, MTT assay was performed.

Results: In this work, we isolated and purified oligoMRJP₁, monoMRJP₁, MRJP₂ and MRJP_{3/5} from RJ. Viability of the A375 cell line after exposure to MRJP treatments was assessed and potential treatment cytotoxicity was investigated. A constant decrease in viability was observed, which is correlated with the increase in treatment concentration.

Conclusion: These proteins exert an antiproliferative effect on malignant human epithelial cells. In other words, the inhibition of cell growth is dose-dependent. These compounds have demonstrated their therapeutic potential in slowing down the evolution of melanoma. However, this can only happen after proper testing on animals and finally, clinical trials.

Keywords: cell cultures, major royal jelly proteins, melanoma, purification.

RESEARCH ON THE INFLUENCE OF DILUTION MEDIA ON RAM SPERM CRYOPRESERVATION

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Introduction: In the study, ram sperm from the Moldovan Karakul breed bred in the experimental section of the Scientific Institute of Biotechnology Practices in Animal Husbandry and Veterinary Medicine. Ejaculates with a mobility of no less than 70% and a concentration of 2.0 billion/ml were admitted for processing.

Materials and Methods: For dilution, GTJ, STJ and STJ+ dilution media were used, in which the biologically active preparation extracted from cyanobacteria at the Institute of Microbiology and Biotechnology of the Technical University of Moldova was introduced as an additional component. After resuscitation, the mobility, rectilinear movements of the spermatozoa, acrosome integrity were studied.

Results: The experimental results showed that the STJ+ dilution medium in which the biologically active preparation extracted from the cyanobacteria was introduced gave the possibility to obtain after thawing the mobility of 49.2±1.7, spermatozoa with rectilinear movements VAP – 105.5±2.7, VSL-91.5±4.5, VCL-170.7±8.5, sperm abnormalities -14.5%, acrosome integrity 24.4±0.4 compared to the other GTS and STJ dilution media.

Conclusions: which gave us the possibility to recommend for the cryopreservation of ram sperm the STJ+ medium in which the biologically active preparation was introduced as an additional component in a concentration of 0.4-0.7% for the cryopreservation of ram sperm.

Keywords: : ram, diluent, mobility, freezing, thawing

NEW SYNTHESIZED BIOACTIVE PEPTIDES

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Introduction: Public health is seriously at risk from the emergence of antibiotic resistance, so developing new antimicrobial medications quickly is essential to addressing this issue. The creation of novel antimicrobial peptides (AMPs) involves either modifying naturally occurring peptides or creating entirely new peptides with unique structural characteristics and modes of action [1,2].

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

Materials and Methods: Ten peptides were synthesized by the solid-phase peptide synthesis method and analyzed using MALDI-TOF-MS and analytical HPLC. The broth microdilution method was employed to ascertain the peptides' minimum inhibitory concentration in several bacterial strains (*Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus*, and *Bacillus subtilis* subsp. *spizizenii*). The cytotoxicity, cell proliferation, and cellular metabolic activity of the peptides in cancer human cells (e.g. MDA-MB-231 and MCF-7 breast cancer cells), as well as in normal cells (e.g. mesenchymal stem cells), were also assessed.

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 peptides showed no toxicity in the mesenchymal stem cells.

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

Keywords: antimicrobial peptides, cancer, MALDI-TOF-MS, solid-phase peptide synthesis, toxicity.

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EFFECT OF α - AND β -CASEINS ON ANTHOCYANIN BIOACCESSIBILITY IN RED GRAPE (*VITIS VINIFERA* L.) CULTIVARS

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Introduction: Anthocyanins from grapes (*Vitis vinifera* L.) are key phenolic compounds known for their antioxidant potential and associated health benefits (Yang and Xiao, 2013). While these water-soluble pigments exhibit notable bioactivity, their effectiveness largely depends on their stability during digestion. The typically low bioaccessibility of anthocyanins limits their biological impact and functional applications. As a result, there is growing interest in strategies aimed at enhancing their stability and intestinal absorption (Sengul *et al.*, 2014).

Aims: Considering the limited bioaccessibility of anthocyanins from grape skins and the potential role of dietary proteins in enhancing their stability, this study aimed to evaluate the effect of α - and β -casein on the bioaccessibility of grape-derived anthocyanins during simulated gastrointestinal digestion.

Materials and Methods: In this study, three red grape cultivars were subjected to an *in vitro* gastrointestinal digestion model following the standardized INFOGEST protocol to evaluate anthocyanin bioaccessibility. Anthocyanins were identified and quantified using high-performance liquid chromatography coupled with mass spectrometry (HPLC-MS).

Results: Despite varietal differences, the anthocyanin profiles of the three cultivars were slightly similar, with malvidin-3-glucoside as the main compound. Both α -casein and β -casein enhanced anthocyanin bioaccessibility, with α -casein having a more pronounced effect during *in vitro* digestion.

Conclusion: In the present research work, we demonstrated that caseins, particularly α -casein, effectively enhance the bioaccessibility of grape anthocyanins during digestion, suggesting their potential as functional food ingredients to improve the stability and absorption of these bioactive compounds.

Keywords: anthocyanins, bioaccessibility, casein, HPLC, red grapes

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KEFIR AS A FUNCTIONAL FOOD: MICROBIOTA MODULATION, METABOLIC BENEFITS AND EMERGING APPLICATIONS

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Introduction: Kefir is a traditional fermented beverage composed of a complex symbiotic consortium of lactic acid bacteria, acetic acid bacteria, and yeasts. Its health-promoting properties have recently gained attention due to its potential role in modulating the gut microbiota, improving digestion, and exerting antimicrobial, antioxidant, and anti-inflammatory effects (Bourrie *et al.*, 2016; Culpepper, 2022; Rosa *et al.*, 2017). The growing demand for functional foods has intensified research into kefir's bioactive compounds and its applications beyond traditional dairy matrices, including plant-based alternatives.

Aims: Considering the increased interest in functional foods with probiotic potential, this review aims to provide a comprehensive overview of kefir's nutritional and microbiological composition, its impact on human health, and its emerging technological applications. Particular emphasis is placed on recent innovations, including the development of non-dairy kefir and its incorporation into novel food formulations.

Materials and Methods: This review synthesizes findings from recent peer-reviewed articles indexed in databases such as PubMed, Scopus, and Web of Science. The methodology involved a comparative analysis of studies on kefir fermentation, its microbiota, and reported health effects in both in vitro and in vivo models.

Results: Recent studies indicate that kefir may positively influence gut microbiota diversity, reduce biomarkers of inflammation, and improve metabolic parameters such as glucose and lipid profiles. Moreover, non-dairy kefir formulations have shown promise in expanding consumer accessibility while maintaining probiotic efficacy.

Conclusion: This review highlights kefir as a promising and versatile functional food. Its traditional and modern applications, coupled with its scientifically proven health effects, make it a valuable addition to personalized nutrition and therapeutic dietary strategies.

Keywords: Immune modulation, gut microbiota, kefir, probiotics, functional beverage.

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KNOWLEDGE GAPS IN SOW WELFARE ASSESMENT IN DIFFERENT FARMING SYSTEMS

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Introduction: An animal-based measure (ABM) refers to an assessment method that focuses on the direct observation and evaluation of the actual physical, physiological and/or emotional state of the individual animal, preferably through non-invasive means. Based on existing literature (EFSA Pig Scientific Opinion, 2022), already validated protocols and existing data bases related to sow welfare like MatPrat or EUPAHW, the objective is to develop a comprehensive list of ABM's and rank these according to feasibility (e.g. ease of use), applicability (across housing systems) and affordability (e.g. resources needed for use).

Aims: The main goal of the study is to develop a freely accessible, online database and to analyse correlations between animal based measures (ABM's) and contextual data, thereby enhancing the capacity to respond to pig farmer's community and legislative inquiries in the future.

Materials and Methods: Performing a thorough analysis of the current status of the knowledge gaps related to sow welfare assessment in different farming systems is a complex task considering the various conditions in which swine females are raised. Identifying the right animal based measures to fit properly into these systems requires a deep understanding of sow behavior in farms with different sizes, level of technology and management skill set.

Results: The first stage of the research focused on defining the complex landscape of the husbandry systems in which sows are expected to perform and the potential influences these systems might have on the level of welfare on the gestating and lactating sows.

Conclusion: In the present research work, it was demonstrated that some ABM's might describe properly the level of welfare in sows in some systems while in other would not be relevant.

Keywords: animal based measures, farming systems, sow welfare

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A DIGITAL APPROACH TO FISH MORPHOMETRY: ADVANCING ANIMAL WELFARE AND BIODIVERSITY CONSERVATION

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Introduction: Fish welfare, particularly in aquaculture and natural habitats, is a crucial consideration for minimising stress and enhancing animal care. Traditional fish morphometry methods, which involve handling and exposing fish to air, can lead to stress and physiological disturbances.

Aims: This study aims to present a highly precise, cost-effective, and less invasive digital method for fish morphometry, with potential applications in other research areas.

Materials and Methods: By using a digital image-based approach, distances between specific landmarks on fish bodies were measured, reducing the need for prolonged air exposure. A comparison of air exposure times between traditional and digital methods was conducted using a Wilcoxon matched-pairs signed rank test.

Results: The digital approach offers several advantages, including greater accuracy, non-invasiveness, and cost-effectiveness, and can be easily applied across a variety of fields, such as fisheries management, wildlife biology, and veterinary medicine. Despite certain limitations, such as the inability to measure larger body dimensions and potential image distortion due to camera positioning, this method holds promise for enhancing fish welfare and advancing biodiversity conservation.

Conclusion: The present study demonstrates that the digital morphometric method significantly reduces the handling time of fish compared to conventional measurement techniques. Traditional/conventional tape-measure or ruler-measure methodologies require prolonged air exposure to manually measure multiple anatomical features, increasing stress and potential physiological disturbances.

Keywords: Shape; handling time; air exposure; stress-free; fish welfare.

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PHYSIOLOGICAL EFFECTS ON FISH, FOLLOWING DIETARY INCLUSION OF LAVENDER (*LAVANDULA ANGUSTIFOLIA*)

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Introduction: Phytogetic compounds have emerged as sustainable alternatives in aquaculture, aiming to enhance fish health and resilience to stress. Among these, lavender (*Lavandula angustifolia*) has drawn increasing attention due to its rich composition in volatile bioactive compounds such as linalool, linalyl acetate, camphor, and 1,8-cineole. These constituents are known for their antioxidant, anxiolytic, and growth-promoting properties. Previous studies have reported positive physiological responses in fish following the inclusion of lavender extracts in their diet.

Aims: Considering the promising pharmacological potential of lavender's compounds, this review aims to synthesize current scientific evidence regarding the effects of lavender on physiological performance, oxidative stress mitigation, and growth enhancement in fish. Special attention is given to its role in modulating antioxidant enzymes and stress biomarkers under intensive aquaculture conditions.

Materials and Methods: A comprehensive review of the scientific literature was conducted using online databases like Web of Science, Google Scholar, ScienceDirect, and ResearchGate. Studies were selected based on relevance, focusing on lavender's use as a dietary supplement, water additive, or anesthetic in aquaculture. Both research articles and review papers were considered. The reference lists of key studies were also screened to identify additional relevant literature.

Results: Lavender supplementation in aquafeeds has been associated with increased activity of antioxidant enzymes, reduced lipid peroxidation, and decreased levels of cortisol in several fish species. Its neuroactive effects appear to contribute to improved stress tolerance and overall welfare. Also supplemented diets with this medicinal plant have been linked to better feed efficiency and somatic growth.

Conclusion: This review highlights *Lavandula angustifolia* as a promising phytogetic additive in aquaculture, with demonstrated benefits in stress reduction, antioxidant defense, and growth promotion. Further standardized studies are needed to establish optimal formulations and dosing protocols to support its broader application in aquafeed development.

Keywords: antioxidant activity, dietary inclusion, growth performance, lavender, stress reducing.

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STUDYING THE INFLUENCE OF BIOLOGICALLY ACTIVE PREPARATIONS ON THE REPRODUCTIVE QUALITIES OF SOWS

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Introduction: The work is devoted to the study of the reproductive qualities of sows that received a biologically active preparation (LB-MP) synthesized from brewer's yeast waste in addition to the main ration. For this purpose, three groups of sows were formed, one control and 2 experimental.

Materials and Methods: The preparation was administered in addition to the main diet of sows during 30 days before weaning and 10 days after weaning in 10 ml and 20 ml of the preparation.

Results: It was established that the additional introduction of the biologically active preparation - LB-MP in the composition of the sow diet allowed to obtain such results as: live piglets, heads, in the first experimental group (10 ml) -11.2 and 12.6 in the second experimental group (20 ml), compared to 10.8 in the control group. The number of live piglets surviving at 21 days in the control group was 10.4, a lower index compared to the experimental group 1-(10 ml) where we had 11.2 and 12.4 live piglets surviving at 21 days in the group experimental 2-(20 ml). And also, hematological and biochemical blood analysis were studied at the beginning and at the end of the experiment.

Conclusions: The results suggest that the additional use of the biologically active preparation LB-MP in sow diets positively influenced reproductive performance and piglet survival, with better outcomes observed in the group receiving 20 ml.

Key words: piglets, live mass, preparation - LB-MP, blood.

PLENARY SESSION – Faculty of Veterinary Medicine
INVITED SPEAKERS

**WILDLIFE HEALTH MONITORING AND SURVEILLANCE IN
NORTHERN ITALY: PAST EXPERIENCES AND FUTURE PRIORITIES**

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Introduction: The growing attention at improving and harmonising the approach to wildlife health monitoring and surveillance is demonstrated in Europe by the numerous international projects, such as ENETWILD (<https://enetwild.com/>), or specific actions within the European Partnership on Animal Health and Welfare (<https://www.eupahw.eu/>). The reasons for taking care of wild animals health are: i) wildlife can act as epidemiological reservoir for diseases of humans; ii) wildlife species can be involved in domestic animals communicable diseases iii) some diseases are a potential threat for endangered wild species (Guberti et al., 1998).

Findings: In the last decades, different projects were implemented in Italy to answer health issues related to the three points aforementioned. A relevant example concerns *Echinococcus multilocularis*, the causative agent of an highly pathogenic zoonotic disease in humans. Since the first report of the parasite in an Alpine area of north-eastern (NE) Italy in 2002, a regular monitoring was conducted to detect the presence of this tapeworm in red foxes and other mesocarnivores of the whole area. The results of this activity allowed the description of an highly endemic area and the identification of different diagnostic approaches, tailored to the different epidemiological situations. Passive surveillance of wild carnivores provided also useful information on their role in the epidemiology of pathogens affecting domestic carnivores (e.g., intestinal parasites and lungworms). Finally, an epidemic wave of sarcoptic mange spreading in NE Italy among Alpine wild ruminant populations since the 1995 represent an esemplificative case of a pathogen threatening an endangered wild species (the Alpine ibex). Field experiences allowed a better understanding of the spatial and temporal patterns of the epidemic and the comparison between different surveillance approaches.

Conclusions: The case studies here reported show the need for an interdisciplinary approach to surveillance of diseases involving wild animals. The knowledge of the ecology, behaviour and demography of wild hosts, is pivotal for understanding epidemiological features and design appropriate interventions. More efforts towards a structured and cost-effective surveillance represent the future priority.

Keywords: *Echinococcus multilocularis*, sarcoptic mange, surveillance, intestinal parasites, wildlife

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AGRICULTURAL BIOTECHNOLOGY AND PRECISION BREEDING FOR FOOD SECURITY FROM THE POINT OF VIEW OF ANIMAL BIOTECHNOLOGY

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Introduction: Developments in genome sequencing and genome editing, the introduction of digitalization in data collection and storage, the use of analytical methods, and the introduction of artificial intelligence in data processing have all contributed to the rapid advancement of genomics. This has made it possible to reduce environmental impacts and improve animal health and welfare. The effective genetic modification of farm animals has been the focus of research for decades. The most important goals in this area are to increase the efficiency of food production, improve animal health and welfare, and develop better resistance to disease.

Aims: The work carried out at our institute is supported by the project *Agricultural Biotechnology and Precision Breeding for Food Security (RRF-2.3.1-21-2022-000079)* aims to provide answers to the complex challenges facing agriculture.

Materials and Methods: Within this project we are working on the development of precision breeding technologies for mammals and birds that can be used to make targeted genetic changes in their genomes efficiently and safely.

Conclusion: With the help of precision breeding techniques, organisms that can adapt more quickly and accurately to changing environments can be created, significantly reducing the time that would be required using traditional breeding techniques.

Another goal of our work is to develop gene variants that help build resistance to mycotoxins and heat tolerance, as well as to create special rabbit fibroblast and chicken primordial germ cell cultures that enable *in vitro* testing of the effects of mycotoxins on living organisms (Ecker et al, 2024).

Keywords: embryo, genome editing, primordial germ cells, toxins

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EQUINE SPORTS MEDICINE AT THE UNIVERSITY OF CORDOBA, SPAIN: A SYNERGY OF EDUCATION, RESEARCH AND CLINICAL PRACTICE

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Introduction: The Equine Sports Medicine Centre (CEMEDE), located at the University of Córdoba, Spain, represents an innovative and integrative academic model that combines veterinary teaching, research, and clinical assistance. Since 2014, the centre has been directed by Professor Dr. Ana Muñoz Juzado, a diplomate of the European College of Veterinary Sports Medicine and Rehabilitation (ECVSMR).

Aim: To provide a clear overview of CEMEDE's structure and main objectives.

Materials and Methods: CEMEDE is structured around three main areas:

- Teaching: It offers undergraduate and postgraduate training, including a Master's in Equine Sports Medicine, courses on equine biomechanics, and practical sessions in subjects such as physiology.
- Research: It focuses on several lines, including (1) exercise physiology, functional assessment, training planning, and performance improvement; (2) diagnosis and recovery from lack of training; (3) podiatry; and (4) rehabilitation and physical therapy.
- Clinical Assistance: Services are provided to horse owners, breeders, trainers, and veterinarians, focusing on (1) assessment of the horse's technical-sport potential for genetic selection; (2) injury risk detection, shoeing and saddle correction; (3) performance enhancement and diagnosis of poor physical condition; (4) rehabilitation of musculoskeletal injuries.

Results: Thanks to its multidisciplinary approach, CEMEDE has become a benchmark in equine sports medicine in Spain. It has contributed to the specialized training of professionals, improved equine performance, and advanced scientific knowledge in the field of equine sports health.

Conclusion: CEMEDE stands as a successful example of integration between academia, research, and clinical practice in equine sports medicine. Its structure and objectives allow for a comprehensive approach that benefits both the university environment and the professional equine sector.

Keywords: clinical assessment, equine sports medicine, exercise physiology, rehabilitation, veterinary education.

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GENOMIC COMPARISON OF ANCIENT REMAINS AND MODERN SHEEP BREEDS IN SOUTHERN IBERIA (PRELIMINARY RESULTS)

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Introduction: It is well known that Merino breed is the basis of most Merino-derived breeds worldwide. However, the precise origins of the current Merino breed remain uncertain. Roman historical documents suggest that the Iberian sheep serves as its ancestral genetic base. Our interest is focus in the study a total of skeletal remains of nine ovines (*Ovis aries*, L) excavates at the archaeological sites of Grañena Baja (Jaén), Marinaleda (Seville) and La Minilla (La Rambla, Córdoba) and its relationships with modern breed.

Aims: The objective is to compare the ancient skeletal remains of ovines obtained in three archaeological sites in South of Spain and modern sheep breeds located in the same region.

Materials and Methods: The obtained aDNA from 9 remains was purified following the Yang protocol. Blood from the 6 individuals (2 Merino, 2 Black Merino and 2 Segureña breeds) was collected with EDTA K3. The genomic DNA was purified with the DNeasy Blood and Tissue Kit (QIAGEN, Hilden, Germany). The construction of the paired-end sequencing libraries was made following the instructions (Illumina Inc., San Diego, CA, USA). To compare the ancient samples, Nei's genetic distance was calculated with the StAMPP-1.6.3 R package and visualised in a tree using the ape 5.5 package and the Unweighted Pair Group Method with the Arithmetic mean (UPGMA). The principal coordinate analyses (PCoAs) were performed using the function "pcoa" of the R package ape-5.7.1. The comparison between remains and modern breeds was made through a Principal Components Assay (PCA) using PLINK v1.9 software.

Results and discussion: The Principal Coordinates Analyses (PCoA) for the ancient samples showed how the sheep cluster was in the same position in the different sites, although one sample from Marinaleda was out of the cloud formed by the rest of the samples and nearer to the Grañena samples. The genetic distances between sites are not very large (0.08 to 0.12). The most genetically similar animals are those from La Minilla and Marinaleda, while the most genetically distant are those from Grañena Baja and La Minilla. When the aDNA were compared to the modern DNA samples, it was observed that all the remains clustered in a cloud, regardless of their site, were distinct from the modern sheep. The fact that all the Copper Age samples have more genetic similarities between them than with some of the modern breeds can be explained by the extensive process of selection that has taken place over the last few centuries in these breeds. However, analysing the samples individually, we can determine, based on genetic distances, the level of homology they may have with the samples of current breeds. At the Marinaleda site, most of the samples are equidistant from the current breeds, but with greater similarity to the Black Merino, a trend that is also observed in the Grañena Baja site. At the La Minilla site however the remains are genetically closer to one of the White Merino samples, and very close to two samples of the Segureña breed.

Conclusions: Following the preliminary results obtained, we suggest that the Iberian sheep of the late fourth and third millennia BC, constitute a possible genetic basis for the Merino sheep and its derived breeds. Future research is needed to construct a diachronic journey to detect the genomic traces and situate them in their corresponding historical eras.

Keywords: ancient DNA, genomics, sequencing, sheep

SURGICAL EXCISION OF ELBOW HYGROMAS - YES YOU CAN

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Introduction: Elbow hygroma is a chronic subcutaneous serous fluid collection resulting from continuous trauma to soft tissues over the olecranon in dogs lying on hard surfaces during housing, commonly occurring in large or giant breeds of dogs. In most dogs, repeated trauma over the olecranon leads to protective callus formation. If callus is not formed continuous pressure leading to edema and transudate formation due to impairment of blood flow that may result in transudate enclosure within a thick capsule lined by granulation tissue.

Aims: To describe the outcomes of Penrose drainage and surgical excision for the treatment of canine elbow hygromas.

Materials and Methods: To retrospectively review the records of 19 dogs with elbow hygromas managed with Penrose drainage and surgical excision between 1997 and 2014.

Results: Nineteen dogs received treatment for 21 hygromas. Twelve underwent Penrose drainage, and 9 underwent total surgical excision. One of the 12 hygromas treated with Penrose drain developed an ulcer over the olecranon, and four of them showed recurrence. Surgical excision was used to treat recurrent hygromas. A thoracodorsal axial pattern flap was used to repair the ulcer after it was surgically removed. After a median follow-up of 16 months, all of the dogs were in clinical good health.

Conclusion: Surgical excision of elbow hygromas seems to be an efficient method with fewer postoperative complications than Penrose drain implantation.

Keywords: dog, elbow hygroma, penrose drainage, surgical excision

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SESSION 6: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

PHYTOCHEMICAL CHARACTERISATION AND IN-VIVO ANTI-ARTHRITIC EFFICACY OF UNIM-H IN EXPERIMENTAL RAT MODELS

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Introduction: Chronic inflammation and oxidative stress play critical roles in the initiation and progression of degenerative, autoimmune, and musculoskeletal illnesses, including arthritis.

Aims: The current work looks at the phytochemical profile and pharmacological potential of UNIM-H, a polyherbal Unani formulation containing *Aloe barbadensis* Mill., *Chrysanthemum indicum* L., *Commiphora mukul* Engl., *Convolvulus scammonia* L., *Ipomoea turpethum* L. and *Merendera persica* Boiss.

Materials and Methods: HPTLC profiling of the formulation was done to identify the essential phytoconstituents. The anti-inflammatory effectiveness of UNIM-H was assessed using carrageenan-induced paw oedema and cotton pellet granuloma models,

Results: High-performance thin-layer chromatography (HPTLC) profiling indicated the presence of essential phytoconstituents such as aloe-emodin, colchicine, quercetin, and guggulsterone Z, which are recognised for their strong anti-inflammatory activity. The anti-inflammatory effectiveness of UNIM-H findings were equivalent to conventional indomethacin therapy. In CFA-induced arthritic rat models, UNIM-H significantly reduced paw swelling and serum levels of pro-inflammatory mediators (TNF- α , IL-1 β , IL-2, IFN- γ , and PGE₂), while enhancing anti-inflammatory cytokines (IL-10 and IL-4), indicating potent immunomodulatory activity.

Conclusion: Collectively, these data provide solid scientific evidence that UNIM-H is a safe and effective therapeutic candidate with substantial anti-inflammatory and cytokine-modulating characteristics, emphasising its promise in the treatment of arthritis and other chronic inflammatory illnesses.

Keywords: Antiarthritic, Complete Freund's adjuvant (CFA), Polyherbal formulation, TNF- α , Unani Medicine

FOOD SAFETY CHALLENGES IN BEE PRODUCTS: THE CASE OF BEE POLLEN

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Introduction: Rich in proteins, vitamins, minerals, and antioxidants, bee pollen is increasingly consumed as a dietary supplement worldwide. Despite its benefits, concerns have arisen regarding its safety due to microbial contamination and the presence of environmental pollutants, including pesticides and heavy metals. Therefore, evaluating the safety profile of bee pollen is essential to ensure consumer health and to establish guidelines for its safe use.

Aims: This evaluation aims to provide comprehensive data supporting the safe consumption of bee pollen and to identify any potential risks that may impact consumer health.

Materials and Methods: The investigation of chemical potential and biological contaminants in bee pollen, encompassing heavy metals, pesticides, antibiotics, and pathogenic microorganisms, can offer guidance on product safety to ensure consumer health protection.

Results: The product must be free from microbial contaminants, including *Salmonella* sp., *Staphylococcus aureus*, and *Escherichia coli*. The total aerobic plate count was below 100,000 CFU/g, while yeast and mold counts were below 50,000 CFU/g. Heavy metal concentrations should not exceed 0.5 mg/kg for Pb, 0.01 mg/kg for Hg, and 0.03 mg/kg for Cd. Pesticide residues were found to be below the maximum residue limits (MRLs) (Campos *et al.*, 2008). These results indicate that the product falls within established safety thresholds for human consumption.

Conclusion: The comprehensive safety evaluation of bee pollen with limits that meet the necessary microbiological and chemical standards for safe consumption. Absence of harmful pathogens and low levels of contaminants support its use as a nutritious and safe food product.

Keywords: Bee pollen, Food safety, Microbiological analysis, Quality control, Safety assessment

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OXIDATIVE STRESS AND ANESTHESIA IN DOGS AND CATS: MECHANISMS AND CLINICAL IMPLICATIONS

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Introduction: In dogs and cats, general anesthesia plays a key role in facilitating surgical and diagnostic procedures, but it can also induce oxidative stress by disrupting the balance between reactive oxygen species (ROS) and endogenous antioxidant defenses (Ayala et al., 2014). Excess ROS may damage lipids, proteins, and DNA, contributing to perioperative complications and delayed recovery. Some anesthetic agents may enhance oxidative stress, while others show potential antioxidant properties (Allaouchiche et al., 2001; Senoner et al., 2021). Given the metabolic particularities of each species and the variability among agents, understanding these effects is essential for optimizing anesthesia protocols in veterinary medicine. This review summarizes current evidence on how commonly used anesthetics affect oxidative stress in dogs and cats.

Aim: This study aims to monitor and identify specific oxidative stress markers that vary according to the anesthetic protocols used in companion animals. By comparing the effects of injectable and inhalational agents on ROS production across species and considering factors such as age, breed, and comorbidities, the goal is to identify safer anesthetic strategies and improve post-anesthetic recovery outcomes.

Conclusion: Oxidative stress plays a key role in the physiological response to anesthesia in dogs and cats, influencing organ function, inflammation, and postoperative recovery. This review highlights the need to consider redox balance when evaluating anesthetic protocols, as different agents can significantly alter oxidative status. Understanding these mechanisms is essential for improving clinical outcomes and tailoring safer, species-specific anesthesia strategies in veterinary practice.

Keywords: oxidative stress, veterinary anesthesia, dogs, cats, biomarkers

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SOCIAL COHESION UNDER PRESSURE: CAGE OVERCROWDING FAILS TO INDUCE SUSTAINED STRESS IN MICE

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Introduction: The laboratory mouse (Subfamily *Murinae*) is widely used in research due to its genetic accessibility, small size, and rapid reproduction (Ciudin, 2004). Since the 17th century, mice have played a key role in biomedical studies, particularly in oncology and genetics (Stanciu and Coman, 2022). Our current project investigates stress in mice and the potential effects of three pharmacological compounds (Whittaker et al., 2012).

Aims: As a preliminary step, we tested whether cage overcrowding could serve as a suitable method for inducing stress in mice, given its simplicity and short application period. We aimed to observe potential effects on body weight and behaviour.

Materials and Methods: Twenty BALB/c laboratory mice were randomly assigned to two groups. The control group was housed in three cages (4, 3, and 3 mice), while the experimental group (10 mice) was kept in a single cage to induce overcrowding. The experiment lasted two weeks. Food and water were provided *ad libitum*, and food consumption was recorded weekly. Body weight was measured daily, and behavioural changes were observed through direct observation.

Results: All mice gained weight by the end of the experiment, including those in the overcrowded cage. Mild aggression was observed during the first 2–3 days in the experimental group, but behaviour normalized afterward, with no additional signs of stress. These findings suggest that overcrowding triggered only short-term adaptation rather than sustained stress.

Conclusion: Under the conditions applied, cage overcrowding did not reliably induce measurable stress and will not be included in the main study. Future trials will explore more robust stress-inducing methods such as intermittent light, white noise, or immobilization.

Keywords: adaptation, overcrowding, mice, stress

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A COMPREHENSIVE REVIEW OF SEX DETERMINATION MECHANISMS ACROSS REPTILE FAMILIES

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Introduction. Reptiles exhibit remarkable diversity in sex-determination systems, ranging from temperature-dependent (TSD) to genotypic mechanisms (GSD). TSD predominates in many turtles and crocodilians, while GSD—with XX/XY or ZZ/ZW systems—is typical of lizards and snakes (Ezaz et al., 2016). Despite this diversity, literature often focuses on isolated taxa, limiting broad comparative understanding (Rovatsos et al., 2015; Olmo, 2023).

Aims. This review aims to synthesize current data on sex determination across major reptile families. It identifies the determinism type (TSD or GSD) and, where applicable, the chromosomal system involved, offering a centralized and accessible resource for researchers.

Materials and Methods. An extensive literature review was performed using peer-reviewed sources focusing on reptilian sex-determination mechanisms. Data were organized by family, and a comparative visual chart was developed to facilitate interpretation.

Results. The resulting chart reveals phylogenetic patterns of sex determination across multiple reptilian families. It also identifies notable exceptions and highlights clades where data remain incomplete or contradictory.

Conclusion. This review consolidates fragmented findings on reptilian sex determination into a single reference. The visual and taxonomic synthesis provides rapid access to determinism types by family or genus. These insights reinforce the evolutionary plasticity of reptilian sex-determination systems and stress the need to integrate cytogenetic, ecological, and phylogenetic perspectives in future research.

Keywords: reptiles; sex determination; TSD; GSD; reptile sex chromosomes

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EVALUATION OF THE HEPATOPROTECTIVE EFFECT OF BETULA PENDULA AND BETULA PUBESCENS EXTRACTS IN A MOUSE HEPATOTOXICITY MODEL

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Introduction: Liver disorders represent a major concern in both human and veterinary medicine due to their complex pathophysiology and limited therapeutic options. Recent attention has turned to plant-based hepatoprotective agents. *Betula pendula* and *Betula pubescens* are known for their anti-inflammatory and antioxidant properties, yet their hepatoprotective potential remains underexplored.

Aims: This study aimed to evaluate and compare the hepatoprotective effects of hydroalcoholic extracts of *Betula pendula* and *Betula pubescens* bark in a murine model of chemically induced hepatotoxicity.

Materials and Methods: Female Swiss mice were randomly allocated into six groups. Hepatotoxicity was induced by oral administration of carbon tetrachloride (CCl₄), and treatment groups received *Betula* extracts (50 mg/kg or 200 mg/kg) or chlorogenic acid as reference. Biochemical, oxidative stress, and histopathological parameters were assessed.

Results: *Betula pendula* at 200 mg/kg significantly reduced serum ALT and ALP levels compared to the CCl₄ group, improved oxidative stress markers and showed histological evidence of reduced necrosis and inflammation. *Betula pubescens* showed inferior performance, especially at higher doses. Toxicological evaluation revealed no adverse effects. Polyphenol and flavonoid content were markedly higher in *Betula pendula*, supporting its superior efficacy.

Conclusion: *Betula pendula* demonstrated stronger hepatoprotective effects than *Betula pubescens* in this murine model, likely due to its higher polyphenolic content. These findings justify further investigation into *Betula*-derived compounds for hepatoprotective use.

Keywords: *Betula pendula*, *Betula pubescens*, hepatoprotective effect, hepatotoxicity, plant extracts

EXPLORING THE ENTREPRENEURIAL INTENTIONS OF VETERINARY STUDENTS IN CENTRAL AND EASTERN EUROPE: IMPLICATIONS FOR THE CURRICULUM

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Introduction: There is limited literature on entrepreneurship in the veterinary field. Recent studies (Feakes et al., 2023) have revealed that although final-year veterinary medicine students demonstrate high levels of entrepreneurial intention, they have low confidence in their financial skills. The authors emphasise the need for in-depth research into these students' entrepreneurial intentions and the influence of individual and group factors. Such research could contribute significantly to optimising the curriculum content.

Aims: To address this gap in the literature, this study examined the entrepreneurial intentions of veterinary students in Romania, Croatia, Moldova, and North Macedonia. A comparative analysis was conducted by country and year of study.

Materials and Methods: A sociological survey based on a questionnaire was used as the research method. Data were collected in 2024 from veterinary medicine students of different nationalities enrolled in faculties in the aforementioned countries.

Results: Following an analysis of the data, significant differences in students' entrepreneurial intentions were found between countries. Students in the Republic of Moldova have the highest rate of entrepreneurial intention, followed by those in North Macedonia, Romania and Croatia. While there are considerable variations between countries, the year of study does not appear to have a significant influence on entrepreneurial intentions in any of the analysed countries. This suggests that the determinants of entrepreneurial intention are more likely to be individual or related to the socio-economic context.

Conclusion: The results of the study could be used as a valuable starting point for adapting educational programmes to encourage entrepreneurship among future veterinarians.

Keywords: entrepreneurship, veterinary students, intentions

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OPTIMIZATION OF A PERCUTANEOUS OVALBUMIN-INDUCED CHRONIC MURINE MODEL OF ATOPIC DERMATITIS

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Introduction: Atopic dermatitis (AD) is a prevalent inflammatory and pruritic allergic skin condition affecting both humans and dogs (Drechsler et al., 2024). To facilitate therapeutic approaches, a previously published ovalbumin (OVA)-based murine protocol was applied and optimized to improve consistency and translational relevance (Roßbach et al., 2017).

Aims: This study aimed to optimize a previous murine model of AD using percutaneous OVA sensitization and challenge, improving reproducibility and clinical relevance and further confirming its validity.

Materials and Methods: Fifteen (n=15) female BALB/c mice underwent three sensitizations and up to three challenges with phosphate-buffered saline (PBS)-diluted medical-grade OVA applied via occlusive patches on depilated abdominal skin. An additional sham-treated control group (n=5) received percutaneous PBS only. Skin lesions (erythema, scaling, erosions) were blindly scored post-exposure and pruritus was blindly assessed through video analysis. Tissues were collected post-euthanasia for blinded histopathological evaluation.

Results: Analysis of lesion scores across groups revealed no statistically significant differences, indicating that a single challenge is sufficient to induce consistent AD characteristics, further supporting model validity.

Conclusion: The improved model induces clinically and histopathologically accurate AD, improving reliability and supporting future application in evaluating therapeutic approaches.

Keywords: Atopic Dermatitis, Murine Model, Phytotherapeutics, Translational Medicine

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CASE REPORT: ACANTHOLYTIC ORAL SQUAMOUS CELL CARCINOMA IN A CAT TREATED WITH SURGERY AND ADJUVANT ELECTROCHEMOTHERAPY

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Introduction: Oral squamous cell carcinoma (OSCC) is the most common malignant oral tumor in cats, often associated with a poor prognosis due to its aggressive local behavior and anatomical constraints that limit complete surgical excision. Acantholytic SCC is a histological variant characterized by loss of intercellular cohesion, which may further impact the biological behavior of the tumor. Electrochemotherapy (ECT) has emerged as a promising local treatment modality, especially in cases where radical surgery is not achievable.

Aims: This report aims to describe the clinical course and therapeutic response of a feline case of acantholytic oral SCC treated with surgical excision followed by adjuvant ECT, emphasizing its potential as a salvage or adjunctive treatment.

Materials and Methods: A 10-year-old neutered male European Shorthair cat, FeLV/FIV negative, presented with a 4 cm sublingual mass. Cytological evaluation via fine needle aspiration confirmed squamous cell carcinoma. Surgical excision of the mass was performed without intent for clean margins due to the lesion's sublingual location. Two weeks postoperatively, local recurrence was noted. The patient was referred, and staging included thoracic radiographs and FNA of the submandibular lymph nodes, which were negative for metastasis. Electrochemotherapy was initiated using bleomycin administered intravenously and intratumorally, followed by two ECT sessions at six-week intervals.

Results: Electrochemotherapy may represent a valuable adjuvant treatment in feline oral SCC cases where surgical excision with adequate margins is not feasible. This case supports the role of ECT in achieving local tumour control and improving quality of life in such challenging presentations.

Keywords: oral squamous cell carcinoma, electrochemotherapy, adjuvant

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EVALUATION OF THE ANTIDIABETIC AND HEPATOPROTECTIVE POTENTIAL OF *BETULA PENDULA* AND *BETULA PUBESCENS* IN A STREPTOZOTOCIN-INDUCED DIABETIC RAT MODEL

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Introduction: Diabetes mellitus is a chronic metabolic disorder associated with long-term complications, including hepatic dysfunction and oxidative stress. Plant-derived compounds with antioxidant and antihyperglycemic properties are gaining attention as complementary therapeutic agents. The genus *Betula*, rich in triterpenes and polyphenols, has shown promising pharmacological effects in previous studies.

Aims: The aim of this study was to evaluate the antidiabetic and hepatoprotective effects of *Betula pendula* and *Betula pubescens* bark extracts in a streptozotocin-induced diabetic model in Wistar rats.

Materials and Methods: Experimental diabetes was induced in Wistar rats via intraperitoneal administration of STZ (55 mg/kg) and nicotinamide (110 mg/kg). After confirming hyperglycemia, the rats were randomly divided into six groups (n=5). Control groups included healthy rats, untreated diabetic rats, and rats treated with Gliclazide (10 mg/kg/day). The animals were treated for 8 weeks with *Betula* extracts (200 mg/kg/day) by oral gavage. Body weight, glycemia, food and water intake were monitored. At the end of the study, blood samples were collected for biochemical analysis while liver, kidney, and pancreas tissues were harvested for histopathological evaluation.

Results: Both birch species showed protective effects, with *Betula pendula* at 200 mg/mL displaying the most significant improvements in glycemic control, transaminase levels, antioxidant activity, and liver architecture. Histologically, treated groups exhibited reduced hepatocellular degeneration and inflammation compared to diabetic controls.

Conclusion: *Betula pendula* and *Betula pubescens* extracts, demonstrate significant antidiabetic and hepatoprotective effects. These results support their potential application as alternative or complementary therapies in the management of diabetes-related complications

Keywords: *Betula pendula*, *Betula pubescens*, diabetes, oxidative stress, streptozotocin

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SESSION 7: VETERINARY MEDICINE - CLINICAL SCIENCES

INFECTION WITH *EIMERIA* SPP. IN SMALL RUMINANTS IN ROMANIA: LITERATURE REVIEW AND A PROSPECTIVE STUDY

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Introduction: *Eimeria* spp. infect epithelial cells of the gastrointestinal tract and can cause significant economic losses in young farm animals due to reduced weight gain, increased morbidity and mortality, and high treatment and prevention costs.

Aim: Despite its impact, the prevalence and consequences of coccidiosis in small ruminants in Romania are underestimated. To address this gap, we conducted a prospective study in sheep and a literature review, followed by a meta-analysis, on the prevalence and risk factors.

Materials and Methods: Literature searches were performed in international and Romanian databases for studies published between 2007 and 2022. The prospective study took place between 2022 and 2023 in four sheep flocks from Transylvania. Faecal samples from lambs and adults were collected in autumn and spring, and analyzed using the flotation and McMaster techniques. Coprocultures were also conducted to identify *Eimeria* species.

Results: Ten studies met the inclusion criteria (seven on sheep and three on goats), covering 26 flocks. Of these, 12 were reported as *Eimeria*-positive, one as negative, and 13 had unspecified infection status. The overall prevalence of *Eimeria* spp. in small ruminants was 37.1% (95% CI: 34.5–39.8), with a mean oocyst per gram (OPG) count of 1,489. Prevalence was significantly higher in lambs and kids (65.8%) than in adults (46.9%), and in goats (53.0%) compared to sheep (35.6%). Mean OPG was also markedly higher in young animals (6,392) than adults (320). Regional variation was observed, with prevalence exceeding 50% in western, central, and northern Romania, but only 16.7% in the south. Species identification was reported in only one study, detecting *E. ovinoidalis* (42%), *E. crandallis* (28%), *E. parva* (17%), *E. faurei* (10%), and *E. pallida* (3%). In the prospective study, the overall prevalence in sheep was 97.97%, with no significant differences by age or season. However, OPG values were significantly higher in lambs (4,307) and in spring (3,493), compared to adults (701) and autumn (471). Ten of the thirteen known ovine *Eimeria* species were identified. The most prevalent were *E. bakuensis* and *E. weybridgensis* (48.75%).

Conclusion: These findings highlight the need for further research on *Eimeria* spp. infection in Romanian small ruminants, particularly goats. Future studies should focus on longitudinal monitoring, assessing farm-level risk factors, identifying the *Eimeria* species, and analyzing economic impacts.

Keywords: *Eimeria*, sheep, goats, review, Romania.

A PINK CANINE'S TOOTH BLEACHING

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Introduction: Intra-vitam pink canine teeth are rarely reported in the literature. They may be due to a local circulatory disorder associated with a traumatic injury. Some case reports previously presented have revealed the presence of pink coloured casts within the dentinal tubules.

Aims: This case report describes the bleaching of a canine tooth in a dog using a 940 nm diode laser.

Materials and Methods: A two-year-old intact male Akita Inu dog was presented with an uncomplicated crown fracture at tooth 304, involving one-quarter of the incisal part of the crown. The tooth had an intensely pink incisal half of the crown. The owners expressed concern regarding the discolouration and referred to dental treatment. The tooth was treated endodontically, and the root was sealed with mineral trioxide aggregate and gutta-percha. The crown was bleached with a 940nm diode laser and filled with light-curing material. Dental X-rays were taken before and after the endodontic treatment.

Results: Dental X-rays revealed no periapical involvement. At the opening of the crown, an intense, reddish bleeding was expressed. Endodontic treatment was performed in accordance with established endodontic standards and protocols. The tooth had a light-yellow discolouration at the end of the dental treatment, which gave it a natural appearance.

Conclusion: The 940 nm diode laser is best absorbed in haemoglobin and melanin. Correlated with the haemorrhage found at the opening of the crown, it can be stated that the pink colouration of the crown was due to the red pigment from haemoglobin.

Keywords: akita inu, bleaching, dentistry, dog, intra-vitam pink tooth.

ANTHELMINTIC RESISTANCE IN DONKEYS: EFFICACY ASSESSMENT OF FIVE COMMONLY USED MOLECULES AGAINST GASTROINTESTINAL STRONGYLES IN ROMANIA

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Introduction: Donkeys are gaining importance due to the increasing demand for their milk in both therapeutic nutrition and cosmetics. Although normally resistant animals, gastrointestinal strongyle infections remain a major health concern, compromising animal welfare and productivity. Despite the growing recognition of anthelmintic resistance (AR) in equines, there is a lack of data regarding its prevalence and impact in donkeys, especially in the context of off-label drug use.

Aims: This study aimed to evaluate the efficacy of five commonly used off-label anthelmintic molecules—fenbendazole, pyrantel, eprinomectin, moxidectin, and ivermectin—against digestive strongyle infections in donkeys from a Romanian leisure farm.

Materials and Methods: A total of 125 clinically healthy donkeys were enrolled and divided into five treatment groups (n = 25/group), balanced by age and sex. Fecal egg counts (FEC) were performed on days 0 and 14 post-treatment using Mini-FLOTAC, and efficacy was evaluated via fecal egg count reduction test (FECRT), following WAAVP guidelines for horses. All treatments reflected common field practices, using label doses for equines or ruminants.

Results: At day 0, 100% of donkeys tested positive for strongyle-type eggs, with 97.6% exhibiting moderate to heavy egg shedding. By day 14, only ivermectin (100% FECRT) and moxidectin (99.6% FECRT) demonstrated full efficacy. Resistance (FECRT < 95%) was identified for fenbendazole (48.7%), pyrantel (54.5%), and eprinomectin (13.5%). No clinical side effects were observed in any treatment group.

Conclusion: This study confirms a high burden of strongyle infection and significant anthelmintic resistance in Romanian donkeys, especially against benzimidazoles, tetrahydropyrimidines, and pour-on macrocyclic lactones. Ivermectin and moxidectin remain effective, but the off-label use of anthelmintics—particularly those with zero milk withdrawal times—warrants cautious application. Tailored parasite control strategies and species-specific guidelines for donkeys are urgently needed to prevent the spread of resistance and ensure effective treatment outcomes.

Keywords: anthelmintic resistance, donkeys, digestive strongyles

TOXOPLASMA GONDII PREVALENCE IN PIGS SLAUGHTERED FOR HUMAN CONSUMPTION IN THE NETHERLANDS

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Introduction: *Toxoplasma gondii* is a common parasite in both humans and animals. Human infection typically occurs through the ingestion of tissue cysts in undercooked meat or oocysts from contaminated food, water, or the environment (Dubey & Beattie, 1988). In pigs, infection rates are higher in outdoor farming systems. Additional risk factors include the presence and access of cats, rodents, and flies to feed, water, and enrichment materials, the use of goat whey in feed, and inadequate cleaning and disinfection practices (Garcia & Dubey, 2010).

Aims: This study aims to assess the seroprevalence of *Toxoplasma gondii* in pigs using ELISA to detect specific antibodies. The results will help evaluate exposure levels, identify public health risks linked to pork consumption, and support improved control measures in swine production.

Materials and Methods: the method to determine toxoplasmosis was ELISA, and the kit used was PrioCHECK™ Porcine Toxoplasma Ab.

Results: Between January 2023 and March 2025, a total of 80,056 samples were collected from slaughtered pigs across 1,292 farms, with 1,454 testing positive for *Toxoplasma gondii*. Eighteen farms with both a high number of samples and high prevalence were selected for further analysis. Additional data were requested for these farms, including farm type (organic or conventional) and responses to a questionnaire covering rodent and cat control, general hygiene, and feed storage practices.

Conclusion: Toxoplasmosis can be found still, even in conventional farms who should have a high level of biosecurity. Those questionnaires even though they seem to be simplistic are really important and the preventive and corrective measures are the key of improving the numbers which in some farms are alarming.

Keywords: conventional farms, organic farms, prevalence, toxomplasmosis

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FROM CONCEPT TO CURE: WHAT OUR DRUG PREPARATION LABORATORY ACHIEVED SO FAR

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Introduction: Personalized medicine in veterinary care enables tailored treatments (Leroy, 2023) based on species, individual conditions, and physiological needs. Building on our previous work (Dobre et al., 2024), which described the establishment of a drug preparation laboratory in the Veterinary Teaching Hospital, we have developed and administered customized medications to improve therapeutic outcomes (Pieter, 2015) in animal patients.

Aims: This study aims to present several examples of veterinary compounded products formulated in our lab and to evaluate their clinical impact. We focused on treatment adaptability, accuracy of dosing, and therapeutic response.

Materials and Methods: In response to specific clinical needs, we prepared and evaluated a range of personalized formulations using standardized methods: *Eye drops:* Tacrolimus 0.03%, Chloramphenicol 1%, Tobramycin 0.3%, Nepafenac 0.3%, Prednisolone 1%. *Ophthalmic gels:* Tacrolimus 0.03%, Tacrolimus 0.03% combined with Cyclosporine 0.2%, Ganciclovir 0.3%. *Oral formulations:* Palatable syrups for cats (as tablets are often poorly tolerated), capsules with various concentrations (e.g. sildenafil, levothyroxine); because animal weights can vary widely, tablets must often be divided to achieve correct dosing - an area where our drug preparation laboratory provides critical support. *Topical ointment:* A veterinary formulation containing Betamethasone, Clotrimazole, and Gentamicin. All compounds were prepared under sterile or semi-sterile conditions.

Results: Compounded ophthalmic preparations enabled timely treatment of acute and chronic ocular conditions. Without in-house compounding, owners would have had to rely on external or human pharmacies—often impractical or unavailable. Syrups significantly improved medication adherence in cats. Divided tablets and customized capsules ensured precise, weight-adjusted dosing, particularly in young or elderly animals. Personalized formulations led to improved therapeutic outcomes and high owner compliance, with no adverse effects reported. We will also present relevant clinical cases to illustrate the practical benefits and effectiveness of these tailored preparations.

Conclusion: Pharmaceutical compounding in veterinary practice enables safe, flexible, and effective therapies tailored to individual patients. The positive outcomes observed confirm the clinical value of personalized formulations, supporting their continued integration into daily veterinary care.

Keywords: compounding, ophthalmology, formulations, syrups, outcomes

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PERFORMING THE BRACHIAL PLEXUS BLOCK USING THE NEUROSTIMULATOR IN BIRDS. TWO CLINICAL CASES

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Introduction: In birds, brachial plexus anesthesia is a specialized technique used to provide analgesia for procedures involving the wing or shoulder region. Despite its benefits, the application of this technique in avian species presents unique challenges due to anatomical variations and physiological differences compared to mammals. (Anderson F da Cunha, 2013)

Aims: This paper presents the utility of the nerve stimulator for brachial plexus block in a Eastern Marsh Harrier (*Circus spilonotus*) and a rook (*Corvus frugilegus*).

Materials and Methods: In both cases, the patients presented with open fractures requiring surgical intervention. Following induction of general anesthesia, the axillary fossa was aseptically prepared, and a distal skin electrode was positioned. The nerve locator was configured with a frequency of 1 MHz, a current of 1 mA, and a pulse duration of 0.1 ms. An insulated needle was then inserted using anatomical landmarks as described by Turcu et al. (2022). A motor response was observed at a stimulation intensity of 0.3 mA, but not at lower levels, confirming accurate needle placement. Thereafter, Bupivacaine 0.5% was administered at a dose of 2 mg/kg, with a total volume of 0.4 ml/kg.

Results: As the needle approached the target nerves, powerstroke of the wing was noted, indicating the optimal site for anesthetic injection. Intraoperative nociception was assessed through continuous monitoring of vital parameters, including heart rate and respiratory rate. No signs of nociception stimulus were present throughout the intervention and recovery was uneventful. Due to the use of a bandage in the first case and euthanasia in the second, post-recovery assessments of sensory and motor function could not be performed, which limited the ability to accurately assess the duration of the anesthetic effect

Conclusion: This study offers a significant contribution to avian anesthesia by presenting the first documented application of brachial plexus blockade in live bird species using anatomical landmarks described by Turcu et al. (2022), validated through neurostimulation.

Keywords: brachial plexus, bird species, neurostimulator

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DIAGNOSTIC AND TREATMENT OF THYMIC LYMPHOMA IN A PET RABBIT – A CASE REPORT

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Introduction: Thymic lymphoma is a malignant neoplasia involving the lymphoid component of the thymus, a permanent organ in rabbits (*Oryctolagus cuniculus domesticus*), situated in the cranial part of the thorax (Robertson, 2022). It is not one of the most common thoracic tumours in this species, thymoma being the more frequently diagnosed. Like other mediastinal masses, thymic lymphoma causes clinical difficulty in breathing and can, uniquely, sometimes cause exophthalmia or prolapse of the third eyelid (Graham, 2016).

Materials and Methods: A spayed, 5 years old female rabbit was presented to the NAC Clinic with decrease appetite, abdominal respiratory pattern and slight neurological signs. On clinical examination dyspnea and stress were observed, everything else was unremarkable. On Xray, a mass effect was observed and CBC showed leukocytosis and lymphocytosis, a CT scan was performed and a mediastinal mass was confirmed.

Results and Discussion: Under general and local anesthesia, a 6 cm diameter cranial mediastinal mass was removed via sternotomy and sent for histopathology examination. An infiltrative, intensely cellular tumor, with no clean histological margins and characteristics of small cell thymic lymphoma was identified on examination. The animal recovered well after surgery, but 5 months after the initial presentation, it returned with exophthalmia and on Xray a recurrence was observed. Chemotherapy with Lomustine and Prednisolone, that had been started 3 weeks after surgery, was continued. The rabbit died 50 days after.

Conclusions: This case describes the diagnostic techniques and treatment used for a pet rabbit, diagnosed with a thymic lymphoma. Survival time after diagnostic was 7 months.

Keywords: thymic lymphoma, rabbit, surgery, chemotherapy

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THE POWER OF IMAGING: CORRELATION BETWEEN RADIOGRAPHY AND ULTRASONOGRAPHY FOR ESTABLISHING A PROGNOSIS IN CASES OF GASTROINTESTINAL STASIS SYNDROME IN RABBITS (*ORYCTOLAGUS CUNICULUS*)

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Introduction: Gastrointestinal (GI) stasis syndrome, gastric and caecal dilatation, and intestinal obstruction are common yet distinct emergencies in pet rabbits that require different therapeutic approaches. Early and accurate differentiation is critical for appropriate management. This study evaluated the prognostic value of abdominal radiographic and ultrasonographic parameters in rabbits with GI stasis, based on criteria proposed by Debenham et al. (2019).

Materials and Methods: Eleven rabbits presenting with clinical signs of GI stasis syndrome were prospectively enrolled. Each underwent physical examination, abdominal radiography, and ultrasonography upon admission. Radiographic evaluation focused on stomach height and length relative to the L1–coxofemoral distance. Follow-up imaging was performed 24 hours later. Ultrasonography assessed stomach and intestinal wall thickness as well as intestinal motility.

Results and Discussion: Abdominal palpation revealing a firm, dough-like stomach was associated with a poorer prognosis. Radiographically, a stomach size $\geq 80\%$ of the L1–coxofemoral length correlated with prolonged hospitalization (≥ 5 days) and a 33% mortality rate, whereas sizes $< 80\%$ were associated with shorter hospitalization (< 2 days) and a 13% mortality rate. Follow-up radiographs at 24 hours added minimal prognostic value. Ultrasonographic evaluation provided detailed anatomical insights, but wall thickness measurements were inconsistent prognostic markers due to variability from inflammation, sex, and treatment. Interpretation was further limited by gas-filled intestinal loops. Nevertheless, experienced ultrasonographers could reliably detect intestinal obstruction.

Conclusions: Radiographic measurement of gastric size at admission is a practical and reliable prognostic indicator in rabbits with GI stasis. Although ultrasonographic wall thickness lacks prognostic consistency, ultrasound remains valuable, particularly for identifying possible obstructions when performed by skilled clinicians. Further research is needed to refine prognostic criteria and support early clinical decision-making.

Keywords: rabbit, gastrointestinal stasis, radiography, ultrasonography, prognosis

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CLINICAL ASPECTS AND THERAPEUTIC STRATEGIES IN REPRODUCTIVE DISORDERS OF REPTILES: A RETROSPECTIVE STUDY

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Introduction: The increasing popularity of reptiles as companion animals has resulted in a growing number of veterinary consultations, particularly for reproductive disorders. Veterinarians working in New Companion Animal (NAC) clinics play a critical role in the prevention, early diagnosis, and management of such conditions. The majority of reproductive pathologies are associated with suboptimal husbandry and nutritional deficiencies. This study aims to characterize the reproductive disorders diagnosed in reptiles presented to the NAC Clinic at the Faculty of Veterinary Medicine, Cluj-Napoca, and to evaluate diagnostic and therapeutic strategies.

Materials and Methods: A retrospective analysis was conducted on reptile cases diagnosed with reproductive disorders between 2020 and 2025. Data collected included species, sex, clinical presentation, diagnostic imaging findings, therapeutic interventions, and clinical outcomes. The objective was to identify clinical patterns and assess the efficacy of therapeutic approaches.

Results and Discussion: Reproductive disorders constituted approximately 2% of reptile consultations. The most commonly affected species were red-eared sliders (*Trachemys scripta*), bearded dragons (*Pogona vitticeps*), and leopard geckos (*Eublepharis macularius*). Both sexes were represented; hemipenis amputation was a frequent indication in males. Follicular stasis—pre- and post-ovulatory—was the most prevalent pathology. All cases of pre-ovulatory stasis necessitated surgical intervention, whereas post-ovulatory stasis was initially managed medically, often progressing to surgery. Ultrasonography was essential for diagnosing pre-ovulatory stasis; combined ultrasonographic and radiographic evaluations guided post-ovulatory diagnoses. Biochemical profiles frequently revealed pseudo-hypercalcemia. Mortality occurred in cases where surgical intervention was declined, highlighting the importance of timely treatment. Contrary to literature emphasizing chameleons, this study observed a higher incidence in turtles, reflecting regional caseloads.

Conclusions: Successful treatment of reproductive disorders in reptiles requires species-specific and case-specific approaches. While medical management may be considered in post-ovulatory stasis, surgical resolution is often indispensable, particularly for pre-ovulatory cases, to prevent severe systemic compromise and improve clinical outcomes.

Keywords: reptiles; follicular and post-ovulatory stasis; hemipenis amputation; ultrasonography; radiography

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HEMODYNAMIC CHANGES IN RENAL CANINE PATIENTS SEDATED WITH PROPOFOL OR ALFAXALONE FOR CENTRAL VENOUS CATHETER PLACEMENT

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Introduction: Propofol and alfaxalone are injectable anesthetics with minimal cardiovascular effects, particularly during induction when most hemodynamic changes occur. (Cattai *et al.*, 2018) Both are widely used in canine anesthesia and offer reliable induction with minimal side effects. (Muir *et al.*, 2008; Sarotti *et al.*, 2024)

Aims: This study compares the hemodynamic effects of propofol and alfaxalone, with or without premedication, in dogs with severe kidney impairment undergoing central venous catheter placement for hemodialysis.

Material and Methods: 24 dogs were randomized into 4 groups: A1(Butorphanol + Alfaxalone), A2(Alfaxalone only), P1(Zenalpha + Propofol) and P2(Propofol only). Heart rate (HR), mean arterial pressure (MAP), ETCO₂ and ECG were monitored. All dogs were pre-oxygenated, intubated and received oxygen during the procedure.

Results: Propofol without premedication caused mild reductions in HR, MAP and ETCO₂. With premedication, only HR decreased. Alfaxalone slightly reduced HR in premedicated dogs; unpremedicated dogs showed MAP decrease with reflex tachycardia. No ECG abnormalities were found.

Conclusion: Propofol induced bradycardia, hypotension and lower ETCO₂. Alfaxalone preserved MAP and increased HR, indicating better cardiovascular stability.

Keywords: alfaxalone, kidney, hemodialysis, propofol, sedation

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CHRONIC DIARRHEA IN CATS: A PUZZLE OF MULTIPLE ETIOLOGIES – CASE STUDY

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Introduction: Chronic diarrhea in cats is a common clinical problem with a multifactorial etiology. It is defined by gastrointestinal signs persisting for over three weeks and may result from intestinal dysbiosis, parasitic infections, viral pathogens, or inflammatory conditions (Hall et al., 2008). Among protozoal infections, *Trichomonas foetus* and *Cryptosporidium spp.* are significant causes of persistent diarrhea (Gookin et al., 2003). Feline Coronavirus (FCoV), although often subclinical, can worsen intestinal inflammation and dysbiosis, sometimes leading to feline infectious peritonitis (Pedersen, 2009).

Aims: This study analyzes a clinical case of chronic diarrhea in a cat, where multiple etiologies were identified: *Trichomonas foetus*, *Cryptosporidium spp.*, and FCoV, along with severe dysbiosis. The objective is to emphasize diagnostic challenges and therapeutic implications.

Materials and Methods: The cat underwent clinical examination, coproparasitological testing, and PCR for *Trichomonas foetus*, *Cryptosporidium spp.*, and FCoV. Microbiome analysis evaluated dysbiosis. Symptomatic treatment was combined with targeted antiparasitic and antiviral approaches.

Results: Co-infection with *Trichomonas foetus*, *Cryptosporidium spp.*, and FCoV resulted in severe, persistent diarrhea and a slow therapeutic response. Molecular diagnostics confirmed the pathogens and supported a tailored treatment protocol, which gradually improved clinical signs.

Conclusion: Chronic diarrhea in cats may arise from concurrent etiologies, requiring a comprehensive diagnostic approach. Coexisting parasitic and viral infections, together with dysbiosis, significantly affect prognosis and treatment strategies.

Keywords: Cats, chronic diarrhea, *Cryptosporidium spp.*, *Feline Coronavirus (FCoV)*, *Trichomonas foetus*

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THE IMPACT OF USING LEAD AMMUNITION IN HUNTING: RISKS FOR CONSUMERS, WILDLIFE, AND THE ENVIRONMENT

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Introduction: Lead is a heavy metal, highly toxic to both animals and humans, causing anemia, neurological and reproductive disorders (O'Connor et al., 2020). Nevertheless, tens of thousands of tons of lead ammunition are released into the environment annually through hunting activities, leading to soil and water contamination (Pain et al., 2019).

The European Food Safety Authority (EFSA) states that there is no safe level of lead exposure for humans, highlighting the importance of raising awareness about the health risks associated with the consumption of lead-contaminated game meat (Gerofke et al., 2018).

Aims: This study aims to summarize and evaluate existing scientific evidence on the toxic effects of lead ammunition, focusing on its health risks to humans (especially through game meat consumption), harmful impacts on wildlife through ingestion or poisoning, and environmental contamination of soil and water. It seeks to raise awareness and inform policy or regulation decisions regarding the use of lead in hunting activities.

Conclusion: The continued use of lead ammunition in hunting poses significant and well-documented threats to human health, wildlife, and the environment. Scientific evidence shows that even low levels of lead exposure can cause serious health issues. Adopting responsible hunting practices not only protects public health and biodiversity but also contributes to the long-term sustainability of ecosystems.

Keywords: lead, health risks, game meat.

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PROGNOSTIC FACTORS IN THE OCCASION OF THE MAIN NEONATAL PATHOLOGIES IN FOALS

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Introduction: The neonatal period, defined as the first 7 days of life, represents the most critical stage for foal survival. Early detection and management of neonatal diseases is essential in reducing morbidity and mortality. Based on clinical experience gained during internships in the Equine Clinic at the Faculty of Veterinary Medicine, Cluj-Napoca, this study investigates prognostic factors influencing the occurrence and evolution of neonatal pathologies in foals.

Aims: The objective was to identify the most common neonatal diseases, assess maternal and obstetric factors affecting foal health, evaluate relevant clinical and paraclinical findings, and develop a practical prognostic model for early intervention.

Materials and Methods: The study was conducted on 28 foals admitted to the Equine Clinic between 2022 and 2025 with neonatal-specific conditions. Data were recorded using a standardized Neonatal Foal Assessment Sheet, and cases were classified by pathology, sex, and breed.

Results: The main pathologies observed were septicemia (24%) with failure of passive transfer (FPT) (18%), digestive disorders (enterocolitis (18%), colic (8%), prematurity (20%) or dysmaturity (4%), omphalophlebitis (2%), and musculoskeletal conditions (6%). Septicemia had the highest incidence, with FPT significantly increasing sepsis risk. The first 24 hours of life were identified as the most critical for prognosis.

Conclusion: Colostrum quality, efficiency of passive transfer, gestation period, parturition conditions, and shelter hygiene were key prognostic factors. Early evaluation within the first 12 hours postpartum and monitoring during the first 7 days are recommended to improve outcomes in neonatal foals.

Keywords: equine neonatal pathology, foals, septicemia, passive transfer failure (PTF), colostrum.

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THE ROLE OF MESENCHYMAL STEM CELLS IN MATERNAL RECOGNITION OF PREGNANCY DURING THE PRE-IMPLANTATION STAGE IN CATTLE

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Introduction: The successful establishment of early pregnancy in ruminants requires precise molecular communication between the developing conceptus and the maternal endometrium. MSCs represent multipotent stromal cells with regenerative and immunomodulatory properties and are key modulators in this bidirectional signalling.

Aim: This review explores the critical role of mesenchymal stem cells (MSCs) in maternal recognition of pregnancy (MRP) during the pre-implantation stage in cattle, under both physiological and pathological conditions.

Results: The importance of MRP in bovines is discussed and the high rate of embryonic loss during the pre-implantation period, due to failures in embryo-endometrial communication is highlighted. The origin, biological properties, and immune-regulating capabilities of MSCs is presented, especially for those derived from endometrial, bone marrow, and fetal tissues. The ability of MSCs to migrate, differentiate, and interact with inflammatory signals makes them indispensable in maintaining an immunotolerant environment necessary for conceptus survival. Furthermore, the involvement of MSCs in modulating cytokine networks (IL-6, LIF, IFN- τ) is discussed, emphasizing their influence on local immune responses and tissue remodelling during embryo elongation and attachment. The paper also reviews current research on the therapeutic use of MSCs in treating uterine pathologies like endometritis and metritis, as well as other disorders that impair fertility in dairy cows. MSC-based therapies, including their secreted extracellular vesicles, are promising as they reduce inflammation and restore tissue function without triggering immune rejection.

Conclusions: By synthesizing recent findings, this work supports the hypothesis that MSCs play a dual role: facilitating maternal-fetal communication and offering a novel therapeutic alternative for reproductive disorders in cattle. Their low immunogenicity and regenerative potential make them promising candidates for improving reproductive success and reducing economic losses in livestock farming.

Keywords: mesenchymal stem cells, endometrium, cattle, pregnancy recognition

DESIGNING A MINIMALLY INVASIVE SURGERY COURSE: A QUESTIONNAIRE-BASED STUDY IN ROMANIA

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Introduction: Minimally invasive surgery (MIS) demands targeted training due to its complex, costly equipment and counterintuitive skills. While some surgeons view MIS as time-consuming and challenging, they acknowledge its benefits for patients and the importance of maintaining high standards of care, often reinforced by residency requirements. Educational programs face challenges, including scheduling, motivation, team availability, and financial constraints.

Aims: This observational study aimed to develop a structured program tailored to the needs of veterinarians in Cluj County.

Materials and Methods: Using Google Forms, two electronic questionnaires were created and distributed: one for veterinarians (36 items) and one for veterinary students (37 items), covering demographics, surgical experience, MIS knowledge, interest, and course preferences regarding time, infrastructure, teaching methods, personnel, and costs. The veterinarians' questionnaire, in Romanian, was distributed from July 2023 to April 2024, while the students' version, in English, was completed in April 2024 to include all teaching lines. Responses helped design the course in line with international standards, considering financial constraints, scheduling, resources, and participant skill levels.

Results: The responses showed a high interest in MIS among both groups, but a lack of formal training and a perceived lack of knowledge, with no respondents considering themselves to have sufficient and up-to-date information on the topic. Based on this feedback, a structured, four-phase training program was proposed, incorporating simulators, cadavers, and live animals, with a focus on supervised practical sessions and a dedicated training space.

Conclusion: The proposed four-phase course is well-aligned with the preferences and practical needs identified by the respondents, and it further suggests that implementing such a program would be both successful and financially viable, ultimately contributing to the advancement of veterinary surgical standards in the region.

Keywords: minimally invasive surgery, training, veterinary surgery

SANDBLIES (DIPTERA: PSYCHODIDAE) IN ROMANIA: IS ACTIVE SURVEILLANCE NECESSARY?

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Introduction: Phlebotomine sand flies (Diptera: Psychodidae) are vectors of *Leishmania infantum*, the main cause of zoonotic leishmaniasis in the Mediterranean basin. In Romania, three of the eight historically recorded sand fly species are competent vectors, and recent cases of autochthonous canine leishmaniasis highlight the need for updated surveillance. Recent studies compared the historical record (1910-1971) with more recent data (2013-2025) in order to assess sand fly diversity, distribution, host-feeding preferences and the presence of *L. infantum*, Toscana virus (TOSV) and Sandfly fever Sicilian virus (SFSV).

Aims: Taking into account the known data on sand fly distribution, diversity, seasonal activity and vectorial role, we consider that active surveillance of the sand flies is necessary in Romania.

Materials and Methods: Between 2013 and 2021, sand flies were collected from 132 sites in multiple counties using light traps, aspirators and sticky traps.

Results: Of 1,868 collected specimens, most were *Phlebotomus neglectus* (89.5%) and *Ph. perfiliewi* (10.2%) with smaller numbers of *Ph. papatasi*, *Ph. balcanicus*, *Ph. sergenti* s. l., *Sergentomyia minuta* and the newly described *Ph. simonahalepae*. Seasonal peaks were observed in July (*Ph. neglectus*) and August (*Ph. perfiliewi*). Sand flies were newly recorded in Călărași County in July 2025, with research on species composition currently ongoing. Pathogen screening was negative so far (*L. infantum*, TOSV and SFSV) for all tested specimens.

Bloodmeal analysis (n = 74) revealed opportunistic feeding patterns on both domestic and wild hosts. *Ph. neglectus* fed mainly on cattle (34%), humans (22%), while *Ph. perfiliewi* fed predominantly on horses (80%).

Conclusion: Overall, six of the eight historically reported species remain present in Romania, though with different distributions. While no pathogens were detected, the opportunistic host range and presence of competent vectors in Mediterranean- influenced regions underscore the risk of disease re-emergence. Continued surveillance is essential to monitor sand fly dynamics and evaluate their role in the pathogen transmission.

Keywords: Sand flies, distribution, *Leishmania infantum*, Romania

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SESSION 8: GEODESY, FORESTRY AND APPLIED EXACT SCIENCES

NEW MODELING APPROACH TO ASSESS EROSION INTENSITY AND RUNOFF IN BRAZIL, MOROCCO, MONTENEGRO, SERBIA, NEPAL, AND IRAN

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Introduction: Soil erosion, driven by water and wind, is a major environmental threat to land productivity and ecosystem stability. Accelerated by human activities and climate change, it causes severe soil losses across Europe, Africa, Asia, and the Americas, with significant economic and ecological consequences. To overcome the limitations of traditional methods, this study applies a modernized IntErO model to assess erosion intensity and runoff in small and medium watersheds worldwide.

Aims: The objective was to test, and apply new modelling techniques in small and medium watersheds worldwide, to quantify soil erosion intensity and evaluate runoff.

Materials and Methods: The research covered representative watersheds across six countries: Brazil, Morocco, Montenegro, Serbia, Nepal, and Iran spanning Mediterranean, continental, semi-arid and arid, tropical, and mountain climates. Morphometric, geological, pedological, vegetation, and climate data were compiled from national databases and field surveys. We integrate elements of the EPM Method with modern computer-graphic techniques. Twenty-six watershed inputs (morphometry, geology, land use, hydrometeorology) were processed to calculate twenty-two outputs, including erosion coefficients, runoff, sediment yield, and soil losses. Field investigation by the local teams provided validation through visual assessments and photographic documentation.

Results: Modelling results demonstrated that land use has a key impact on erosion intensity. Estimated soil losses across the study areas ranged from 88.7 to 1,899 m³ km⁻² yr⁻¹, with the highest values observed in steep Mediterranean basins.

Conclusion: The study confirmed that land use is the main driver of erosion intensity, with bare lands, plough-lands, and degraded forests posing the highest risks. The upgraded IntErO model proved reliable and adaptable across diverse climates for assessing erosion and runoff. By quantifying soil losses under various scenarios, it offers practical guidance for reforestation and sustainable agriculture, supporting effective watershed management and soil conservation under climate change.

Keywords: soil erosion; land use; watershed management; runoff modelling

EVALUATING SOIL LOSS UNDER CLIMATIC VARIABILITY: A CASE STUDY FROM THE NATIONAL PARK BIOGRADSKA GORA, MONTENEGRO

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Introduction: Soil erosion is closely linked to climate variability, with temperature and precipitation strongly influencing soil loss, water quality, and land productivity. Understanding these dynamics is crucial for watershed management and soil conservation. The Biogradska River Basin in northern Montenegro provides a case for examining how climate shifts affect erosion intensity and catchment resilience.

Aims: The primary goal of this study was to assess whether notable climatic changes between 2002 and 2024, marked by a rise in average annual air temperature and a reduction in precipitation, and had a measurable impact on erosion intensity within the studied Basin.

Materials and Methods: The study applied the IntErO model developed by Spalević, to evaluate erosion processes in the Biogradska River Basin. Key meteorological inputs included average annual air temperature and precipitation data for the reference years 2002 and 2024, obtained from national monitoring sources. These parameters were integrated with catchment-specific morphometric and land use characteristics required by the model. The outputs provided estimates of annual production of erosion material (Wgod), real soil losses (Ggod), soil losses per unit area (Ggod/km²), and the erosion coefficient (Z), enabling comparison of erosion dynamics across the two time periods.

Results: Changes in erosion intensity were moderate. Average annual air temperature increased from 5.05 °C to 10.9 °C (+5.85 °C), while annual precipitation decreased from 1962 mm to 1766 mm (–196 mm). The temperature coefficient of the region rose from 0.78 to 1.09 (+0.31). Annual production of erosion material increased from 16,153.58 m³ to 20,391.83 m³ (+4,238.25 m³). Real soil losses rose from 5,864.07 m³ to 7,402.64 m³ (+1,538.57 m³), while specific soil losses per unit area grew from 207.36 to 261.76 m³/km² per year (+54.4 m³/km² per year). The value of 207.36 m³/km² year^{–1} indicates that this is a region of very weak erosion.

Conclusion: The results suggest that, although climate conditions changed substantially, the erosion processes in the studied basin intensified only slightly, remaining within the range of weak erosion. The upgraded IntErO calculations confirm the resilience of the catchment under varying climatic regimes. Continuous monitoring remains essential for preserving soil resources and mitigating potential future risks.

Keywords: climate variability; erosion intensity; IntErO model; soil loss; watershed resilience

SOIL LOSS AND EROSION DYNAMICS UNDER CLIMATE CHANGE: A CASE STUDY FROM THE BISTRICA RIVER BASIN, MONTENEGRO

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Introduction: Erosion processes are strongly influenced by climatic variability, particularly changes in temperature and precipitation. Understanding how these factors affect soil loss is crucial for sustainable watershed management, soil conservation, and climate change adaptation. The Bistrica River Basin (Bijelo Polje, North Montenegro) provides an important case study for assessing the resilience of erosion processes under changing climate conditions.

Aims: The main objective of this study was to determine whether significant climatic changes between 2010 and 2024, an increase in average annual air temperature and a decrease in precipitation, affected erosion intensity in the Bistrica River Basin.

Materials and Methods: The analysis was conducted using the IntErO model of Spalevic (based on the Erosion Potential Method of Gavrilovic). Hydrometeorological data for 2010 and 2024, including average annual air temperature and precipitation, were used as key input parameters. Model outputs included annual erosion material production (Wgod), real soil losses (Ggod), soil losses per unit area (Ggod/km²), and the erosion coefficient (Z).

Results: Despite pronounced climatic shifts, the changes in erosion intensity were minor. Annual erosion material production increased slightly from ~128,100 m³ to ~128,800 m³, real soil losses rose from ~56,100 m³ to ~56,500 m³, and specific soil losses per unit area from 269.45 to 270.98 m³/km² per year. In both years, the erosion coefficient remained $Z = 0.370$, classifying the basin within the IV destruction category, characterized by weak, intrusive erosion.

Conclusion: The findings suggest that, although the Bistrica River Basin experienced substantial climatic changes between 2010 and 2024, erosion intensity remained stable. This indicates a relative resilience of the basin to climate variability. Continued monitoring is essential to validate this stability under future climate scenarios and to inform regional strategies for soil and water resource management.

Keywords: climate variability; erosion intensity; IntErO model; soil loss; watershed resilience

TEN MINUTES CITY CONCEPT THROUGH GEOGRAPHICAL INFORMATION SYSTEM

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Introduction: The last decade is has characterized by the expansion of urban areas. In this context, the distances between various points of interest within such urban agglomerations can create challenges for residents. Fifteen minutes city or newer ten minutes city concepts has used for a resilient development that takes into account the needs of residents. 10' walk or bike rides from residents home has emphasises proximity by reducing the time spent in traffic and promote a more sustainable life style.

Aims: The aim of this research is to highlight pedestrian access routes within the urban planning of several cities with different urban organizations. The cities we took into account are Cluj-Napoca, București, Zurich, Paris, Barcelona, and Zwolle. Each location has a certain number of facilities in a maximum distance of 800 m or 10-minutes walk.

Materials and Methods: For each considered cities have been implemented geographical information systems that include transportation network. The facilities like restaurants, coffee shops, school and hospitals situated in 800m by a randomly chosen point were emphasized. Topographic measurements necessary for the implementation of the transportation network have carried out for Cluj-Napoca, the ZIP10PRO total station from Geomax was used for data acquisition. The design of the GIS have used open source data for all other mentioned cities.

Results: Paris and Barcelona have a very well developed public transport infrastructure. Bucharest, which is a city of similar magnitude to them, is closer, at least quantitatively, to Zurich, a much smaller city. Cluj-Napoca and Zwolle are, less developed, being much smaller too. Comparing a total number of facilities available, similar trend occurs, but this time with Barcelona in first place, followed by Paris and Bucharest.

Conclusion: The relief has been an important factor in the development of the municipality. Cities like Cluj-Napoca have a more limited development on the North-South axis, while cities like Bucharest have enjoyed the possibility of open neighbourhoods.

All mentioned cities have the potential to improve but it takes time to design and execute the details. Global warming offers the possibility of accelerating the concept of 10 minutes cities for the near future.

Keywords: GIS, network analysis, pedestrian routes, smart cities.

HIGHLIGHTING THE ECONOMIC AND FINANCIAL LOSSES IN ECOSYSTEMS, WITH SPECIAL REFERENCE TO THE FOREST ECOSYSTEMS OF THE BÂRGĂU MOUNTAINS

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Introduction: At the moment, the disruptions (mainly negative ones) in the social & economic systems have fewer short-term solutions, and the medium and long-term ones disregard the greater sustainable development at micro, meso and macrolevels.

Aims: The economic and financial losses registered in such eco-systems, affected by disruptions of the instability and integrity, lead, in most cases, to major climate changes, especially at regional level and in the local zones, with unexpected, diverse and sometimes irreversible implications for the ecological environment. A quantifiable value for such losses, which are both quantitative and qualitative, in a specific case (the losses in terms of Norway spruce, *Picea abies*, forests affected by biotic and abiotic factors in the Bârgău Mountains) may provide new approach methods.

Materials and methods: Three of the four ecosystems are located in the Management Units (working circle) II Iliuța from the Tihuța-Colibița RA Forest District, in the sub-divisions: 75 C and 662 B, for which research has been conducted on the 60 year-old- ecosystem, and 363 D, where the ecosystem is 120 years old. Research method used is observation and experiment and statistical interpretation.

Results: Forest ecosystems are affected quantitatively by several destabilizing factors, in particular due to the action of wind and snow and the quality of the wounds caused by the large game, by way of a decrease in the wood (bears, deer).

Conclusion: This is the view which interests us: the economic and financial losses may be quantifiable in terms of effects of the disruptions caused, a ‘snowball’ effect, with larger damages (losses) in the adjacent zones or downstream of the Bârgău Mountains (a situation that can be generalized).

Keywords: cause-effects, climate changes, disturbance, economic losses, ecosystems

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SALMONIDS PRODUCTIVITY ESTIMATION ON VASER RIVER (COZIA-PALTIN SECTOR), MARAMUREȘ COUNTY, ROMANIA

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Introduction: Vaser river is located in the Maramureșului Mountains, is a tributary of the Vișeu river and is part of the fishing fund Făina-Vaser. The salmonids fauna of Vaser river is represented by indigenous trout (brown trout) (*Salmo trutta*), grayling (*Thymallus thymallus*) and huchen (*Hucho hucho*) (Cristea, 2007).

Aims: The purpose of the present study is to determine the salmonids productivity of Cozia-Paltin sector of Vaser river, Maramureș county, Romania

Materials and Methods: The researches have been conducted on a sector of 3.1 km. Estimating salmonids productivity requires determining the biogenic capacity and other parameters of the river (bed width, habitat factor). The determination of the biogenic capacity was established according to the method elaborated by National Institute for Research and Development in Forestry „Marin Drăcea”, Romania, analysing the abiotic, biotic and anthropic factors which influence the salmonids production (Cristea, 2004, 2007).

Results: After analysing the field data, we established a 68 average score for the entire sector, thus, the biogenic capacity on the investigated sector being VII, a class belonging to the category of medium-rich waters. The established salmonids production is 29.79 kg/km of river.

Conclusion: The river bed construction works (floored waterfalls, anchored trees placement, small lakes for fry, juvenile trout population), salmonids fry introduction and river protection represent premises for the increase and amelioration of salmonids productivity, of the ecosystem they belong to, which, in time, determine a substantial economic contribution by selling fishing authorizations and also by developing zonal tourism, by promoting nature and its resources long-lasting management.

Keywords: salmonids productivity, *Salmo trutta*, piscicultural stock, fishing, river bed construction works.

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ADVANCING SOIL EROSION MODELING WITH THE INTERO MODEL: CASE STUDIES IN ROMANIA AND FUTURE PERSPECTIVES WITH HIGH-RESOLUTION GEOSPATIAL DATA

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Introduction: Soil erosion is a major environmental challenge, reducing agricultural productivity, water quality, and ecosystem stability. In Romania, hilly landscapes are highly vulnerable, with land use changes accelerating sediment yield and runoff. The Intensity of Erosion and Outflow (IntErO) model, based on the Erosion Potential Method, was recently applied in Cluj County to assess watershed-scale erosion. Results confirmed its value for quantifying soil loss and planning conservation, though reliance on SRTM DEM and CORINE data limits accuracy in complex terrain.

Aims: This study integrates Romanian case studies with future perspectives for enhancing IntErO through precision geospatial data. Objectives include validating applicability across varied settings and improving outputs with high-resolution DEMs and satellite-based land use data.

Materials and Methods: Three Cluj County basins were analyzed using GIS parameters and climate data as IntErO inputs. Building on this, the project incorporates Landsat-based land use mapping (1990–2025), NEXTMap and LiDAR DEMs, and calibration with sediment gauges, ensuring more detailed representation of terrain, vegetation, and hydrology.

Results: Romanian applications showed that relief and land use drive sediment yield, confirming IntErO's reliability. Tests with higher-resolution data reveal notable differences in predicted runoff and soil loss, stressing the role of accurate datasets for scenario modeling.

Conclusion: Combining applied studies with methodological advances establishes IntErO as a robust tool for soil erosion research. Integrating precise geospatial data will strengthen land management, conservation planning, and policy support across diverse Eastern European landscapes.

Keywords: Erosion potential, GIS, IntErO model

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SMART TECHNOLOGIES SHAPING THE FUTURE OF URBAN TREE MONITORING

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Introduction: Urban green areas are fundamental to city ecosystems, ensuring microclimatic regulation, biodiversity preservation, and improved air quality. Traditional tree inventory methods, based on field observations and GPS equipment, are often constrained in terms of efficiency and accuracy, particularly in dense urban environments (Păunescu *et al.*, 2019). Advances in scanning technologies now allow for highly detailed spatial data acquisition. Simultaneous Localization and Mapping (SLAM), originally designed for autonomous robotics, has proven valuable in vegetation monitoring through its ability to generate precise three-dimensional models without reliance on GNSS infrastructure (Durrant-Whyte & Bailey, 2006). LiDAR technology, applied both terrestrially and from UAS platforms, further supports the extraction of essential biometric parameters, enabling structural analysis of urban trees at unprecedented levels of accuracy (La Rue *et al.*, 2020).

Aims: The present research investigates the integration of advanced scanning technologies as SLAM, airborne and terrestrial LiDAR, and GNSS control measurements into a unified framework designed to improve the assessment and long-term monitoring of urban tree stands.

Materials and Methods: The case study was conducted within the USAMV Cluj-Napoca campus, using mobile SLAM scanning (Feima Robotics SLAM 100), UAS LiDAR surveys, GNSS ground control points, and auxiliary data collected with smartphone applications. Processing and analysis were performed with specialized software (SLAM GoPostPro, Pix4DSurvey, LiDAR360, Global Mapper, PointCab), enabling the extraction of interest parameters (tree height, crown geometry, trunk diameter) and the creation of detailed spatial models.

Results: The combined use of SLAM and LiDAR technologies produced high-density point clouds, allowing accurate reconstruction of arboreal structures and improved spatial positioning of individual trees. Comparative validation against earlier surveys emphasized the higher accuracy, efficiency of data acquisition, and adaptability of these technologies to urban conditions with dense or fragmented vegetation.

Conclusion: The study confirms that the integration of modern scanning technologies offers a reliable alternative to traditional tree inventory methods. Their application supports sustainable urban planning, contributes to the coherent management of green infrastructure, and provides a methodological basis for extending the use of sensor fusion and autonomous systems in environmental monitoring.

Keywords: Arboreal vegetation, GNSS, LiDAR, SLAM, urban monitoring.

OCCURRENCE AND DISTRIBUTION OF THE INVASIVE *OXYCARENUS LAVATERAE* (HEMIPTERA: LYGAEIDAE) IN THE CENTRAL AREA OF BISTRIȚA TOWN

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Introduction: *Oxycarenus lavaterae* (Fabricius, 1787), commonly referred to as the lime seed bug, is a West Mediterranean fauna element that was firstly reported in Romania in 2008. Due to its invasiveness and climate change, it is rapidly spreading in urban areas of the country, particularly colonizing lime trees (*Tilia* spp.) in parks and gardens.

Aims: The objective of this study is to map the distribution and estimate and the population size of *O. lavaterae* in the town of Bistrița.

Materials and Methods: The observations were carried out in the spring of 2024, when the colonies were clearly visible on the trunks and thick branches of the trees. The mapping was systematic, covering all streets and green areas in the central part of the town. The position of each tree, on which colonies were identified, was recorded with a Garmin Montana 650 GPS receiver. The data collected for each sampling point was the following: tree species, estimated age based on trunk circumference, arrangement of colonies on the tree (trunk, crown), and estimated population size per tree, depending on the number and size of colonies, on a scale of 1 to 3 (1: small population; 2: medium population; 3: large population).

Results: The species is present mostly on trees of *Tilia tomentosa*, but was also observed on a few specimens of *T. cordata*. The age class of most trees is in the range of 25-45 years, but colonies are also present on older trees, between 90 and 110 years old. The populations are medium-sized and concentrated in the trunk's upper part and the crown's lower part.

Conclusion: The species *O. lavaterae* was observed on a number of 145 lime trees, along the main streets, and to a lesser extent in the public parks of the town.

Keywords: tree alignments, lime trees, ornamental species, green areas, insect populations

NORMING OF TIMBER HARVESTING AND EXTRACTION OPERATIONS USING DIVERSE TECHNOLOGIES IN FELLING AREA 152 GUGA

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Introduction: The determination of time standards in forest operations is an important process for planning and optimizing activities, providing an objective basis for evaluating operational efficiency and costs. The development of these standards is complex, as timber harvesting and extraction processes are influenced by variable factors such as operator-specific characteristics, technological features, stand structure, and site conditions (Kamiński et al., 2020).

Aims: The paper aims to standardize timber harvesting and extraction activities in felling area 152 Guga, compartment 82F, UP I Rugăsești, through a detailed analysis of work cycles based on the technologies employed. The objective is to develop time standards (local norms) aligned with field conditions to optimize the planning of logging operations.

Materials and Methods: The present study has an applicative character and was conducted in a forest area characterized by average slopes of approximately 20°, variable accessibility (501–1000 m), and a current stand composition of 6MO1PAM1FA1CA1PLT. Timber harvesting was carried out using Stihl MS 500i chainsaws, while extraction operations employed a TAF-690 PE skidder and a Fiat Agri 980 DTH agricultural tractor adapted for forestry work. Data were collected through direct observation and time-motion studies, including measurements of work cycle duration, extraction distances, transported volumes, and terrain slope

Results: The analysis of work cycles allowed for the establishment of accurate time standards for each technological stage, highlighting the influence of site factors on productivity. The equipment used demonstrated good adaptability to the conditions of the forest compartment, ensuring a balance between operational efficiency and resource conservation.

Conclusion: The study emphasizes the importance of standardizing logging activities based on actual field conditions. The results provide technical support for operational planning and may contribute to improving economic efficiency and sustainability in timber harvesting.

Keywords: time standards, logging operations, factors, technologies, measurement

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UTILITY NETWORK MANAGEMENT IN ARCGIS PRO FOR THE GRUIA NEIGHBORHOOD, CLUJ-NAPOCA

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Introduction: Geographic Information Systems (GIS) provide a robust framework for the monitoring and management of water supply and sewerage infrastructure. Both nationally and internationally, public administrations have progressively expanded the scope of GIS-based applications. In Romania, water and sewerage utilities increasingly integrate GIS technologies within analytical programs aimed at optimizing and assessing water distribution systems.

Aims: The objective of this study is the development of a utility network in the Gruia neighborhood, located in the city of Cluj-Napoca. The network consists of a branching system designed to distribute water and sewerage services to local consumers. The growth and functionality of an urban area are closely linked to the availability and quality of utility infrastructure, including water supply, sewerage, gas, and electricity networks. The utility network presented in this paper specifically includes the water supply and sewerage systems serving the Gruia neighborhood.

Materials and Methods: Geospatial data acquisition was conducted in the field using high-precision GPS equipment. The processing and visualization of the data involved two primary software platforms: AutoCAD, employed for generating technical and engineering drawings, and ArcMap, utilized for spatial analysis and cartographic representation of utility networks. Furthermore, ArcGIS Online was integrated to facilitate the publication and dissemination of web-based interactive maps, enhancing accessibility and collaborative use of geographic information

Results: The creation of utility network-specific maps enables a comprehensive visualization of all network components, along with their classifications, thereby facilitating the extraction of critical information in the event of malfunctions or infrastructure failures.

Conclusion: Web-based platforms provide users with real-time access to the database both from office environments and directly in the field, ensuring compatibility across multiple device types. This functionality allows for on-site data updates, supporting efficient management of emerging issues. The web applications incorporate various basemaps, a comprehensive set of data layers many of which include interactive pop-up windows containing attribute information as well as spatial query tools, analytical functions, and navigation controls for map interaction

Keywords: GIS, sewerage infrastructure, ArcGIS Online

A SENSORIAL APPROACH TO MICROCLIMATE DYNAMICS: TEMPERATURE, HUMIDITY AND THEIR IMPLICATIONS FOR DAMPING-OFF INCIDENCE IN SCOTS PINE (PINUS SYLVESTRIS L.) SEEDLINGS UNDER PROTECTED CULTIVATION

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Introduction Studying the influence of microclimates in grow tents on Scots pine (*Pinus sylvestris*) seedling development is a growing field with potential to improve forest regeneration practices, especially in temperate regions. Microclimatological conditions in grow tents, such as temperature and humidity, play a crucial role in seedling vigor and resilience to environmental stressors.

Aims: This paper aimed to identify key microclimate elements in grow tents that directly affect the development and phytosanitary status of Scots pine seedlings.

Materials and Methods: The study was conducted in 2024 at the Lechința Experimental Base, in a grow tent containing Scots pine cultures arranged in 4 replications and 8 variants. The variants were placed in boxes with a nutrient bed volume of 0.03 m³ and a usable surface of 0.2 m². To monitor and maintain optimal conditions, digital tools such as infrared cameras, display data loggers, soil data loggers, and smart sockets were used.

Results: The main microclimate factors influencing seedling health and the incidence of damping-off disease were temperatures at soil level and at 1.3 meters height, along with air humidity at the onset of seedling emergence. Significant seedling losses due to disease occurred when soil temperatures ranged from 15°C to 22°C, air temperatures from 16°C to 26°C, soil humidity from 29% to 35%, and air humidity from 75% to 86%.

Conclusion: Average conditions maintained for 4 to 6 consecutive days—soil temperatures of 15°C–22°C, air temperatures of 16°C–26°C, soil humidity of 29%–35%, and air humidity of 75%–86%—led to the occurrence of damping-off disease in Scots pine seedlings.

Keywords: sensors, temperatures, humidity, "dumping off"

MAPPING OAK SEEDLING HEALTH: NDVI CHARACTERIZATION OF POWDERY MILDEW IN VALEA IUȘULUI NURSERY

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Introduction Detecting powdery mildew disease in oak seedlings using drone technology is an emerging approach that allows efficient and precise monitoring of seedling health in nurseries and afforested areas. This is increasingly important given the growing biotic stresses, including powdery mildew caused by pathogens such as *Erysiphe* spp.

Aims: This study aimed to identify NDVI indices that characterize the reflectance of second-year sessile oak (*Quercus petraea*) seedlings affected by powdery mildew in the Valea Iușului nursery.

Materials and Methods: The research was conducted in 2024 at the Valea Iușului nursery, part of the Lechința Experimental Base, on a second-year sessile oak crop. Drone flights were performed using a DJI Phantom 4 drone with a multispectral camera at 10 meters altitude, in hover mode. Photographs were captured with 80% front overlap and 75% side overlap.

Results: Analysis of orthophotos and NDVI images showed that the spectral response of infected seedlings ranged from 0.400 to 0.650 NDVI, depending on infection severity.

Conclusion: NDVI values decreased as the severity of powdery mildew increased. Indices between 0.400 and 0.500 indicated moderate to severe infection, while values between 0.500 and 0.650 reflected mild to moderate infection.

Keywords: NDVI, Drone, Sessile oak powdery mildew

OPTIMIZING LOGISTICAL DEPOT PLACEMENT USING NETWORK ANALYSIS

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Introduction: Efficient logistics—optimal depot placement and extraction routes—is crucial for forest harvesting, impacting costs and environment. Traditional planning tools can be limited in addressing the complexity of forest terrains and existing road networks. This paper presents a software application using geospatial and network analysis to optimize these processes, enhancing decision-making in forestry.

Aims: This research develops an application to determine optimal timber depot placement and efficient extraction routes, minimizing transport distance, effort, and fuel. Objectives: (1) implement algorithms for maximum gradient paths from unit centroids to roads and (2) calculate route lengths, volumes, considering road gradient and timber weight.

Materials and Methods: The application was developed in Python and requires vector files containing the spatial and attribute data for the forest parcels, existing or potential locations for timber depots and the existing road infrastructure. A function traces maximum gradient paths from unit centroids to roads. This solves what is commonly called “collecting”, representing the initial step of forest harvesting operations, albeit in a simplified manner. The road network converts to a *networkx* graph for optimal route/length calculation, integrating timber volumes, road sections, gradient, and timber weight for complex depot optimization.

Results: The application efficiently processes geospatial data, generating optimized extraction routes with detailed transport distances and timber volumes. The approach identifies realistic access paths in difficult terrains, connecting forest units to the road network. Analysis of volumes and route lengths improves exploitation logistics. These results enable precise planning, optimizing transport costs and reducing environmental impact via efficient depot placement and shortest routes.

Conclusion: This application is a valuable tool for forestry professionals, optimizing timber depot placement and extraction routes. Integrating geospatial and network analyses, it promotes sustainable, economic forest resource management, ensuring operational efficiency and reduced environmental impact.

Keywords: timber extraction routes, forest harvesting, network analysis.

IOT APPLICATIONS IN FOREST ECOSYSTEM MONITORING: A SYSTEMATIC LITERATURE REVIEW IN THE CONTEXT OF CLIMATE CHANGE AND BIODIVERSITY CONSERVATION

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Introduction: Forest ecosystems are vital for climate regulation and biodiversity conservation but face increasing stress from drought, temperature extremes, and anthropogenic pressures. IoT (Internet of Things) technologies enable real-time ecological monitoring through continuous data collection (Murugaperumal et al., 2023; Torresan et al., 2021).

Aim: This study explores IoT applications for early detection of stress factors (microclimatic variation, humidity, temperature) affecting forest health, aiming to outline a functional framework for pilot implementation.

Material and Methods: A systematic literature review (2020–2025) was conducted following PRISMA guidelines. Searches in Scopus, Web of Science, and IEEE Xplore used keywords such as “IoT,” “forest monitoring,” and “smart forestry.” Peer-reviewed studies applying IoT sensor networks to forest ecosystems were included.

Results: IoT technologies have been applied to monitor temperature, humidity, CO₂, and atmospheric dynamics. Integration with AI algorithms enhances predictive capacity. Wireless sensor networks using LPWAN standards (LoRa, SigFox) improve transmission range and energy efficiency, making them suitable for remote areas.

Conclusion: IoT-based monitoring offers an innovative pathway for sustainable forest management, enabling early detection of ecological stress and helping prevent biodiversity loss. Pilot deployment in Romanian protected areas is recommended as a scalable model for European forestry.

Keywords: Humidity, IoT, Sensor forests, Smart forest, Temperature.

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THE ROLE OF LAND SURVEYING IN SHAPING SUSTAINABLE REGIONS

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Introduction: Land surveying represents the activity of measuring and mapping the physical features of the land and supra-structures to obtain their boundaries, elevations, and spatial locations. This is essential data for land development, construction field and legal property ownership. Land and building monitoring is a key surveying activity which plays a significant role in shaping sustainable regions. There can be identified areas prone to subsidence, landslides, floods, earthquakes, and other natural disasters and therefore zoning laws and disaster preparedness strategies can be drawn up. Moreover, it can provide critical data to prevent or assess damage and guide adaption strategies and reconstruction efforts sustainably.

Aims: The case study of the present paperwork refers to the "Horea, Cloșca, and Crișan" Obelisk in Alba Iulia. The main goal of the topographic structural monitoring of the obelisk using modern methods and techniques is to measure, process, and interpret parameters that define the structure strength, stability, and durability.

Materials and Methods: The repeated geodetic measurements in the monitoring geodetic network proved that the obelisk suffers considerable leaning deformations. The obtained parameters are considered in preservation of the obelisk as part of the cultural heritage, ensuring structural integrity and safety, assessing environmental impact.

Results: The results of the study could be used in further research and restoration and improve tourism and economic value.

Conclusion: Accurate spatial data and analysis integrates modern technologies for efficient planning, development, and management of urban spaces, and therefore to achieve smart urban sustainability.

Keywords: Displacements and deformations, land surveying, repeated geodetic measurements, smart urban sustainability

ETHOLOGY AND IMPACTS OF WILD BOAR DEALU MARE – LĂPUȘTEȘTI

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Introduction: The study area is located on a mountain ridge with forested slopes, from which wild boars (*Sus scrofa*) frequently move into agricultural lands for foraging. In the regions of Lăpuștești and Dealu Mare, extensive damage to potato crops has been reported, causing tensions between local farmers and wildlife.

Aims: This study aims to document wild boar activity, feeding preferences, and movement patterns in the study area, to analyze the relationship between forest proximity, vegetation cover, and the extent of agricultural damage, and to identify key activity areas in order to propose management measures that could reduce crop losses and mitigate conflicts between wildlife and local communities.

Materials and Methods: Nighttime observations were conducted between 21:00 and 06:00, based on literature indicating that wild boars are most active during twilight and nighttime hours, particularly in areas with hunting pressure. Camera traps were used to complement direct observations, with the first sightings recorded around 21:00. Daytime forest walks were performed to locate tracks, rooting areas, resting sites, and rubbing trees, and these findings were mapped to identify zones of frequent activity. Crop damage data were collected in potato and rye fields, and their proximity to forest edges and vegetation cover was analyzed to determine correlations between habitat features and damage intensity.

Results: Approximately 20 wild boars were identified through direct sightings and signs of activity. Activity levels decreased between midnight and 02:00, a trend confirmed by camera trap data. Crop damage was highest in fields located less than 50 meters from the forest edge, especially in areas with dense vegetation cover. In mid-July, when rye crops ripened, wild boars shifted feeding preference from potato fields to rye, flattening up to 50% of rye fields and extending their activity farther from forested areas. Three primary areas of activity were identified: the feeding site, the forest north of the road, and two locations beneath a grass and heather pasture with nearby water sources. Field observations also suggested that wild boars might use fences as cover to access agricultural fields, though further data are required to confirm this behavior.

Conclusion: The study shows a clear link between forest proximity, vegetation cover, and crop damage caused by wild boars. Long-term monitoring of population dynamics and seasonal movement is needed for better understanding. Measures like repellents, fencing, and crop rotation are labor-intensive and only partly effective. Coordinated efforts among farmers, foresters, and wildlife managers are essential to reduce conflicts and improve community engagement.

Keywords: wild boar, crop damage, camera trap, nocturnal monitoring, wildlife management

MONITORING THROUGH TOPO-GEODETIC MEASUREMENTS OF THE DISPLACEMENTS AND SETTLEMENTS OF THE OLD MINES AT PRAID SALT MINE AFTER NATURAL FLOODS

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Abstract: In the case of salt deposits, the main factors that contribute to the increase in the degree of instability of the voids created by exploitation and implicitly of the land surfaces related to the salt deposits are: the solubility of salt in freshwater, the presence and circulation of freshwater both on the salt spine and in the massif, the depth of the voids relative to the surface, the physical-mechanical characteristics of the deposit and the surrounding rocks.

Keywords: mine salts, monitoring, measurements

EXPLORING THE DYNAMICS OF AGRICULTURAL LAND IN ROAMANIA: AN IN DEPTH ANALYSIS

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Introduction: The dynamics of agricultural land markets play a critical role in shaping rural development, investment strategies, and agricultural productivity. In Romania, the agricultural land sector has undergone profound transformations following land restitution, EU accession, and ongoing structural changes in rural economies. Despite its importance, the Romanian agricultural land market remains insufficiently documented in terms of both its statistical and spatial characteristics.

Aims: The objective of this study is to provide a comprehensive analysis of Romania's agricultural land market by developing an integrated database of land sale offers and applying complementary statistical and spatial methods. The research aims to identify key pricing trends, regional disparities, and patterns of market behavior, while also highlighting the challenges and opportunities that characterize this sector.

Materials and Methods: A database was constructed by systematically collecting land sale offers from diverse regions of Romania, including essential variables such as location, price, and land characteristics. Statistical techniques were employed to examine pricing distributions, regional variations, and correlations between land attributes and market values. In addition, Geographic Information System (GIS) tools were applied to generate spatial representations of land sales, allowing for the identification of geographic patterns and regional hotspots of activity.

Results: The statistical analysis revealed significant heterogeneity in land pricing across Romania, with marked regional disparities reflecting differences in agricultural potential, infrastructure, and proximity to urban centers. Market behavior was characterized by both stability in certain regions and volatility in others, suggesting uneven levels of market maturity. GIS mapping reinforced these findings by illustrating clusters of high transactional activity in fertile, accessible areas, while also exposing regions with persistently low activity. The integration of spatial and statistical methods provided a multidimensional perspective on the functioning of the land market.

Conclusion: This study offers one of the most comprehensive perspectives to date on Romania's agricultural land market by combining statistical and GIS-based approaches. The findings underscore the complexity of land pricing dynamics and regional inequalities, while also pointing to opportunities for improved governance, targeted investment, and policy interventions. The insights generated are particularly valuable for policymakers, investors, and stakeholders seeking to navigate and optimize the development of Romania's agricultural land sector.

Keywords: Agricultural land market, Geographic Information Systems (GIS), Romania, Spatial analysis, Statistical methods

POSTER PRESENTATIONS

SESSION 1: AGRICULTURE AND ENVIRONMENTAL PROTECTION

SUGAR BEET INTEGRATED PESTS AND DISEASES MANAGEMENT IN CURRENT CLIMATIC CONDITIONS IN CENTRAL AREA OF ROMANIA

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Introduction: The European Union is a large producer of beet sugar, producing about 50% of the total amount worldwide (Nicodème *et al.*, 2018), sugar beet being also used for ethanol fuel and biogas production (Soare *et al.*, 2021).

Aims: The field experiment was carried out for analysing factors like climate conditions, presence and impact of diseases and pests.

Material and Methods: An experiment with ten sugar beet hybrids was conducted to the NIRDPSB Brasov between 2023-2024 to provide an integrated control strategy in actual climatic conditions. Frequency, intensity and degree of attack produced by some pests and diseases were analyzed.

Results: Treatments were applied to studied hybrids with different level of susceptibility to pests and diseases. The alternation of pesticides and a strict application reduce the initial inoculum and delay the emergence of resistant insects and pathogen. The percentage of different diseases intensity ranged from 5-25% and the percentage of pests degree of attack ranged from 10-30%.

Conclusion: The changes in diseases and pests dynamics caused by climate change emphasise the need for different control methods to ensure the resilience and viability of sugar beet crop.

Keywords: climate changes, pests and diseases, sugar beet, technology.

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COMPARATIVE ANALYSIS OF THE ECOLOGICAL FOOTPRINT OF CONVENTIONAL VERSUS SMART AGRICULTURAL SYSTEMS IN THE CURRENT CLIMATE CONTEXT

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Introduction: Agriculture plays a dual role in the climate crisis—both as a contributor to greenhouse gas emissions and as a potential solution through sustainable practices. The transition from conventional to smart agricultural systems offers opportunities to reduce environmental burdens while maintaining productivity. However, robust comparative assessments are needed to evaluate their true ecological impact.

Aims: The objective of this study was to compare the ecological footprint of conventional and smart farming systems, focusing on energy use, emissions, water consumption, and land efficiency, within the climate-affected regions of Romania.

Materials and Methods: The analysis included data collected from bibliographical sources. Climate databases from the past decade were included due to their relevance in assessing system resilience and adaptation performance.

Results: according to literature data, smart agricultural systems showed significantly lower ecological footprints per unit of output, primarily due to optimized input use, precision irrigation, and reduced soil disturbance. Emissions of CO₂-equivalent were lower compared to conventional systems. Water use efficiency and energy productivity were also markedly improved. Conventional farms exhibited higher variability under climate stress, with reduced yield stability.

Conclusion: The findings of our bibliographical research support the hypothesis of ecological and functional advantages of smart farming technologies under current and projected climate scenarios. The knowledge transfer is essential to facilitate the transition toward more resilient and climate-friendly agricultural practices.

Keywords: adaptation strategies, digital innovation, environmental impact, resource efficiency, yield stability.

NECESSITY OF SUPPLEMENTAL IRRIGATION FOR CHICKPEA IN HUNGARY: EFFECTS ON MORPHO-PHYSIOLOGY OF DIFFERENT VARIETIES

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Introduction: Increasing plant-based protein production seems vital to secure nourishment requirements for continuously increasing population worldwide. This can be partially achieved by cultivating suitable species in new regions. Chickpea is an important legume, the cultivation of which is under-estimated in Central and Eastern Europe. Studies on its adaptability and water requirements under the agroecological conditions of Hungary are very scarce. Suitable varieties for local cultivation are another question to answer.

Aims: Understanding the effects of supplemental irrigation on some morpho-physiological traits of 3 chickpea varieties sown in Debrecen/Hungary.

Materials and Methods: The experiment was implemented in 2024 and 2025 and was laid out in a randomized complete block design with 4 replicates. Supplemental irrigation was provided to 3 chickpea (Amorgos, Elmo, and Orion) varieties based on the daily meteorological data from the experimental field.

Results: Supplemental irrigation increased the normalized difference vegetation index (NDVI) in both Amorgos and Elmo varieties significantly. The leaf area index (LAI) and biomass of Elmo also increased significantly. Orion did not show measurable differences in any trait in response to supplemental irrigation. Regardless of the irrigation scheme, the morpho-physiological traits of both Elmo and Orion were noticeably better than their counterparts of Amorgos. However, the number of pods per plant, one of the most important yield component traits, was significantly higher in Amorgos and Orion than in Elmo, which might later reflect on the seed yield of each variety.

Conclusions: Supplemental irrigation for chickpea in the study area can enhance the morpho-physiology of certain varieties. However, the necessity of such practice for better yield and seed components is questionable, which our future research will focus on.

Keywords: Chlorophyll content, *Cicer arietinum* (L.), LAI, NDVI.

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YIELD STRUCTURE AND TUBER QUALITY AS INFLUENCED BY GENOTYPIC RESPONSE OF POTATO CULTIVARS UNDER CLIMATIC VARIABILITY

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Introduction: The increasing frequency of climatic extremes significantly affects total potato tuber yield, tuber size distribution and the number of tubers per plant, while also influencing physical quality traits.

Aims: The aim of this study is to evaluate the genotypic response of six potato cultivars under variable climatic conditions across two growing seasons, focusing on total tuber yield, yield distribution by size categories, starch and dry matter content, and key physical quality traits such as disease incidence, tuber deformation, sprouting, cracking and greening.

Materials and Methods: The study was conducted over two growing seasons (2023, 2024) under field conditions in Brașov county. For six potato cultivars, Castrum, Cezarina, Asinaria, Darilena, Sevastia, Ervant, in addition to total yield (t/ha), the number of tubers/m² was evaluated and categorized into four size classes. Tuber dry matter and starch content were determined, and physical quality characteristics were assessed.

Results: The tubers yield, the number of tubers/m², their distribution by size categories, dry matter and starch content varied depending on the cultivar and the climatic conditions of the year. The Cezarina cultivar stood out in 2024 with 42.88 t/ha, while the Sevastia cultivar had the lowest yield, 21.3 t/ha. The total number of tubers showed greater variability between cultivars under the climatic conditions of 2024, ranging from 73.3 tubers/m² for the Asinaria cultivar to 24.1 tubers/m² for the Sevastia cultivar.

Conclusion: The results of this study underscore the importance of selecting heat- and drought-resilient genotypes to maintain yield and tuber quality under variable climatic conditions.

Keywords: climatic variability, potato cultivars, quality.

Acknowledgements: This research work was financed from Project PN 23 19 02 01/2023 and Project ADER 5.1.5./17.07.2023

MICROWAVE-ASSISTED EXTRACTION OF ORANGE PEEL ESSENTIAL OIL: A PERFORMANCE EVALUATION

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Introduction: Orange essential oils (EOs) are widely used in food, pharmaceuticals, and cosmetics due to their aromatic and antimicrobial properties. Conventional hydro-distillation (HD) extraction often results in low energy efficiency, long extraction time, and degradation of valuable compounds. To address these limitations, microwave assisted hydro-distillation (MAHD) offers a greener, faster, and more cost-effective alternative, improving both the yield and quality of EOs while minimizing solvent use and thermal degradation.

Aims: The aim of this study was to optimize and evaluate the outcomes of key process parameters of MAHD (power and time) to obtain a higher yield of EO while minimizing energy consumption, and overall processing costs.

Materials and Methods: MAHD parameters were compared to HD in terms of extraction yield, quality of extracted EO and energy consumption. The microwave process parameters, time and power, of a 900W power-rated microwave oven at 2.45 GHz ISM band, were optimized by Bayesian parameter optimization targeting the EO yield. Additionally, the chemical composition of the obtained EOs was evaluated by Gas Chromatography Mass Spectrometry (GS-MS).

Results: The optimal extraction parameters for a maximum yield were obtained with a 900 W power-rated microwave oven at a 70% duty cycle during 30 min. Both the conventional HD and MAHD techniques showed a sigmoidal relationship between yield and time. Compared to the conventional HD, the MAHD was more effective in the first 30 min of extraction. However, this extraction method reached a plateau after 30 min, becoming less effective than the conventional method for extended extractions. The energy-cost efficiency of the MAE increased quickly, overtaking the conventional method after few seconds of extraction, reaching a maximum after 30 min. In terms of chemical composition, both extraction methods did not show relevant differences, with D-limonene accounting for the 95% of the extracted EOs.

Conclusion: MAHD shows great promise in terms of time and energy-cost effectiveness for extracting EOs from orange peel waste, as it provides ~200% increase in EO yield after 15 min compared to the conventional method. However, further research is required to optimize the design of the microwave reactor that achieves uniform absorption of the microwave energy to improve the performance of this technique.

Keywords: essential oil, hydro-distillation, limonene, microwave extraction, orange peel.

THE BEHAVIOR OF SEVERAL NEW PERSPECTIVE MAIZE HYBRIDS, IN THE UNFAVORABLE CONDITIONS OF 2024

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Introduction: Maize (*Zea mays*) is one of the main agricultural crops both in our country and worldwide. The breeding of this plant includes both aspects regarding production and the adaptation of genotypes to unfavorable environmental conditions, conditions that unfortunately have been encountered more and more often in our country (Horhocea *et al.*, 2024; Călugăr *et al.*, 2024). Both the newly created inbred lines and the hybrids resulting from their crossing must have a high production per unit area and a series of other characters of agronomic interest, such as a good flowering-silking coincidence, a reduced number of unbroken plants, a reduced number of sterile plants, as low a humidity as possible at harvest, etc.

Aims: Taking into account the above-mentioned aspects, 145 new maize hybrids were tested for their yield and a number of other traits, to assess the general (GCA) and specific (SCA) combining ability of newly created inbred lines.

Materials and Methods: 29 elite lines were crossed in a cyclic system with five newly created inbred lines, thus resulting 145 maize hybrids. The hybrids were tested in 2024, at 70,000 plants/ha, in randomized blocks, with three repetitions.

Results: The TF314 inbred line showed the best GCA, exceeding the next line, TF309, by an average of approximately 850 kg/ha. The elite lines that transmitted the highest average yield were TA483, TF320 and TE292. The highest yielding hybrid was TA477 x TF313, followed by TE390 x TF 314, TA 483 x TF311, TF320 x TF314, TA483 x TF309 and TF320 x TF 309. Another aspect worth mentioning is the fact that all the hybrids resulting from the crossing of the newly created lines with elites TA452, TA483 and TE292 had above the experimental average yields. All newly created hybrids had a high percentage of erect plants at harvest, between 94-100%, demonstrating the strictness that was shown in creating the parental forms.

Conclusion: Although the yield in 2024 had quite low values compared to the specifics of the cultivation area, these hybrids showed superior adaptive capacity to the unfavorable conditions of the year. The best hybrid combinations will continue to be tested in the coming years, and due to the good GCA, the TF314 line will become an elite line

Keywords: maize, new hybrids, yield.

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A TRANSATLANTIC COLLABORATIVE APPROACH TO SUSTAINABLE BIOACTIVE PACKAGING FOR MINIMALLY PROCESSED FRUITS

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Introduction: The rising demand for fresh, minimally processed fruits, particularly tropical and subtropical produce, has led to an increased interest in bioactive packaging. This approach offers a promising way to extend shelf life and enhance safety without compromising fruit quality, but research gaps still remain. Specifically, further research is needed to optimize technology integration, ensure regulatory approval, and assess consumer acceptance of innovative packaging solutions. A collaborative partnership between the EU and Latin America could present a unique opportunity to address these challenges by utilizing their combined expertise in sustainable food packaging innovation, with the know-how of tropical fruit processing.

Aims: This research aims to make use of a scientific network between EU and Latin American institutions to develop bioactive packaging solutions that ensure the safety and extend the shelf-life of minimally processed Colombian fruits, facilitating their entry on the EU market.

Materials and Methods: A consortium of 8 partners will make use of international secondments to implement two state-of-the-art technologies to obtain bioactive materials: bacterial cellulose (BC) produced by *Komagataeibacter xylinus* enriched with bioactive compounds and kraft paper containing encapsulated essential oils.

Results: This research will generate bioactive materials for minimally processed fruit as a coating for the cardboard punnets and paper top-seal. These two case studies will be a proof of concept for the holistic assessment of each packaging-foodstuff pair and will constitute the basis for further research, but also for food processors, the principal stakeholders of this research.

Conclusion: This approach will provide novel food products in terms of a packaging solution that will have all the needed data to enter the EU market. This partnership can be mutually beneficial through the exchange of best practices, promoting sustainable packaging, and supporting the development of safe and high-quality foods that meet the standards of the EU market.

Keywords: bioactive packaging, food safety, international research collaboration, partnership.

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SPONTANEOUS BERRY SPECIES IN BISTRIȚA-NĂȘĂUD COUNTY FORESTS, RESOURCES FOR HEALTH AND LOCAL ECONOMIES. A CASE STUDY: THE RASPBERRY

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Introduction: Wild berry species, especially those naturally occurring in Romania's forest ecosystems, represent a valuable yet underutilized resource. Among them, the raspberry (*Rubus idaeus*), with its dual ecological and socio-economic significance, contributes not only to biodiversity but also to rural livelihoods and public health.

Aims: This study aims to evaluate the ecological distribution and potential economic and nutritional value of spontaneous raspberry populations in Bistrița-Năsăud County forests, emphasizing their contribution to local development and natural health product.

Materials and Methods: The case study focuses on spontaneous raspberry populations in selected forest areas in Bistrița-Năsăud County. Field observations were carried out during the fruiting season over two consecutive years. Data were collected on plant density, fruit yield per square meter, soil type, elevation, and coexisting flora. Interviews with local collectors and analysis of supply chains were conducted to assess socio-economic impact.

Results: The findings highlight significant raspberry biomass in semi-shaded forest margins between 600–1200 m altitude, especially on acidic soils. Local communities actively engage in harvesting, with wild raspberries generating seasonal income and being used for traditional products such as syrups, jams, and herbal remedies. The antioxidant content of wild raspberries was found to be higher than that of cultivated varieties.

Conclusion: Spontaneous raspberry populations in Romanian forests provide a sustainable, naturally regenerating resource with multiple benefits. They play a critical role in forest ecosystem resilience, contribute to food security, and offer potential for eco-certified local products. Sustainable management, community engagement, and better integration into local development strategies are essential to preserve and capitalize on this resource.

Keywords: antioxidants, biodiversity, forest margins, rural economy, sustainable harvesting.

ISOTOPIC AND ELEMENTAL FINGERPRINTS “MEET” THE PORK MEAT

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Introduction: Due to their biological qualities, pigs represent one of the species majorly involved in meeting the population's meat needs, ensuring over 30% of world consumption. In Romania, pork is a traditional product, with a relatively constant consumption throughout the year, the annual mean consumption per capita being around 36 kg.

Aims: The aims of our study were: i) highlighting the ^2H , ^{18}O , and ^{13}C isotopic signature of investigated pork meat samples as function of geographical origin; ii) recording their elemental concentrations; iii) performing Partial Principal Component Analysis (PCA) to assess if samples from different geographical origins offer the potential to cluster into separate groups, and applying Linear Discriminant Analysis (LDA) to identify and point out the best differentiation markers related to sample's place of origin.

Materials and Methods: Isotopic Ratio Mass Spectrometry (IRMS) together with Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) represent efficient analytical techniques enable to trace the geographical origin of different food products, especially if these techniques are combined with statistical methods.

Results: $\delta^2\text{H}$ and $\delta^{18}\text{O}$ values ranged from -71.0 to -21.2 ‰, and from -9.3 to -2.8 ‰, respectively. The contents of macro- and micro essential elements presented the order: $\text{K} > \text{Na} > \text{Mg} > \text{Ca} > \text{Zn} > \text{Fe} > \text{Cu} > \text{Cr}$. LDA model assigned in the initial classification 91.4% separation of samples, while for cross-validation procedure, a percentage of 90% was obtained. Thus, $\delta^2\text{H}$, K, Rb and Pd were identified as most representative parameters to differentiate the pork meat samples coming from Romania *versus* those from abroad.

Conclusion: A total set of 70 loin pork samples were collected; the isotopic and elemental signatures were determined. The multivariate statistical approaches (ANOVA, PCA, and LDA) were applied to obtain the most important predictors which could distinguish the meat samples geographical origin.

Keywords: pork meat; geographical origin; IRMS; ICP-MS; chemometrics.

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FROM MOUNTAIN TO THE SEA: STABLE ISOTOPES INSIGHTS FROM THE ARIEȘ RIVER TO THE BLACK SEA

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Introduction: Stable isotopes of hydrogen (^2H) and oxygen (^{18}O) are natural tracers in the water cycle. They help us understand key environmental processes such as evaporation, precipitation, river inflow, and sedimentation. Carbon isotopes give information regarding the organic or inorganic carbon in sediments. Together, they offer a detailed picture of environmental processes.

Aims: This study aims to compare the isotopic fingerprints of two contrasting aquatic environments - the Black Sea and the Arieș River - to better understand their hydrological and geochemical dynamics.

Materials and Methods: The water and sediment samples were collected and then analyzed by Isotope Ratios Mass Spectrometry (IRMS). Sediment samples were separated into organic and inorganic fractions for carbon isotope analysis.

Results: Regarding the Aries water samples, the $\delta^{18}\text{O}$ variation range was between -10.5 and -9.3 ‰, while $\delta^2\text{H}$ values ranged between -69.8 ‰ and -63.3 ‰. For the Black Sea, the isotopic fingerprints of water samples were, for ^{18}O , from -2.4 ‰ and -1.0 ‰, and from -25.3 ‰ to -17.6 ‰ for $\delta^2\text{H}$, respectively. The mean value of -28.6 ‰ for the ^{13}C fingerprint of the bulk organic component from Aries River sediments was recorded, while for the inorganic component, the $\delta^{13}\text{C}$ signatures range between -7.4 and -1.2 ‰. Also, the average value of -25.3 ‰ was obtained for the organic component of Black Sea sediments, and for the inorganic component, the $\delta^{13}\text{C}$ fingerprints range between -4.3 and -1.5 ‰ versus VPDB international standard.

Conclusion: Combining hydrogen, oxygen, and carbon isotopes it is obtaining a multi-dimensional view of these aquatic systems and their sedimentary processes. In the context of climate change and human impact, isotopic tools can help us monitor, predict, and understand changes in both freshwater and marine systems.

Keywords: river, sea, stable isotopes.

Acknowledgements: This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CCCDI-UEFISCDI, project number 19PED/2025, within PNCDI IV.

FOOD SAFETY CONDITIONS FOR GOLDEN BERRY (*PHYSALIS PERUVIANA*) BASED PRODUCTS

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Introduction: Golden berries (*Physalis peruviana*) are an exotic South American fruit valued for their high flavonoid content. Colombia is the leading producer and exporter in the world (Muñoz *et al.*, 2021); however, due to their limited international recognition, global consumption remains low. As a result, there is a lack of comprehensive information regarding potential health risks and standardized food safety protocols associated with their consumption.

Aims: Improving the international recognition and consumption of golden berries requires a better understanding of microbial survival in both whole fruit and juice, enabling the development of effective food safety strategies.

Materials and Methods: Fruit was analysed in two ways: entire and in juice obtained with a fruit juice extractor. Sampling was done in different selective and non-selective media for the initial characterization. Afterwards, *Escherichia coli* and *Listeria monocytogenes* were inoculated in the juice and sampled to describe growth/inactivation.

Results: Samples analysed in this study presented low microbial diversity and frequent presence of fungi contamination; Foodborne pathogens *E. coli* and *Listeria spp.* showed low resistance to the golden berries juice conditions.

Conclusion: Although golden berries have traits that may limit microbial growth, it is still necessary to develop protocols that enhance their safety for use in food products.

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Keywords: food safety, *Listeria monocytogenes*, *Physalis peruviana*.

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METHOD VALIDATION OF TOXIC ELEMENTS (Cd, Pb and As) ANALYSIS IN FISH BY ICP-MS

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Introduction: Fish is a valuable source of essential nutrients, but it can accumulate toxic elements such as Cd, Pb and As, which can affect human health. Monitoring of these contaminants is done by modern analytical techniques, such as: AES, EDXRF, FAAS, GFAAS, ICP-AES and ICP MS. Validated method of analysis is very important in any analytical procedure and its use ensures the precision of the analytical outcomes.

Aims: The proposed of the present study is to validate a method for analyzing toxic elements (Cd, Pb and As) in fish by ICP-MS, using the following parameters: linearity, limits of detection (LOD), limits of quantification (LOQ), precision and accuracy.

Materials and Methods: The microwave equipment used to digest a certified reference material (SRM NCS ZC 73006) and fish samples was Speed ENTRY by Berghof®. The analysis of Cd, Pb and As was done using ICP-MS ELAN DRC (e), Perkin Elmer, mass spectrometer.

Results: Good satisfactory linear relationships were observed, as indicated by correlation coefficients obtained ($r > 0.999$) for the calibration curves. The instrumental LODs in ng/L were: 1.070 (Cd), 2.589 (Pb) and 36.204 (As). The instrumental LOQs in ng/L were: 10.69 (Cd), 25.89 (Pb) and 362.03 (As). The precision of analytical method was determined in terms of repeatability and reproducibility. The low RSD values obtained ($< 2\%$) in both cases confirmed the good precision and robustness of the method. The accuracy was evaluated using recovery tests using a certified reference material. The recovery rates obtained in infant food samples ranged between 80% and 112%, with a precision not exceeding 8% RSD.

Conclusion: Validation results demonstrated that the analytical method for heavy metals (Cd, Pb and As, respectively) are suitable for their intended purpose.

Keywords: method validation, toxic elements, ICP-MS.

Acknowledgements: This work was supported by project number 19PED/2025.

SPATIAL DISTRIBUTION OF HEAVY METAL(LOID)S CONCENTRATIONS ALONG ARIES RIVER BASIN: THE HEALTH RISK ASSESSMENT AMONG ADULTS AND CHILDREN

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Introduction: Heavy metals (HMs) pose a serious risk to human health and the environment. In central Romania's Transylvania region, past mining activities at Rosia Poieni, Rosia Montana and Baia de Aries are major pollution sources, historically impacting the Aries River through mining and ore processing (Moldovan A., 2022).

Aims: This study focused on the following objectives: the determination of heavy metal(loid)s (Cd, Pb, Cu, and As), concentrations from Aries River and health risk assessment for the intake of HMs among adults and children via ingestion and dermal routes.

Materials and Methods: The river water samples (n=24) were analyzed by ICP-MS for metal concentrations. Human exposure to HMs was assessed by ingestion and dermal absorption, following U.S. EPA guidelines (U.S. EPA, 1989). Non-carcinogenic health risk was evaluated using the Hazard Quotient (HQ), while carcinogenic risk was assessed based on lifetime exposure and metal-specific cancer slope factors.

Results: Mean metal levels followed the order: Cu>As>Cd>Pb. Exposure (CDI) showed Cu and As as dominant pathways. Hazard Index (HI) values were below 1, indicating low non-carcinogenic risk. Carcinogenic risk (CR) remained within safe limits (10^{-6} - 10^{-4}).

Conclusion: Health risk assessment showed children are more vulnerable than adults, though HQ and HI remained below 1, indicating low non-carcinogenic risk. Cancer risk values (CR) were within acceptable limits.

Keywords: Aries River, Health risk, heavy metals.

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ASSESSING THE HEMATOPHAGOUS POTENTIAL OF *CORYTHUCHA CILIATA* SAY: BETWEEN PHYTOPHAGY AND HUMAN INTERACTIONS

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Introduction: *Corythucha ciliata* Say (the sycamore lace bug) is an invasive insect that mainly feeds on the leaves of *Platanus* spp (Halbert et. al, 1998; Mutun, 2009). Recently, however, there have been isolated reports of bites on humans, indicating a possible occasional blood-feeding behavior (Florian et. al., 2022).

Aims: This study aimed to assess public perceptions of direct interactions with this species and to identify signs of its potential hematophagy.

Materials and Methods: A survey was conducted using a questionnaire distributed to the general population across various Romanian regions, with a focus on Cluj, Sibiu, and parts of Oltenia. The questionnaire collected data on the perceived frequency of bites attributed to *C. ciliata*, sting locations, circumstances, and any local or systemic reactions. Data from over 180 participants were analyzed.

Results: Findings indicate a correlation between the presence of sycamore trees and direct interactions with the insect, especially in urban areas. Although definitive proof of hematophagy was not established, the findings provide a basis for further entomological research, including direct observation and laboratory testing. Such studies are important for understanding the potential risks posed by insects traditionally considered strictly phytophagous.

Conclusion: The results of this study suggest that *Corythucha ciliata*, traditionally known as a strictly phytophagous species, may occasionally interact directly with humans, potentially through stings. While hematophagy could not be conclusively demonstrated, the reported frequency and patterns of human-insect contact—particularly in urban areas with a high density of sycamore trees—highlight the need for further investigation.

Keywords: *Corythucha ciliata* Say, feeding behavior, human interaction, survey.

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ARE GREEN MANURES BENEFICIAL FOR THE ARABLE SOIL MICROBIOTA? A SHORT REVIEW

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Introduction: Green manures—crops grown primarily to be incorporated into the soil—are a sustainable alternative to synthetic fertilizers, known to enhance soil structure, nutrient cycling, and microbial activity.

Aim: This review aims to synthesize recent findings on the impact of green manures on arable soil microbiota, focusing on microbial diversity, enzyme activity, soil health, and climate change mitigation.

Materials and Methods: The review compiles and analyzes data from over 30 scientific sources published between 2010–2024, covering field studies and meta-analyses on green manure effects on microbial populations, soil enzymatic activity, and community structure.

Results: Green manures significantly increased microbial biomass carbon (Mishra *et al.*, 2023), enhanced the abundance of beneficial bacteria and fungi (Zhang *et al.*, 2017), and stimulated enzymatic activity such as urease, phosphatase, and glucosidase involved in nitrogen, phosphorus, and carbon cycling (Solanki *et al.*, 2022). Incorporating mixed green manure species led to synergistic effects on microbial diversity, while applications also improved soil resilience and reduced greenhouse gas emissions (Pu *et al.*, 2023).

Conclusions: Green manures enhance soil microbial diversity and functionality, support nutrient availability, suppress pathogens, and contribute to climate-resilient farming. Their integration into agricultural practices offers a viable path toward more sustainable and productive agroecosystems.

Keywords: enzyme activity, green manure, microbial activity, sustainable farming

FROM YEAST TO TASTE: DEVELOPMENT OF MUFFINS WITH MICROBIAL OIL PRODUCED BY *YARROWIA LIPOLYTICA*

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Introduction: Sustainable food innovation has led to increased interest in microbial oils as alternatives to plant-based fats. Microbial lipids from yeasts like *Yarrowia lipolytica* offer environmental advantages and beneficial fatty acid profiles, including oleic and linoleic acids (Beopoulos *et al.*, 2009; Bellou *et al.*, 2016). Their application in baked goods could reduce reliance on conventional vegetable oils without compromising quality.

Aims: This study aimed to assess the feasibility of using *Y. lipolytica* microbial oil as a full or partial replacement for sunflower oil in muffins.

Materials and Methods: Four muffin formulations were prepared using varying fat sources: 100% sunflower oil (control), 100% microbial oil, a 1:1 blend of sunflower and microbial oil, and a formulation including 10% freeze-dried *Y. lipolytica* biomass (containing 54% lipids). A trained panel (n = 10) assessed sensory attributes such as crust color, crumb structure, texture, and overall acceptability using a 9-point hedonic scale. Fatty acid profiles of the oils were analyzed by gas chromatography, and oxidative stability was measured using pressure differential scanning calorimetry (PDSC).

Results: Microbial oil consisted mainly of linoleic (53.5%) and oleic acid (35.5%). The 50:50 blend had the highest acceptability (8.2/9), outperforming control in texture and mouthfeel. Biomass muffins had darker crusts and denser crumbs but remained acceptable (7.0/9). PDSC stability averaged $\tau_{max} = 22.6$ min.

Conclusion: *Y. lipolytica* oil is a promising sustainable fat alternative for bakery applications, offering good sensory performance and oxidative stability.

Keywords: fatty acid composition, microbial oil, oxidative stability, sensory evaluation, *Yarrowia lipolytica*.

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COMPREHENSIVE EVALUATION OF ARIES RIVER BASED ON ELEMENTAL CONTENT AND CHEMOMETRICS

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Introduction: Worldwide, a lot of dangerous substances, especially heavy metals, are released into rivers as a result of industrial processes, atmospheric precipitation, fast population expansion, and other human made natural activities. Among different industrial domains, mining represents a complex sector, affecting every part of surrounding environment.

Aims: The aim of the present study was the evaluation of Aries River from Transylvania, Romania, through elemental evaluation, followed by chemometric data processing.

Materials and Methods: Water samples were collected from 15 points, in a decommissioned mining area, along the Arieș River and its tributaries. For storage, the samples were treated with 5 % of high purity HCl until the analysis. The quantification of 9 lanthanides and Cd, Sb, Hg, Pb, As and Se from selected water samples was accomplished using an Inductively Coupled Plasma - Mass Spectrometer (ICP-MS), Plasma Quant MS ELITE (Analytik Jena, Jena, Germany). Measurement Parameters: Analysis Type – Quantitative; Scans/Replicate: 10; Replicates/Sample: 3; Plasma flow: 10.50 hL/min; Auxiliary flow: 1.35 L/min; Nebulizer flow: 1.00 L/min; Pump rate: 15 rpm; Stabilization delay: 20 sec; Internal Standards: Sc45; Y89; Tb159.

Results: Principal component analysis (PCA), summarises data variance into fewer components and also contributes to data reduction. Three PCs were extracted, PC1 had 62.75% and high loading for Nd, Eu, Gd, Dy, Ho, Er, Lu, Pb, PC2 had 12.70% (La, Ce, Se) and PC3 had 8.02% (Hg) from data variance. Cluster analysis (CA) grouped the sampling sites in 3 main clusters.

Conclusion: PCA results represent a clear indicator of common sources of river water pollution. Cluster analysis highlighted a few sampling points with higher concentration of all elements (except Sb and Hg).

Keywords: Aries, chemometric, ICP-MS, water quality.

Acknowledgments: This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CCCDI-UEFISCDI, project number 19PED/2025, within PNCDI IV.

DEVELOPMENT OF *ZERO-TRANS* STRUCTURED LIPIDS FOR BAKING APPLICATIONS

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Introduction: Baked goods account for 40–50% of *trans* fatty acids in the human diet. Due to the labelling regulations, it is necessary to eliminate hydrogenated, *trans*-containing fats from baking shortenings. *Trans* fatty acids are not practically formed during interesterification, making the process a viable alternative to hydrogenation for producing specific fats.

Aims: This study aimed to develop a zero-*trans* fat product with physical properties similar to those of a typical baking shortening.

Materials and Methods: For development of *zero-trans* baking shortening enzymatic interesterification was applied with variety of enzymes to establish optimal parameters for this process. As biocatalysts, both immobilised (attached to an inert support) and native (non-entrapped by any support) enzymes were applied. As a source of palmitic acid, the fatty acid defining proper type of crystals formation, palm stearin was explored.

The composition of triacylglycerols was analysed using reversed-phase high-performance liquid chromatography (RP-HPLC). Fatty acids were methylated prior to analysis by gas chromatography (GC) based on the AOCS Official Method Ce 1-62. The solid fat content was measured by pulse nuclear magnetic resonance (p-NMR) as specified in the AOCS Official Method Cd 16-81. The slip melting point was measured according to the AOCS Official Method Cc 3-25.

Results: As anticipated, the content of *trans* isomers retained on the same level as for the initial mixture. For fats interesterified with the immobilised enzymes, analysed solid fat content showed values similar to standard shortening formulated with hydrogenated fats. Furthermore, the immobilised enzymes formed new triacylglycerols with palmitic acid with them, which was not observed for the native enzymes.

Conclusion: Enzymatic interesterification with immobilised lipases offered greater potential in production of fats with desired properties. Considering the cost of enzymes, both Lipase PS “Amano” IM and Lipozyme RM IM can be cheaper alternatives to Novozym 435.

Keywords: baking shortening, palm stearin, structured lipids, *trans* isomers.

SUSTAINABLE SOIL AMENDMENT: PROMOTING WHEAT GERMINATION WITH BIOCHAR FROM POTATO PEELS AND APPLE POMACE

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Introduction: Biochar has gained attention as a sustainable soil amendment, improving soil quality, enhancing nutrient retention, and supporting plant growth. Potato peels and apple pomace (apple marc) represent abundant and low-cost biomass sources to produce biochar.

Aims: The main objective was to prepare biochar from potato peels and apple pomace by pyrolysis at 450 °C and investigate their effects on wheat germination. More specific, the study aimed to evaluate nutrient changes in the soil following biochar amendment and seedling growth.

Materials and Methods: Biochar was produced by pyrolysis of dried potato peels and apple pomace at 450 °C. Soil was amended with biochar at a fixed rate and used as growth medium for wheat seeds. Seed germination was conducted over 10 days under controlled conditions. Samples were collected before planting and after the germination period, EA, AAS, and ICP-OES highlighted key nutrients as well as traces of transitional metals.

Results: Biochar exhibited a well-developed porous structure and high fixed carbon content, characteristics which are favourable for improving soil water retention and nutrient exchange. Before germination, soil amended with biochar showed elevated levels of essential nutrients compared to control soil: K increased from 120 mg/kg (control) to 185 mg/kg (biochar amended), Ca from 250 mg/kg to 310 mg/kg, and Mg from 70 mg/kg to 95 mg/kg. After 10 days, nutrient concentrations decreased, indicating uptake by wheat seedlings: 140 mg/kg (K), 280 mg/kg (Ca), and 80 mg/kg (Mg), respectively. Biochar-amended soils also showed higher levels of transition metals compared to controls. Fe increased from 45 mg/kg in the control soil to 62 mg/kg in the amended soil, while Mn rose from 22 mg/kg to 33 mg/kg. Zn levels increased from 5.8 mg/kg to 8.2 mg/kg, Cu from 2.1 mg/kg to 3.5 mg/kg, and Ni from 1.4 mg/kg to 2.3 mg/kg. After germination, slight decreases in Fe, Mn, and Zn were observed, consistent with a partial plant uptake: Fe decreased to 57 mg/kg, Mn to 30 mg/kg, and Zn to 7.4 mg/kg.

Conclusion: These results demonstrate enhanced nutrient and trace element availability in biochar-amended soils, correlating with improved seedling growth parameters such as root length and shoot height. These findings promote the valorisation of agro-industrial wastes for sustainable agricultural applications.

Keywords: apple pomace, biochar, potato peels, soil, waste.

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WEED FLORA ANALYSIS IN CONVENTIONAL POTATO CROP IN ȚARA BÂRSEI AREA

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Introduction: Weeds are a major problem in potatoes crop in Romania. Large distance between rows, the use of manure and fertilizers, the long period from planting to plant emergence, slow preliminary growth of potato plants create favourable conditions for an early emergence (Soren et al., 2018; Cristea et al., 2022).

Aims: to provide an overview of the weed flora in potato field in Țara Barsei area, as well as a taxonomic and biological spectrum analysis.

Materials and Methods: Floristic weed analysis was carried out during 2023-2024 in the experimental plots of NIRDPSB Brasov. Weed flora abundance, percentage density and percentage frequency were determined from a 50 cm x 50 cm quadrat thrown twice per plot at three phases of potato growth.

Results: Weed flora consisted of 17 species; most of the species belonging to broad-leaved species, while grasses comprised only two weed species. Weeds largely depend on the type of soil and on the measures used to control them. Cosmopolitan species have the highest percentage in conventional potato crop. The most frequent species were *Convolvulus arvensis* L., *Cirsium arvense* (L.) Scop., *Chenopodium album* L., *Amaranthus retroflexus* L., *Setaria viridis* L., and *Equisetum arvense* L.

Conclusion: The weed threshold can be reduced to a reasonable and tolerant level using appropriate chemical control measures and knowing the weed flora composition.

Keywords: conventional potato, flora, taxonomic analysis, weeds.

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ASSESSING POTATO CROP RESPONSE TO CURRENT CLIMATIC CONDITIONS FROM USING VEGETATION INDICES IN CENTRAL PART OF TRANSYLVANIA

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Introduction: Production limiting factors have high spatial variability, which requires knowledge, monitoring and modeling of resources. Vegetation indices, such as NDVI, provide information on leaf function, which is essential in capturing light and CO₂ needed for the growth of underground organs and determines crop yield (Vannoppen and Gobin, 2022).

Aims: Achieving proper management of potato crops using plant monitoring sensors.

Materials and Methods: During 2023-2024, were evaluated twelve potato varieties. Two NDVI readings were carried out on the middle leaves of three potato plants. For interpretation of chlorophyll results was used the formula of nitrogen index (Shapiro *et al.*, 2006).

Results: The NDVI values recorded on 22.06.2023 were between 89.98 N index for the Castrum variety and 84.3 N index for the Cosiana and Sevastia varieties and on 18.07.2023 between 89.9 N index for the Castrum variety and 86,8 N index for the Foresta variety. Values recorded on 18.06.2024 were between 91.81 for the Marvis variety and 88.56 N index for the Azaria variety, and on 8.07.2024 between 91.78 for the Castrum variety and 89.61 N index for the Sevastia variety.

Conclusion: The NDVI index depends significantly on the climatic conditions and on the adaptability to drought and water stress of potato varieties.

Keywords: climatic conditions, NDVI values, potato variety, yield.

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ASSESSMENT OF TRITICALE VARIETAL QUALITY UNDER TRANSYLVANIAN CONDITIONS

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Introduction: The chemical makeup of triticale determines its nutritional value, as evidenced by the average levels of the main nutrients that comprise its complex structure. Because of its high nutritional content, it can effectively replace maize and wheat in domestic animal feed. Triticale is also used for satisfying rational and nutrient-dense human diets.

Aims: The primary objective of this study was to qualitatively assess the winter triticale genotypes grown in the ARDS Turda experimental fields using the following grain quality indices: protein, fat, fibre, and starch.

Materials and Methods: The experiments were laid out according to the balanced square grid method in six replications, with the first 3 replications additionally fertilised (N₁₀₀ kg ha⁻¹). The biological material was represented by 25 genotypes of winter triticale. Sowing was carried out in the optimal period for the Transylvanian area (October 24, 2023), at a density of 600 germinable grains/m², in a chernozemic soil. Quality indices were determined using the FT-NIR TANGO spectrometer and the Perten Inframatic 9500 analyser.

Results: Protein mean values ranged from 9.02 (N₅₀) to 10.34% (N₁₀₀); fat mean values varied from 2.84 (N₅₀) to 3.01% (N₁₀₀); fibre mean values were between 2.97 (N₅₀) and 2.88% (N₁₀₀); and starch mean values ranged from 74.52 (N₅₀) to 74.16% (N₁₀₀), according to the results. After being fertilised with N₁₀₀, the genotypes with the highest protein content were Zori (11.2%), Haiduc, and Tulnic (11.3%). The Pisc variety had the highest fat content in both fertilisation situations, with values of 3.23% for N₅₀ and 3.45% for N₁₀₀. Zaraza (3.46% - N₁₀₀) and 18339T (3.34% - N₅₀) exhibited the highest percentage of fibre in grains. The Zori and Odă FD varieties had the greatest starch contents, with 76.44% (N₅₀) and 76.02% (N₁₀₀), respectively.

Conclusion: The quality of the winter triticale crop can be greatly improved by properly applying nitrogen fertilisers at the optimal phenophase, making it suitable even for bread-making.

Keywords: fat, fibre, protein, starch, triticale.

Acknowledgements: This research was carried out as part of the ADER 113/2023.

PRELIMINARY DATA ON THE COMPLEX OF SOIL PEST INSECTS IN MAIZE AND SUNFLOWER AGROECOSYSTEMS IN THE CONDITIONS OF SANDY SOIL FROM SOUTHERN ROMANIA

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Introduction: Crop monitoring for soil pest presence in maize and sunflower crops is essential to maintain crop health and ensure high yields. The soil-dwelling insect species are known to form complex assembly that can differ significantly across various farming systems and soil type. Despite of topic importance, the systematic data and researches about the spectrum of the soil insect's species that can cause damage on agricultural crops in the conditions of sandy soils from southern Romania are very scarce.

Aims: The aim of the study was to identify the spectrum of the coleopteran species that can cause damage on maize and sunflower crops on a typically sandy soil from Dăbuleni area.

Materials and Methods: The field survey was conducted in the experimental area of R.D.S.P.C.S.D. Dăbuleni, in three experimental plots, two plots of maize, one having rye as the

previous crop and the second sown after alfalfa, and a plot of sunflower sown after rye. The soil fauna was monitored from April to July 2024, using pitfall traps with formalin 4% as preservative solution. Pitfall traps were installed and content collected three time per months and afterwards the samples were transferred to Research and Development Institute for Plant Protection, Bucharest entomology laboratory, where the collected material was examined and pest species individuals were separated. The numerical abundance and relative frequency of each taxon, species richness and Shannon-Weiner diversity indices were calculated using Past 4.03 software.

Results: The results of the soil pest monitoring in the experimental plots organized at S.C.D.C.P.N. Dăbuleni in 2024 shows a total of 17 pest species in maize and 14 pest species in sunflower, assigned to eight Coleoptera families. The complex formed by Elateridae, *Crypticus quisquilius* and Anthicidae was dominant in maize plots while in sunflower plot the Elateridae species complex was closely followed by *Opatrum sabulosum*. The differences between the soil pest communities' structure of each crop are discussed.

Conclusions: The paper brings actual data on the specific composition of coleoptera pest associated with maize and sunflower crops in southern Romania on a typically sandy soil from Dăbuleni area. The results show the importance of considering soil type and crop rotation as key factors influencing pest soil coleoptera communities.

Keywords: maize, pest coleopteran, sandy soil, soil pests' diversity, sunflower.

Acknowledgements: This study was performed within the project ADER 2.1.1, financially supported by the Ministry of Agriculture and Rural Development, Sectoral Plan for 2023 – 2026.

ASSESSMENT OF THE QUALITY OF THE LIPID FRACTION OBTAINED FROM ACORNS

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Introduction: Acorns, the nuts of oak trees, have been traditionally consumed in various cultures and are gaining renewed interest as a source of bioactive compounds. Among their components, the lipid fraction is of particular interest due to its potential nutritional and functional properties. Investigating this fraction is important, as it may offer alternative sources of high-quality plant-based oils with potential applications in the food and cosmetic industries.

Aims: This study aims to evaluate the quality of acorn-derived oils by analysing their chemical characteristics, fatty acid composition, and oxidative stability.

Materials and Methods: Seeds from two oak species – *Quercus robur* and *Quercus rubra* – were selected for the research. The fatty acid (FA) composition of the extracted oil was determined using gas chromatography. Acid (AV) and peroxide (PV) values were measured using an automatic titrator (TitraLab AT1000 series). Oxidative stability was studied using pressure differential scanning calorimetry with a DSC Q20P thermal analyser.

Results: The analysis revealed that the AV and PV of the oils fell within the accepted standards for vegetable oils. FA profile showed that approximately two-thirds of the oil from *Q. rubra* acorns consists of monounsaturated FAs, whereas *Q. robur* oil contains about 50% monounsaturated FAs. However, *Q. robur* oil exhibited a higher content of polyunsaturated FAs. Based on the oxidative stability analysis, oil from *Q. robur* acorns demonstrated higher stability than oil from *Q. rubra*, as indicated by higher τ_{on} and τ_{max} values.

Conclusion: The obtained results indicate that oils extracted from *Q. rubra* and *Q. robur* acorns meet the quality standards required for vegetable oils, making them potentially valuable raw materials. Due to their favourable FA profiles as well as their satisfactory oxidative stability, especially in the case of *Q. robur* oil, these acorn oils may be suitable for applications in both the food industry, as a health-promoting dietary component, and the cosmetic industry.

Keywords: acorns, oil quality, oxidative stability, vegetable oils.

ASSESSMENT OF THE POSSIBILITY OF USING DIFFERENTIAL SCANNING CALORIMETRY IN THERMAL ANALYSIS OF OIL ISOLATED FROM ALMOND PROTEIN CONCENTRATE

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Introduction: Almond protein concentrate (APC) is used in the food industry as a plant-based supplement to enhance the nutritional value and sensory properties of products like smoothies, yoghurts, and muesli. Due to its high fat content, APC is prone to undesirable transformations such as oxidation during processing and storage, which can impact the food product's taste and shelf life. These changes often occur under the influence of temperature. Therefore, it is particularly important to study the thermal properties of fat, which may affect food products' sensory, rheological, and even nutritional properties.

Aims: This study aimed to evaluate the thermal and oxidative properties of oil extracted from APC using differential scanning calorimetry (DSC) and pressure differential scanning calorimetry (PDSC).

Materials and Methods: Commercial APC (Smart Organic, Bulgaria) was used in this study. FA composition was determined using gas chromatography. Thermal behaviour was studied using DSC Q200 and DSC Q20P (TA Instruments, USA).

Results: Oleic acid was the dominant FA. The oxidative stability of fat at 120 °C was relatively high, with a maximum oxidation time ($\tau_{\max}$) exceeding 60 minutes. DSC analysis showed two endothermic peaks during melting and two exothermic peaks during crystallization, indicating that fat fractions melt and crystallize at different temperatures.

Conclusion: The obtained results indicated that DSC and PDSC techniques can be effective tools for assessing the thermal behavior and oxidative stability of edible oils and fats. These methods allow for the identification of characteristic melting and crystallization transitions as well as the estimation of oxidative resistance, which are important indicators of fat quality. Their application may support the evaluation and optimization of food additives, contributing to extended shelf life and improved product stability.

Keywords: almond protein concentrate; differential scanning calorimetry; fatty acid composition; oxidative stability.

PHYSICOCHEMICAL, THERMAL, AND ANTIOXIDANT CHARACTERIZATION OF MILK THISTLE CAKE OIL: SOXHLET VERSUS ACCELERATED SOLVENT EXTRACTION

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Introduction: Milk thistle (*Silybum marianum*) seed cake, a by-product of oil extraction, is an underutilized source of bioactive lipids with potential applications in functional foods. Its valorization through efficient oil recovery methods supports sustainable food production (Marceddu *et al.* 2022).

Aim: This study aimed to compare the efficiency and quality of oil obtained by Soxhlet extraction (SE) and Accelerated Solvent Extraction (ASE), focusing on their physicochemical properties, fatty acid composition, antioxidant capacity, and thermal stability.

Materials and Methods: Milk thistle seed cake sample from a Polish producer was subjected to Soxhlet extraction (SE), a conventional technique that uses continuous solvent reflux, and Accelerated Solvent Extraction (ASE), an advanced method employing elevated temperature and pressure to enhance solvent penetration and reduce extraction time. Hexane was used as the extraction solvent for both methods. The oil was analyzed for acid and peroxide values, fatty acid profiles by GC, antioxidant activity via DPPH assay, and thermal behavior by differential scanning calorimetry (DSC) (Bryś *et al.* 2017).

Results: ASE produced oil with improved extraction efficiency and better retention of antioxidant activity compared to SE. Fatty acid composition was dominated by linoleic (C18:2) and oleic (C18:1) acids, with both methods yielding profiles typical of milk thistle oil. DSC analysis indicated differences in thermal stability between extraction methods, reflecting variations in oxidative resistance.

Conclusion: Accelerated Solvent Extraction is recommended over Soxhlet extraction for milk thistle seed cake oil recovery due to its higher efficiency, superior antioxidant preservation, and potential for sustainable industrial applications.

Keywords: accelerated solvent extraction, antioxidant activity, milk thistle seed cake oil, soxhlet extraction, thermal stability.

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PHYSICAL AND CHEMICAL PROFILING FOR ENHANCED FOOD SAFETY: ACTIVITIES WITHIN SEURFOOD WP5

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Introduction: Food safety and quality are central to consumer protection and regulatory compliance, particularly in the context of novel foods. Within the SEURFOOD project, the Warsaw University of Life Sciences – SGGW coordinates comprehensive chemical, physical, and spectral characterization of food products before and after processing, aiming to establish robust analytical standards for safer food development. The project brings together EU and South American institutions to evaluate innovative processing and packaging solutions for high-quality, shelf-stable food products.

Aims: As coordinator of Work Package 5 (WP5), SGGW focuses on characterizing food matrices developed in WP3 using validated physicochemical methods. The relevant objectives carried out at SGGW include: (O5.1) assessment of the effects of novel processing and storage on food quality; (O5.3) detailed chemical characterization of powdered oil-based ingredients and their stability; (O5.5) application of chemometric tools to correlate data from different methods and identify and establish processing markers; and (O5.7) dissemination of scientific results.

Materials and Methods: Analyses performed at SGGW include proximate composition (moisture, ash, fat, proteins, fibre, sugars) per EU Regulation 1169/2011, lipid profiling using GC and GC-TLC, oxidative stability evaluation (DSC/PDSC), and IR spectroscopic and thermal analysis. Chemometric approaches support the integration and interpretation of large analytical datasets. All work is performed using standardized procedures and modern instrumentation available at Warsaw University of Life Sciences – SGGW.

Results: SGGW conducts targeted research on food ingredients processed with emerging technologies. In addition, the university organizes scientific workshops and dissemination events on topics including lipid chemistry, chromatography, and data modelling, fostering knowledge exchange within the SEURFOOD network.

Conclusion: Through its leadership in WP5, SGGW contributes high-quality analytical expertise and scientific training to support the SEURFOOD mission of developing functional, safe, and traceable food products.

Keywords: chemical characterization, chemometrics, chromatographic analysis, lipid profiling, thermal analysis.

Acknowledgements: This work was supported by the HORIZON-MSCA-2023-SE-01 - Project 101182843 — SEUR FOOD.

EVALUATING THE INFLUENCE OF PROTEIN-RICH SUBSTRATES ON THE DEVELOPMENT OF *TENEBRIO MOLITOR* L. LARVAE

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Introduction: Many authors have highlighted the numerous benefits of using insects as a substitute source of protein for human consumption (Ojha, S., et al, 2020) considering their rich nutrient levels (Costa, S., et al, 2020). Many countries consume farmed insects in the larval stage, such as the *Tenebrio molitor* L (Ghaly, A., et al., 2009). Kröncke, N. et al., 2023 suggests that larval proteins and other nutrients are affected by different feed substrates. Protein powders lead to more efficient growth and better nutrient absorption by larvae of this species (Machona et al., 2022).

Aims: By studying how mealworms thrive in various substrates, we hope to contribute valuable insights into sustainable production and resource use.

Materials and Methods: Plastic boxes serving as 80 larval rearing vessels, at 22°C. The main substrate consisted of 15 gr oats, mixed with four protein substrates: pea protein, a vegan chocolate mix, hemp protein, and a chocolate and whey mix. Apple (4 gr) slices were provided as a water source.

Results: The total weight increases starting within week 3, reaching max in week 5 and 9. Until week 5 there is a constant evolution of larvae length. The first pupae appear in week 6. In week 13, the pupation rate exceeds 90%; the slowest transformation is found in the hemp substrate, while the fastest in the chocolate and whey mix substrate.

Conclusion: The best substrate for rapid mass growth of mealworms was chocolate and whey mix. Regarding the viability of the larvae over a longer period, hemp substrate would be the most reliable alternative.

Keywords: protein powder, protein substrates, larvae development.

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THE NUTRITIONAL STATUS OF SOME MUSHROOM SPECIES FROM SPONTANEOUS FLORA OF N-W TRANSYLVANIA, ROMANIA

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Introduction: Wild edible mushrooms represent an important nutritional resource due to their valuable macro- and micronutrient content. In North-Western Transylvania (Romania), species such as *Boletus edulis* and *Cantharellus cibarius* are traditionally harvested and consumed, yet their detailed nutritional profile remains underreported locally.

Aims: This study aimed to evaluate the nutritional status and mineral content of two spontaneously occurring mushroom species, *Boletus edulis* and *Cantharellus cibarius*.

Materials and Methods: Mushroom samples were collected from forest ecosystems in N-W Transylvania. After taxonomic identification, specimens were cleaned, dried, and analyzed for mineral composition using atomic absorption spectroscopy and spectrophotometric methods. The results were interpreted on dry weight base to reflect practical consumption patterns and comparative nutritional assessments.

Results: Both species showed high levels of crude protein, crude fiber, crude ash, potassium and phosphorus. Corresponding to Bistrița-Năsăud and Cluj Counties, respectively, in *Boletus edulis* were identified contents of crude protein of 24.4%, and 26.4%, crude fiber of 50.3%, and 42.5%, nitrogen free matter of 13.1% and 20%, 1810 and 1950 mg K/100 g dry matter, and 1100–1500 mg P/100 g dry matter. Corresponding to the same counties, in *Cantharellus cibarius* were identified contents of crude protein of 21.4%, and 20.65%, crude fiber of 36%, and 30.35%, nitrogen free matter of 32.4% and 38%, 2225 and 2695 mg K/100 g dry matter, and 1350–1700 mg P/100 g dry matter.

Conclusion: The analyzed wild mushroom species from North-Western Romania exhibit high nutritional and mineral levels. Their spontaneous growth in ecologically diverse habitats contributes to their mineral richness and underlines the value of preserving natural forest ecosystems. These findings highlight the importance of integrating wild edible mushrooms into sustainable food strategies and further exploring their nutraceutical potential.

Keywords: biochemical composition, forest ecosystems, minerals, sustainable food.

FROM WASTE TO RESOURCE: SUSTAINABLE MATERIALS FOR MINING WATER TREATMENT

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Introduction: Heavy metal pollution has become a serious problem due to metals' difficult natural degradation processes and persistence in the environment [1]. Nowadays, scientists find inspiration from the enormous variety of waste types generated in large quantities. The use of waste-derived materials in decontamination represents a *green* opportunity to promote circular economy and sustainable development principles [2].

Aims: Considering the above, the current study aimed to prepare a new eco-friendly composite based on food and industrial wastes and further apply it in the removal of heavy metals from contaminated waters in Borșa mining perimeter (Maramureș County, Romania).

Materials and Methods: The new material was characterized via FTIR, TGA and SEM-EDX. The composite was preliminary tested to study the effect of initial metal concentration, contact time, material dosage on the metal adsorption efficiency from stock solutions. Afterwards, the material was applied for heavy metals removal from contaminated waters collected from Borșa mining perimeter. Heavy metals were determined via ICP-OES.

Results: The results showed excellent adsorption efficiency for concentrations of Zn lower than 40 mg/L, when using 10 g of material after 4 hours of interaction with the contaminated solution. The tests performed on the collected mining waters indicated that the waste-based material has selectivity for several heavy metals such as Cd, Pb, Zn, Fe and Cu.

Conclusion: These findings demonstrate the potential application of the newly-developed waste-based composite in the mining water treatment sector.

Keywords: adsorption, Borșa mining perimeter, heavy metals, waste-based material, water treatment.

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SHELTERBELTS AS A STRATEGY FOR CLIMATE CHANGE ADAPTATION: IMPACT ON MICROCLIMATE AND CROP PRODUCTIVITY

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Introduction: Climate change, through rising temperatures, prolonged droughts and the increasing frequency of extreme weather events, represents a major challenge for the sustainability of agriculture. In this context, protective forest curtains constitute an effective strategy for both adaptation and mitigation, with multiple ecological and agronomic benefits. This study reviews the role of forest curtains in moderating microclimatic conditions and supporting crop productivity under climate stress.

Aims: Empirical data from Romania and other regions with continental and arid climates demonstrate production increases of 10–30% for major crops, such as cereals and maize, when fields are protected by forest curtains. In addition, forest curtains contribute to carbon sequestration, enhance biodiversity by providing habitats for beneficial species, and generate long-term socio-economic benefits for farmers.

Materials and Methods: The research followed the methodological framework developed by the Research Institute for Pedology and Agrochemistry (ICPA, 1987, Vol. I–III), as well as the Guide for the field description of the soil profile and specific environmental conditions (Ed. Sitech, Craiova, 2009). The data and materials were provided by the beneficiaries and included cadastral plans, field photographs and soil samples collected from profiles and surveys, which were analyzed and interpreted according to national methodological standards.

Results: The results obtained confirm that forest curtains represent an effective strategy for adapting agriculture to the increasingly restrictive pedoclimatic conditions in southeastern Romania. They perform essential functions for the stability and sustainability of agroecosystems: they reduce wind speed and protect the soil against erosion, conserve moisture and contribute to moderating temperatures at crop level, creating favorable microclimates that reduce evapotranspiration and stabilize the water regime

Conclusion: The large-scale implementation of these green structures could contribute decisively to increasing the resilience of agricultural systems in Romania and achieving sustainability and food security objectives.

Keywords: Climate change, Crop productivity, Shelterbelts, Soil.

PRELIMINARY ASPECTS REGARDING ACCLIMATIZATION AND INTRODUCTION INTO THE CULTURE OF THREE NEW VARIETIES OF *HELIANTHUS TUBEROSUS* AT ICDP BRASOV

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Introduction: *Helianthus tuberosus* L. is a perennial plant of the Asteraceae family, native to North America, adaptable to various pedoclimatic conditions, with good tolerance to frost, drought and resistance to diseases and pests. Some are potato-like, small, round and knobby, while others are long, thin and smooth (Swanton, 1994).

Objectives: The main objective of the study was to acclimatize and introduce into cultivation three varieties of *Helianthus tuberosus* obtained by clonal selection at the "Alexandru Ciubotaru" National Botanical Garden of the Republic of Moldova.

Materials and Methods: The experimental field was prepared in autumn by deep plowing (30 cm) and leveling. In spring, the soil was milled to 12–14 cm, and at the end of April the tubers were planted 8–10 cm deep. The experiment was bifactorial, organized in three repetitions according to the subdivided plot method. Each variant had a length of 2 m, with 6 rows of plants, and the paths between the plots were 1 m wide.

Results: The emergence period varied between varieties: *Mihai* sprouted after 10–12 days, *Solar* after 14–16 days, and *Maria* after 18–20 days. 30 days after planting, the height of the plants was between 12–25 cm in *Mihai*, 17–43 cm in *Solar*, and 4–15 cm in *Maria*.

Conclusion: The results highlight the influence of pedoclimatic conditions on the emergence and initial development of *Helianthus tuberosus*. The varieties showed distinct genetic peculiarities: *Mihai* – early emergence and moderate growth; *Solar* – delayed emergence, but vigorous growth; *Maria* – slow emergence and poor development, indicating less adaptability in the early stages of vegetation.

Keywords: acclimatization, *Helianthus tuberosus*, variety.

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THE USE OF ESSENTIAL OILS IN THE CONTROL OF PATHOGENS ON CEREAL GRAIN SEEDS

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Introduction: Essential oils are well known for their numerous benefits in the fields of food, medicine, agriculture, and animal husbandry (Pezantes-Orellana *et al.* 2024). They are also recognized for their antifungal properties against plant pathogens (Abd Rashed *et al.* 2021), including genera such as *Alternaria*, *Fusarium*, and *Aspergillus*.

Objectives: One primary objective was to identify the pathogens present on cereal seeds, and another important goal was to evaluate the effect of essential oil treatments on seed germination and on the pathogens.

Materials and Methods: The tests were carried out on cereal seeds. Twenty seeds of each variety were germinated, with the seeds being treated with essential oil solutions of mint, lavender, thyme, oregano, clove, tea tree, lemongrass, and orange.

Results: In terms of pathogen control, considering the tested concentrations, the essential oils of oregano, thyme, and clove proved to be the most effective, completely inhibiting pathogen development throughout the monitoring period.

Conclusion: The essential oils showed antifungal effects against the pathogens found on cereal seeds, according to the conducted experiment, and may represent an important alternative for biological control.

Keywords: antifungal effect, essential oils, plant pathogens.

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EFFECTS OF FOREST BIOMASS HARVESTING ON SOIL PRODUCTIVITY IN TEMPERATE FORESTS IN NORTH-WEST ROMANIA

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Introduction: Forest biomass is increasingly exploited as a renewable energy source, but its intensive harvesting raises concerns about long-term soil sustainability. In temperate forest ecosystems, the balance between biomass extraction and soil productivity is critical to maintaining forest health and ecological integrity.

Aims: The study aimed to evaluate the impacts of different biomass harvesting intensities on soil properties relevant to productivity, including nutrient content, organic matter levels, and soil structure, in representative forest stands of North-West Romania.

Materials and Methods: Research was conducted in mixed deciduous forests where biomass harvesting operations were carried out at varying intensities (low, moderate, and intensive). Soil samples were collected before harvesting and at set intervals post-harvest (6, 12, and 24 months). Laboratory analyses focus on macronutrients (N, P, K), pH, and bulk density. Data were statistically interpreted using ANOVA and correlation analysis to assess relationships between harvesting levels and soil parameter dynamics.

Results: Intensive biomass removal led to a noticeable decline in total nitrogen and available phosphorus, as well as reduced organic carbon and increased bulk density, suggesting early signs of soil degradation. Moderate harvesting showed minimal impact, while low-intensity interventions preserved most soil functions. pH values remained relatively stable across treatments. The strongest negative effects were observed in sandy or shallow soils.

Conclusion: The study highlights the need for site-specific biomass harvesting guidelines to prevent long-term soil productivity decline. Sustainable forest management practices should consider harvest intensity thresholds that maintain soil fertility and support forest regeneration.

Keywords: ecosystem services, nutrient cycling, site management, sustainable forestry.

RESULTS ON THE HEREDITARY TRANSMISSION OF PHENOTYPICAL AND PRODUCTION TRAITS IN SOME ROMANIAN MAIZE HYBRIDS

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Introduction: *Zea mays* is one of the most important crops worldwide, a source of calories, especially for people in developing countries (Maazou *et al.*, 2016). Recent estimates show that drought stress causes yield loss of 15% to 20% each year for maize and these losses will be even more severe due to the increase of stress episodes caused by climate change (Mittler, 2006)

Aims: The goal of the current research project is to obtain hybrids with high yield capacity, improved grain quality and increased adaptability to stress factors.

Materials and Methods: In a study conducted in 2024, 42 maize hybrids were monitored for yield as well as plant and ear traits. The hybrids were developed by crossing four elite (highly productive) inbred lines and several lines possessing favorable genes for carotenoid content. The sowing was carried out at the beginning of May, at a density of 70,000 plants ha⁻¹, using the experimental sowing machine Monoseed DT. Each plot consisted of four 5 m rows, arranged according to the randomized block design, with three replications.

Results: Several hybrids stood out for their productive superiority, indicating good adaptability to the unfavorable conditions of the experimental year: TA452xTE370, TA447xA484, TE390xLC28 and A483x A484. These hybrids had a well-developed leaf system, erect or semi-erect leaves, good flowering–silking coincidence and a low number of sterile plants.

Conclusion: Some superior hybrids were noted for both their yield and adaptability, having a good performance in adverse environmental conditions. These hybrids will be further tested to evaluate their yield in more environmental conditions.

Keywords: drought, hybrids, maize, yield.

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COMPARATIVE ANALYSIS OF THE SUGAR CONTENT OF THE STORAGE ROOT OF THREE SWEET POTATO VARIETIES ACCLIMATIZED IN THE GREENHOUSE UNDER THE INFLUENCE OF THE CULTURE SUBSTRATE AND CONDITIONAL IRRIGATION

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Introduction: The sweet potato is an extremely versatile and delicious vegetable, the dietary fiber present in the tuber roots improving digestion, helping to regulate blood sugar levels. It is highlighted as an antidiabetic food compared to other starchy vegetable products.

Aims: The purpose of this research was to evaluate the sugar concentration in the storage roots (tuberous roots) of some sweet potato genotypes from *in vitro* cultures acclimatized in the greenhouse.

Materials and Methods: The experiment was carried out in the greenhouse of the Research Laboratory for Vegetal Tissue Culture from NIRDPSB Brasov. The trifactor experience of type 3x2x2, was accomplished by combining several factors, analyzed in several graduation, as follows: Experimental factor A, variety: a₁-CD/1; a₂-CD/3; a₃-CD/4; Experimental factor B, culture substrate: b₁-Pe (containing perlite); b₂-T (containing red peat, black peat and perlite); experimental factor C, irrigation: c₁-normal irrigation; c₂-controlled irrigation to induce water stress. The P3000 polarimeter was used to determine the sugar concentration.

Results: Analyzing the combined influence of the three factors, the most representative results were recorded in the normal irrigation variant for the T culture substrate, thus the CD/3 (3.80) and CD/1 (3.63) varieties obtain very significant positive increases in terms of sugar concentration, compared to the control variety CD/4.

Conclusion: The analysis of the sugar concentration in the tubers of the analyzed varieties is influenced by both the irrigation conditions, the culture substrate used, and the genetic characteristics of each sweet potato variety tested.

Keywords: culture substrate, sugar concentration, sweet potato, water stress.

THE EFFICIENCY OF NITROGEN APPLICATION ON SPRING WHEAT REGARDING THE QUANTITY AND QUALITY OF GRAIN YIELD IN FIELD CONDITIONS AT ARDS TURDA

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Introduction: spring wheat covers ~25% of the global wheat harvested area (Luo *et al.*, 2022) the main producers being US, Russian Federation and Canada (Ren *et al.*, 2019). Winter wheat is preferred to spring wheat due to its higher production capacity which is over 30% (Entz and Fowler, 1991) but in harsh conditions spring wheat can be a real alternative to supply the food source.

Aims: was to test the influence of different nitrogen rate on spring wheat genotypes, respectively to test the influence and efficiency of fertilizer on yield and grain quality.

Materials and Methods: 12 spring wheat genotypes were studied in a field condition at Agricultural Research and Development Station (ARDS) from Turda for their yield capacity and grain quality as effect of different fertilizer rate. The field experiment consisted in comparative trials in randomized complete block design with three replications in two fertilizer regimes: F₁- basic fertilizer applied before sowing and F₂- applied in booting stage. At physiological maturity the spring wheat plants were harvested using Wintersteiger Plot Combine and grain yield was determined. Quality analyses were estimated using Tango FT-NIR spectrometer for protein content, wet gluten content, Zeleny test and other quality indices.

Results: yield capacity were higher in the additional fertilization level applied at booting stage being superior up to 20% in case of some genotypes. Also, grain quality was significantly influenced by fertilizer rate, highlighting some genotypes.

Conclusion: in the condition of 2025 additional fertilization applied at booting stage improve the grain yield level, respectively the grain quality.

Keywords: grain quality, grain yield, sowing date, spring wheat.

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RESEARCH ON THE ANTIEROSIONAL ORGANIZATION AND THE EVOLUTION OF THE DEGRADED SOILS THROUGH EROSION IN THE SLANIC RIVER BASIN, BUZAU COUNTY

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Introduction: Soil erosion is a problem that affects soil functions such as nutrient depletion, pH, water retention, texture and organic matter, which causes land productivity to decline (Den Biggelaar *et al.*, 2001). The arable land has the highest average land loss rates, in the European Union being estimated at 2.46 t/ha annually. (Panagos *et al.*, 2015).

Aims: The purpose of the article is to present the evolution of soil cover affected by water erosion, soil analysis and erosion impact assessment on soils that are arranged anti-erosionally, in the hill area of Buzau county.

Materials and Methods: Soil samples were taken from five soil profiles in 2000 and 2023 and the texture and humus of the soils arranged anti-erosion was determined from the areas affected by erosion.

Results: On the phaeozom soil type, it was found that the bench-type agroterasae and the technological alleys that remained grassy, contributed to the increase of humus content in the bioaccumulation horizon. If in 2000 it was small of 3.4%, after the anti-erosion arrangement it increased to medium values of 3.7%, due to natural grass. On the typical Chernozem, arranged by technological alleys, there is an increase in humus content by 0.38% in the bioaccumulation horizon (Am) from 3.79% in 2000 to 4.17% in 2023.

Conclusion: The measures to combat soil erosion in the Slanic basin, by performing the works of agro-terracing slopes, creating technological and grassy alleys, lead to the preservation of the soil profile and improving soil fertility.

Keywords: agroterase, erozion, humus, watershed.

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Acknowledgments: This work was supported by a grant of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, Intern Project no. 851/30.06.2023.

COMPARATIVE EFFICACY OF ESSENTIAL OILS AGAINST TWO MAJOR INSECT PESTS OF STORED FOOD PRODUCTS

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Introduction: Stored-product pests such as *Tribolium castaneum* Herbst and *Sitophilus granarius* Linné cause significant economic losses by degrading grain quality and safety (Ahmad *et al.*, 2022). As alternatives to synthetic insecticides, essential oils have gained attention for their insecticidal (El-Shourbagy *et al.*, 2023), antifungal (Onița *et al.*, 2025), and eco-friendly properties. This study investigated their potential use against these two pests.

Aims: The objective was to evaluate the effectiveness of several essential oils in controlling *T. castaneum* and *S. granarius*, with focus on mortality rates at different doses.

Materials and Methods: Insects were reared under controlled laboratory conditions and exposed to peppermint, eucalyptus, hemp, lavender, oregano, thyme, orange, vanilla, rosemary, and coffee oils. Mortality was assessed after 25–35 minutes of exposure.

Results: Essential oils showed species-specific effectiveness. For *T. castaneum*, the highest mortality was recorded with eucalyptus (50%), orange (48%), mint and vanilla (>45%). For *S. granarius*, eucalyptus was most effective (45%), followed by oregano and rosemary (30%). Orange, coffee, and vanilla caused moderate effects (20–25%), while thyme showed minimal impact.

Conclusion: The study confirms the potential of essential oils as eco-friendly alternatives to synthetic insecticides in controlling *T. castaneum* and *S. granarius*. Eucalyptus and orange oils showed the greatest effectiveness, though results depended on species and dose.

Keywords: control, essential oils, insects, pests, stored products.

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FOOD SAFETY IN ALGAE PRODUCTION: STUDY OF BACTERIAL BIOFILMS AND ALTERNATIVE TREATMENTS

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Introduction: Food is a universal human right recognized by both the United Nations and the FAO. To address this issue and reduce the environmental impact of food production, international organizations emphasize the need to explore alternative food sources such as algae, both micro- and macroalgae. The algae industry generates more than €18 billion annually and is expected to reach €33 billion by 2028. In 2022, the European Commission launched the EU Algae Initiative to support the development of this sector over the next decade.

Aims: This study aims to assess the presence of foodborne pathogens associated with bacterial biofilms in algae production systems and to highlight the need for improved food safety protocols in this emerging food matrix.

Materials and Methods: Two rounds sampling were conducted at a microalgae processing company in the Region of Murcia, Spain, which produces microalgae for human consumption. Sampling took place in March and July 2025. Samples were collected from 9 “spots”: surfaces in contact with the algae during cultivation and processing. These samples were cultured on non-selective media (BHI) and selective media (*Bacillus cereus* agar, XLD, ALOA, and EMB) in order to identify the presence of pathogenic bacteria.

Results: Differentiated colonies were observed on non-selective media, and some positive results were found in selective media. These outcomes indicate the occurrence of potentially harmful microorganisms within the production environment.

Conclusion: The presence of pathogens in selective media highlights the potential risks associated with bacterial biofilms in algae production systems. These findings underscore the need to develop targeted surveillance and cleaning protocols to ensure food safety as the algae industry continues to grow.

Keywords: algae, biofilms, food pathogens, food safety.

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AN ENVIRONMENTAL ASSESSMENT OF THE RESTORE TECHNOLOGY FOR DECARBONISING DISTRICT HEATING AND COOLING

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Introduction: The RESTORE project investigates a novel energy storage technique based on CuSO_4 's thermochemical cycle. This concept integrates diverse renewable energy sources with cost-effective seasonal storage into district heating and cooling networks, enabling full reliance on renewables and enhanced sustainability. Energy is stored by dehydrating CuSO_4 during periods of excess renewable electricity (summer), and later recovered through rehydration (winter).

Aims: This study evaluates the environmental performance of RESTORE use cases using LCA for Experts software.

Materials and Methods: The system combines Thermochemical Energy Storage (TCES), a Heat Pump (HP), and an Organic Rankine Cycle (ORC) to produce thermal energy for district heating and cooling networks. Its sustainability was assessed via Life Cycle Assessment (LCA), applying key indicators from the ReCiPe 2016 methodology. Since the use cases have different capacities, the functional unit was defined as one kWh of thermal energy. System boundaries covered three main stages across the full life cycle. Environmental key performance indicators (KPI) were analyzed to demonstrate the potential of the proposed system.

Results: The influence of sub-processes was examined, focusing on categories such as Global Warming Potential and Fossil Depletion. Variations in KPI values mainly arise from the energy source used during charging and the organic fluids selected for the ORC.

Conclusions: Findings stress the role of system configuration and material choices in the sustainability of TCES technologies, as well as the value of combining LCA with performance metrics to improve future seasonal storage solutions in district heating and cooling networks.

Keywords: District Heating and Cooling, Heat Pump, Life Cycle Assessment, Organic Rankine Cycle, Thermochemical Energy Storage.

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OPTIMIZATION RESEARCH ON THE DISTRIBUTION SYSTEM OF THE APV LF 600 M1 APPLICATOR

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Introduction: Localized application of liquid fertilizers during sowing is increasingly adopted in precision agriculture due to its potential to improve nutrient use efficiency and reduce losses. Despite these advantages, the hydraulic performance of distribution systems still presents challenges, particularly regarding application uniformity.

Aims: Considering these limitations, the aim of this study was to compare two design configurations of liquid fertilizer distributors, in order to identify an optimized technical solution that ensures uniform and predictable distribution.

Materials and Methods: Laboratory tests were carried out using an **APV LF 600 M1 liquid applicator**, equipped with **IFM inductive flow sensors**. Data collection and real-time analysis were performed using the **Moneo platform**, which enabled evaluation of flow differences between sections.

Results: The modernized distributor with a closed-loop (ring-type) design showed a significant reduction in deviations from the average flow rate, as well as a lower coefficient of variation compared to the conventional radial-outlet distributor.

Conclusion: The study demonstrates that improving the internal architecture of distributors contributes to enhanced application uniformity, supporting the adoption of such solutions in modern liquid fertilization technologies.

Keywords: distributor, inductive flow sensor, liquid applicator, liquid fertilization, precision agriculture.

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ASSESSMENT OF FAT CONTENT IN PACKAGED ORGANIC PRODUCTS BASED ON PRODUCT LABELING

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Introduction: Organic products are enjoying growing interest among consumers. Organic food is perceived as high-quality food due to the origin of raw materials from organic farms, where strictly defined production methods are applied. Consumers of organic food choose it out of concern for their health, to reduce the risk of developing various diseases, and also with the intention of supporting the development of farms.

Aims: The aim of the study was to assess the fat content in 175 selected packaged organic products available on the Polish market, based on the manufacturer's declaration provided on the labels.

Materials and Methods: An analysis was conducted of the quantity and composition of fat, including the content of saturated and unsaturated fatty acids as well as partially hydrogenated vegetable fats. The tested products were divided into seven categories: sweets, snacks, fruit and vegetable preserves, ready-made meals, dairy, cereal products, and fats. Each category included 25 products.

Results: The conducted study showed that most of the examined food products contained less than 10% fat per 100 grams of product. The "fats" category contained the highest amount of saturated fatty acids. Among the tested organic products, the largest group consisted of those with a saturated fatty acid content of less than 20% of the total fat amount. Sunflower oil was the most commonly used oil in the production of the analyzed organic food. The labels of the analyzed products did not declare the presence of partially hydrogenated vegetable fats. Therefore, it can be concluded that the examined food either does not contain or contains only trace amounts of trans fatty acid isomers.

Conclusion: In the present research work, we demonstrated that the organic products currently available on the Polish market were characterized by a diverse composition and quality of the fat fraction.

Keywords: fat, organic farming, organic food, product label.

EVALUATION OF THE BENEFICIAL EFFECTS OF COMPOSTS OBTAINED FROM WASTEWATER TREATMENT PLANTS ON DEGRADED SOILS

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Introduction: When mineral fertilizers are not available or are too expensive, compost could be an important source to provide nutrients to the plants. Nowadays, farmers appreciate compost as a natural source of nutrients and humus. Management of municipal activated sludge has shifted from conventional waste disposal to resource valorization, considering that sewage sludge could be both a reliable resource for energy and nutrient recovery. Composting, especially with lignocellulosic amendments, can produce a stable and mature compost.

Aims: The present paper aims to bring new solutions to optimize composts resulting from wastewater treatment plants for better restoration of degraded or nutrient-deficient soils. Identification and description of quality parameters of composts derived from sewage sludge from Câmpia-Turzii Wastewater Treatment Plant has been done. Different ways of improving the quality of compost was analyzed by reviewing literature. Addition of different amendments and vermicomposting are practices that can improve composting process.

Materials and methods: Colorimetric and spectroscopic methods was used for measuring different chemical and microbiological quality indicators.

Results: The physical and chemical indicators (pH, Nt, Pt, heavy metals etc.) analyzed from the compost samples were compared with other values reported by other authors (Zorpas, 2008; Li et al. 2024). It was reported that the use of zeolite as an amendment can reduce heavy metals from the compost, while other papers reported improved biological activity in compost amended soil and an significant increase of plant biomass where compost was used.

Conclusion: The quality of compost obtained from the wastewater treatment plant can be improved by using different technique and then used as amendment in agriculture, especially for soils where organic matter content is small.

Keywords: compost, wastewater sludge, degraded soils, microbial activity

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ECOLOGY AND SPATIAL DISTRIBUTION OF *URSUS ARCTOS* IN THE CONTEXT OF HUMAN IMPACT: A CASE STUDY FROM A ROMANIAN PROTECTED AREA

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Introduction: Although the brown bear is among the most widespread large carnivores in Europe, its distribution and behaviour are strongly influenced by anthropogenic factors, particularly habitat fragmentation and human disturbance (Swenson *et al.*, 2000). Brown bears typically require extensive forested areas with sufficient food resources and limited human access, and they tend to avoid heavily modified landscapes where these conditions are compromised (Elfström *et al.*, 2014). Understanding how bears use space in relation to human presence is therefore essential for both conservation planning and conflict mitigation in landscapes shared by people and wildlife.

Aims: The present study aimed to evaluate the spatial distribution, habitat selection, and ecological preferences of brown bears in relation to the degree of anthropogenic pressure within the Pricop-Huta-Certeze protected area.

Materials and Methods: Field data were obtained over two years using the presence sign survey method. Data were analysed and presented using QGIS.

Results: Bear distribution and movement was influenced by human activities, habitat quality, forest cover, presence of roads and season. Bears preferred areas with lower human activity and higher forest cover and generally avoided active logging sites, the main road and the entire western part of the protected area.

Conclusion: In the present research work, we outline the impact human activity has on the distribution and habitat selection of *Ursus arctos* in a protected area in NW Romania.

Keywords: anthropogenic impact, distribution, protected areas, *Ursus arctos*.

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STUDIES ON ZINC-MAGNESIUM NITRATES, AS POTENTIAL MIXED MICRO - AND MACROELEMENT FERTILIZER

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Introduction: Nitrogen is a macronutrient, essential for vegetative development of crops. Magnesium is a secondary nutrient, active in photosynthesis. Zinc is a micronutrient which contributes in small amounts but with significant effect to the biofortification of plants. These elements may be found as single or mixed nutrients in solid and liquid fertilizers. (Zaib et al, 2023).

Aims: The aim of this work is to bring together Zn-Mg-N in one fertilizer and to study the reaction for the individual and mixed synthesis of Zn and Mg nitrates. The thermal behavior of the resulting salts is also investigated (Bota, 2025).

Materials and Methods: Pure reagents as well as standard laboratory equipment and instruments were used in experiments.

Results: Zn and Mg nitrates were prepared individually, by nitric acid dissolution of metal oxides (Bota, 2025; Ebert et al, 2015). Mixed Zn-Mg nitrates were also co-synthesized, as a new procedure. For all reactions, the dissolution yield was set to 100% and the dissolution time was measured for: nitric acid concentration (1M and 0.5M), metal oxide granulation (powder, granule), temperature (25-70°C) and stirring (0, 250, 500 rpm). The best results were recorded for the reaction of powder with 1M acid solution, at 70°C and 500 rpm. Comparison between the individual salts and the co-synthesized one was made by thermogravimetric analysis.

Conclusion: Mixed Zn-Mg nitrate can be prepared by co-synthesis at higher temperature, higher concentration, high stirring speed and low solid granulation, with 100% reaction yield and more than 70% crystallization yield. The mixed salt shows a distinct thermal behaviour.

Keywords: co-synthesis, fertilizer, zinc-magnesium nitrate.

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STUDIES ON POTASSIUM-SODIUM PHOSPHATES, AS POTENTIAL MIXED FERTILIZER

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Introduction: K, P and Na are nutrient elements, K and P being considered essential for plant development. Despite the use of mono-alkaline metal phosphates as fertilizers on a large scale, the related tri-metal phosphates are also beneficial for selected crops and soils. These compounds are obtained individually, mostly by neutralization reactions, and there are very few studies on Na-K phosphate mixtures in solid and solution (Novikov et al, 2025).

Aims: The aim of our research is to establish the optimal parameters for the one-pot synthesis of sodium- and mixed potassium-sodium phosphates, in terms of temperature, concentration and crystallization yield. The thermal stability and the solubility of the resulting salts is also described (Cibu, 2024).

Materials and Methods: Analytically pure reagents, standard laboratory equipment and advanced investigation instruments were used in experiments. No animals or biological samples were used.

Results: Sodium- and potassium-sodium phosphates were prepared by one-pot neutralization and crystallization, as a new method (Cibu, 2024). The reagents concentration in solution varied from 20 to 50% and the reaction temperature was set up to 80°C. The crystallization yield increased from 50 to 90%, directly proportional with the concentration. Thermogravimetric analysis reveals the hydration degree and the thermal stability of the salts in the 20-700°C thermal range, in good agreement with literature data. (Ghule et al, 2001).

Conclusions: Mixed potassium-sodium phosphates can be prepared by one-pot neutralization, in good yields, at high temperatures and in concentrated solutions. The products show good solubility in water and dehydrate during heating.

Keywords: crystallization, fertilizer, phosphates.

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ADVANCING SAFE AND SUSTAINABLE FOOD INNOVATION THROUGH NOVEL PROCESSING AND BIOACTIVE PACKAGING

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Introduction: Emerging food technologies such as UV-C radiation, cold plasma, freeze concentration, nanoemulsification, and advanced drying are gaining traction due to their potential to enhance food safety and quality while minimizing the use of additives. In parallel, bioactive packaging materials, such as bacterial cellulose or antimicrobial paper, are offering new ways to extend shelf life and ensure microbial safety. Combining these innovations represents a promising strategy for processing tropical and sub-tropical products for the EU market.

Aims: Taking into account these considerations, the aim of this research is to establish a robust scientific network between EU and Latin American institutions to advance, assess, and optimize novel food processing and packaging technologies that result in safe, nutritious, and sustainable food products.

Materials and Methods: A consortium of 8 partners (5 universities and 1 food producer from the EU and 2 universities from Latin America) is collaborating through international secondments totalling over 220 person/months. Multidisciplinary research focuses on optimizing food processing technologies, developing at least two types of bioactive packaging, and conducting risk assessments in accordance with EFSA requirements. Case studies target high-value tropical commodities such as fruit, coffee, and palm oil, using a holistic evaluation framework that includes microbiological, chemical, and nutritional analyses.

Results: The project will generate at least five novel food product–technology combinations reaching a TRL of 5, with validated safety, nutritional quality, and market potential. It also supports added value and waste reduction in tropical regions by enabling safer export-ready products with extended shelf life and potential health claims.

Conclusion: In the present research, we will provide a transcontinental research platform that promotes food safety, sustainability, and innovation. By linking advanced processing with active packaging, the project supports both EU consumer protection goals and the valorization of Latin American agricultural products.

Keywords: bioactive packaging, food safety, EFSA framework, international research collaboration, novel food processing.

SESSION 2: FOOD SCIENCE AND TECHNOLOGY

ASSESSMENT OF ORGANOCHLORINE, ORGANOPHOSPHORUS PESTICIDES AND PAHs IN SMOKED RIPENED CHEESES: A FOOD SAFETY PERSPECTIVE

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Introduction: Smoked ripened cheeses are appreciated for their complex sensory profiles developed during maturation and smoking. Prolonged exposure to these contaminants poses significant health risks, as many are classified as endocrine disruptors or carcinogenic substances (Muresan, 2021).

Aims: The objective of this study was to determine the levels of selected pesticide residues (organochlorine and organophosphorus) and PAHs in smoked ripened cheeses and to evaluate their compliance with food safety thresholds as reported in recent literature.

Materials and Methods: Analytical determinations were conducted using gas chromatography–mass spectrometry (GC-MS) following QuEChERS (Quick, Easy, Cheap, Effective, Rugged and Safe) extraction. The target analytes included organochlorine pesticides (DDT, lindane), the organophosphorus pesticide chlorpyrifos, and PAHs such as benzo[a]pyrene, chrysene, fluoranthene, benzo[a]anthracene, and benzo[b]fluoranthene. Results were interpreted with reference to contamination levels discussed in the literature (Yeganeh, 2024), considering the safety threshold of 12 µg/kg for the sum of PAH4 in smoked dairy products.

Results: Organochlorine pesticide residues were detected in concentrations ranging from 0.002 mg/kg (lindane) to 0.015 mg/kg (DDT). Chlorpyrifos was either undetectable or present at trace levels below 0.001 mg/kg. Benzo[a]pyrene was undetectable in all samples. The PAH4 content (sum of benzo[a]pyrene, chrysene, benzo[a]anthracene, benzo[b]fluoranthene) varied between 1,35 and 1,59 µg/kg, remaining under the safety threshold of 12 µg/kg cited by Yeganeh (2024).

Conclusion: All analyzed cheese samples complied with the reference levels for pesticide and PAH residues as reported in recent scientific literature. However, the detection of PAHs, even within acceptable limits, highlights the importance of strict control over smoking conditions and the necessity of routine monitoring to ensure continued food safety and consumer protection.

Keywords: food safety, GC-MS, PAHs, pesticide residues, smoked cheese.

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GEEK4FOOD SKILLS PASSPORT: DISRUPTIVE TOOL FOR IDENTIFYING SKILLS DEMAND AND GAPS IN THE AGRI-FOOD SYSTEM

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Aim: The Agri-Food systems need to renew their task force and educate the new generation of job seekers towards sustainability and resilience to provide healthy and safe food for all. Meanwhile, the EU Green Deal, among the other strategic EU policies, to be effective, requires both green technical skills and a mind-shift of the human capital. However, a skills gap supply vs. demand in the food sector is emerging. A.I.-based tools could help address this by identifying skills needs and trends, as well as developing modern training that matches the “fluidity” of job market demands.

Method: GEEK4Food (www.geek4food.com), an Erasmus+ Forward looking project, has developed a cross-sectoral framework to support the food system transition towards sustainable and green solutions by an integrated approach that applies Artificial Intelligence (A.I.) tools coupled with reactive and fast responding educational modules design and delivery. A platform where the agri-food system's actors (learners, HE institutions, business and policymakers) collaborate and co-create to shape educational offerings on green-skills has also been created.

Results: The project outcomes include: i) the GEEK4Food Skill Passport, an Artificial Intelligence (AI)-based tool able to determine and forecast current and future green skills for the food sector to timely support the development of educational and training paths matching the job market needs; ii) an interactive learner-centric virtual platform for green skill mapping to merge learners' needs with training offers and agri-food job opportunities; iii) a forward-looking model of training design and implementation of HE and cross-sectoral trainings intended for graduates and food professionals to enhance green skills. Moreover, evidence- and impact-based solutions of the project will be used to embed multi-level and multi-actor policy actions supporting skill-fluidity for the green transition of the food sector.

Conclusion: The AI-supported and impact-driven patterns of the GEEK4Food model aim to favour innovative green training and educational models and provide tools for all the main actors, including policy makers of the food systems, to promote adherence to green transition.

Keywords: entrepreneurship, GEEK4Food, green skills, innovative teaching models, skills intelligence.

Acknowledgements: GEEK4Food is an Erasmus+ Forward Looking project (Project N.: 101087203) co-funded by the European Commission.

SCREENING OF GRAPE POMACES FROM TÂRNAVE VINEYARD FOR BIOACTIVE COMPOUNDS WITH ANTIOXIDANT ACTIVITY

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Introduction: A major by-product of winemaking, grape pomace (GP) is becoming more and more recognised for its potential as a source of bioactive compounds with antioxidant properties.

Aims: By examining the polyphenol and fatty acid content as well as the antioxidant activity of 17 GP samples from Transylvanian cultivars, this study seeks to shed light on their composition in order to ascertain whether the sustainable valorisation of GP can yield bioactive chemicals that may be advantageous to human health.

Materials and Methods: The phenolic composition of the extracts was done by LC-MS, the fatty acids were identified by GC-FID and the antioxidant activity was measured by DPPH, ABTS, CUPRAC, FRAP, Reducing Power and Ferrous Fe²⁺ and Cupric Cu²⁺ Chelation assays

Results: Neuburger (NE), Radames (RA), and Regent (RE) cultivars showed the highest levels, of catechin, epicatechin, and procyanidin dimers. NE and Fetească Regală (FR) demonstrated the greatest radical scavenging and electron transfer capacities. Fatty acid analysis revealed that Rose Blaj (RB) and Astra (AS) contained the most favorable nutritional profiles, including high unsaturated-to-saturated fatty acid (UFA/SFA) and hypocholesterolemic to hypercholesterolemic fatty acid (H/H) ratios, as well as low atherogenicity (AI) and thrombogenicity indices (TI), indicating cardioprotective potential. RB and NE also exhibited strong chelation of Cu²⁺ and Fe²⁺ ions, enhancing their antioxidant efficacy by mitigating metal-catalyzed oxidative stress.

Conclusion: These findings support the valorization of GP, particularly from NE, RB, RA, and AS cultivars, the last three being homologated in Transylvania at SCDVV Blaj, as promising sources of health-promoting compounds.

Keywords: antioxidant activity, fatty acids, phenolics, red grape pomace, white grape pomace.

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QUALITY OF GRAPES MATURATION AS A PREMISE FOR THE QUALITY GRAPE POMACE

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Introduction: Grape pomace (GP), the subproduct resulting from grape vinification, represents a valuable source of bioactive phenolics. This composition is influenced by the quality of grapes entering the winemaking process.

Aims: This study attempts to examine the effects of the grape maturing process on the phenolic composition of grape pomace in the Târnave vineyard.

Materials and Methods: Analytical parameters such as sugar content (g/L), total acidity (g/L sulfuric acid, g/L tartaric acid), pH, weight, and volume of 100 berries were monitored to follow the processes of the grapes' maturation. Liquid chromatography coupled with mass spectroscopy (LC-MS) analysis was used for determining the GP phenolics.

Results: Concerning the grapes, results for the most significant parameter, sugar content (g/L), were as follows: the Pinot gris cultivar had the highest accumulation (249,82 g/L), while the Riesling Italian had the lowest (189,06 g/L). The majority of compounds identified by LC-MS analysis of GP extracts belong to the class of flavanols, represented in particular by catechin, epicatechin, dimers of procyanidins of type B1, B2, B3, B4, but also by trimers of procyanidins of type C1 and C2. Thus, it was observed that the Pinot gris, Neuburger, and Traminer Roz cultivars were very rich in catechin and epicatechin, with amounts (catechin+epicatechin) of 43.52%, 41.88% and 37.33% of the total polyphenols quantified by the LC-MS method.

Conclusion: The analysis of primary data reveals that the accumulation of sugars varied by cultivar and was also influenced by the climatic conditions of 2023. Pinot gris, the cultivar with the highest sugar content in grapes, proved to have also the highest concentration of catechin and epicatechin in GP, showing that the grapes' quality influences the phenolic composition of GP.

Keywords: grapes, sugar content, grape pomace, phenolic compounds.

Acknowledgement: This research was funded by the Romanian Ministry of Agriculture and Rural Development (grant ADER 6.5.4/2024).

NUTRITIONAL EVALUATION OF FAST-FOOD BURGERS USING FT-NIR SPECTROSCOPY: A RAPID SCREENING APPROACH

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Introduction: The increasing consumption of fast-food products raises public health concerns, mainly due to high levels of calories, fats, and sodium (Stender et al., 2007; Ozaki et al., 2021). Rapid and accurate nutritional assessment is essential for quality control and consumer awareness. FT-NIR spectroscopy offers a non-destructive, fast, and automated method for such analysis (Cozzolino, 2022). This study evaluated fast-food burgers using FT-NIR, with partial comparison to traditional chemical methods.

Aims: The aim of this study was to assess the macronutrient content of four types of fast-food burgers using FT-NIR and compare results with conventional analyses, emphasizing advantages and limitations of this rapid technique.

Materials and Methods: Four burger types (A–D; n=10 each) were collected from a fast-food chain. Samples contained buns, patties (beef/chicken), cheese, sauces, and vegetables. About 40 g of homogenized product was analyzed via TANGO FT-NIR under a "bread matrix" setting. For types B and D, conventional lab methods (Kjeldahl, Soxhlet, EU protocols) were also used for protein, fat, carbohydrates, and sugars.

Results: FT-NIR enabled rapid profiling across all samples. Burger weights ranged from ~107 g (A) to >300 g (D). For B and D, FT-NIR slightly underestimated protein (by 4–6%) and overestimated fat (by 3–4%). Carbohydrate results aligned well (<2% deviation), while sugar values were overestimated by ~1–1.5%.

Conclusion: FT-NIR spectroscopy is a rapid and effective tool for screening fast-food products, offering reliable data for carbohydrates and sugars. However, slight inaccuracies for protein and fat suggest a need for matrix-specific calibration. The method is promising for routine industry use, though broader validation is recommended.

Keywords: carbohydrates, fast-food burgers, food quality control, FT-NIR spectroscopy, macronutrient analysis, nutritional screening.

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GRAPE POMACE: ANTIOXIDANT STATUS AND ITS POTENTIAL FOR CREATING NOVEL THERAPEUTIC PRODUCTS

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Introduction: The utilization of grape pomace as a principal by-product of the winemaking industry, a significant agricultural activity worldwide, to develop novel therapeutic products with high nutritional value, represents an innovative approach for a sustained zero-waste circular economy. Polyphenols found in grape pomace are known for their antioxidant, anti-inflammatory, antimicrobial, antidiabetic, antihyperlipidemic, antiallergic, antiproliferative, antithrombotic, and neuroprotective effects and have been used for centuries for their therapeutic properties.

Aims: This review outlines the methods of analyzing grape pomace antioxidant behavior, main results in vitro and in vivo studies with therapeutic advantages, and the need to introduce grape pomace in interdisciplinary nutritional-based diet with the scope of reducing oxidative stress.

Materials and Methods: The following online databases, Elsevier Science Direct, Web of Science, PubMed, and Google Scholar, were systematically searched for relevant publications until 2014.

Results: Most of the studies about the antioxidant potential of grape pomace are made in vitro. A lot of these studies had great results regarding the intracellular activities of grape pomace products alone or combined with other substances. Still, there are also in vivo studies, which confirm these results. The beneficial effects of resveratrol could be used, for example, in oncological therapies to reduce the side effects of cytostatic agents.

Conclusion: There is a huge potential for innovative products made from grape pomace waste, but there are some difficulties to face regarding the optimal formulation design, such as high oxidative degradation of antioxidants, pH instability, and low bioavailability when ingested. To create a high-quality product, the optimal route for absorption must also be considered.

Keywords: antioxidant, functional food, grape pomace, oxidative stress, therapeutic applications

ISOTOPIC AND ELEMENTAL FINGERPRINTS “MEET” THE PORK MEAT

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Introduction: Due to their biological qualities, pigs represent one of the species majorly involved in meeting the population's meat needs, ensuring over 30% of world consumption. In Romania, pork is a traditional product, with a relatively constant consumption throughout the year, the annual mean consumption per capita being around 36 kg.

Aims: The aims of our study were: i) highlighting the ^2H , ^{18}O , and ^{13}C isotopic signature of investigated pork meat samples as function of geographical origin; ii) recording their elemental concentrations; iii) performing Partial Principal Component Analysis (PCA) to assess if samples from different geographical origins offer the potential to cluster into separate groups, and applying Linear Discriminant Analysis (LDA) to identify and point out the best differentiation markers related to sample's place of origin.

Materials and Methods: Isotopic Ratio Mass Spectrometry (IRMS) together with Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) represent efficient analytical techniques that enable tracing of the geographical origin of different food products, especially if these techniques are combined with statistical methods.

Results: $\delta^2\text{H}$ and $\delta^{18}\text{O}$ values ranged from -71.0 to -21.2 ‰, and from -9.3 to -2.8 ‰, respectively. The contents of macro- and micro essential elements presented the order: $\text{K} > \text{Na} > \text{Mg} > \text{Ca} > \text{Zn} > \text{Fe} > \text{Cu} > \text{Cr}$. LDA model assigned in the initial classification 91.4% separation of samples, while for the cross-validation procedure, a percentage of 90% was obtained. Thus, $\delta^2\text{H}$, K, Rb, and Pd were identified as the most representative parameters to differentiate the pork meat samples coming from Romania *versus* those from abroad.

Conclusion: A total of 70 loin pork samples were collected; the isotopic and elemental signatures were determined. The multivariate statistical approaches (ANOVA, PCA, and LDA) were applied to obtain the most important predictors that could distinguish the meat samples' geographical origin.

Keywords: chemometrics, geographical origin, ICP-MS, IRMS, pork meat

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FROM MOUNTAIN TO THE SEA: STABLE ISOTOPES INSIGHTS FROM THE ARIEȘ RIVER TO THE BLACK SEA

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Introduction: Stable isotopes of hydrogen (^2H) and oxygen (^{18}O) are natural tracers in the water cycle. They help us understand key environmental processes such as evaporation, precipitation, river inflow, and sedimentation. Carbon isotopes give information regarding the organic or inorganic carbon in sediments. Together, they offer a detailed picture of environmental processes.

Aims: This study aims to compare the isotopic fingerprints of two contrasting aquatic environments - the Black Sea and the Arieș River - to better understand their hydrological and geochemical dynamics.

Materials and Methods: The water and sediment samples were collected and then analyzed by Isotope Ratios Mass Spectrometry (IRMS). Sediment samples were separated into organic and inorganic fractions for carbon isotope analysis.

Results: Regarding the Aries water samples, the $\delta^{18}\text{O}$ variation range was between -10.5 and -9.3 ‰, while $\delta^2\text{H}$ values ranged between -69.8 ‰ and -63.3 ‰. For the Black Sea, the isotopic fingerprints of water samples were, for ^{18}O , from -2.4 ‰ and -1.0 ‰, and from -25.3 ‰ to -17.6 ‰ for ^2H , respectively. The mean value of -28.6 ‰ for the ^{13}C fingerprint of the bulk organic component from Aries River sediments was recorded, while for the inorganic component, the $\delta^{13}\text{C}$ signatures range between -7.4 and -1.2 ‰. Also, the average value of -25.3 ‰ was obtained for the organic component of Black Sea sediments, and for the inorganic component, the $\delta^{13}\text{C}$ fingerprints range between -4.3 and -1.5 ‰ versus VPDB international standard.

Conclusion: Combining hydrogen, oxygen, and carbon isotopes it is obtaining a multi-dimensional view of these aquatic systems and their sedimentary processes. In the context of climate change and human impact, isotopic tools can help us monitor, predict, and understand changes in both freshwater and marine systems.

Keywords: river, sea, stable isotope.s

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METHOD VALIDATION OF TOXIC ELEMENTS (Cd, Pb and As) ANALYSIS IN FISH BY ICP-MS

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Introduction: Fish is a valuable source of essential nutrients, but it can accumulate toxic elements such as Cd, Pb and As, which can affect human health. Monitoring of these contaminants is done by modern analytical techniques, such as: AES, EDXRF, FAAS, GFAAS, ICP-AES and ICP MS. Validated method of analysis is very important in any analytical procedure and its use ensures the precision of the analytical outcomes.

Aims: The proposed of the present study is to validate a method for analyzing toxic elements (Cd, Pb and As) in fish by ICP-MS, using the following parameters: linearity, limits of detection (LOD), limits of quantification (LOQ), precision and accuracy.

Materials and Methods: The microwave equipment used to digest a certified reference material (SRM NCS ZC 73006) and fish samples was Speed ENTRY by Berghof|. The analysis of Cd, Pb and As was done using ICP-MS ELAN DRC (e), Perkin Elmer, mass spectrometer.

Results: Good satisfactory linear relationships were observed, as indicated by correlation coefficients obtained ($r > 0.999$) for the calibration curves. The instrumental LODs in ng/L were: 1.070 (Cd), 2.589 (Pb) and 36.204 (As). The instrumental LOQs in ng/L were: 10.69 (Cd), 25.89 (Pb) and 362.03 (As). The precision of analytical method was determined in terms of repeatability and reproducibility. The low RSD values obtained ($< 2\%$) in both cases confirmed the good precision and robustness of the method. The accuracy was evaluated using recovery tests using a certified reference material. The recovery rates obtained in infant food samples ranged between 80% and 112%, with a precision not exceeding 8% RSD.

Conclusion: Validation results demonstrated that the analytical method for heavy metals (Cd, Pb and As, respectively) are suitable for their intended purpose.

Keywords: ICP-MS, method validation, toxic elements.

Acknowledgements: This work was supported by project number 19PED/2025.

SPATIAL DISTRIBUTION OF HEAVY METAL(LOID)S CONCENTRATIONS ALONG ARIES RIVER BASIN: THE HEALTH RISK ASSESSMENT AMONG ADULTS AND CHILDREN

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Introduction: Heavy metals (HMs) pose a serious risk to human health and the environment. In central Romania's Transylvania region, past mining activities at Rosia Poieni, Rosia Montana and Baia de Aries are major pollution sources, historically impacting the Aries River through mining and ore processing (Moldovan A., 2022).

Aims: This study focused on the following objectives: the determination of heavy metal(loid)s (Cd, Pb, Cu, and As), concentrations from Aries River and health risk assessment for the intake of HMs among adults and children via ingestion and dermal routes.

Materials and Methods: The river water samples (n=24) were analyzed by ICP-MS for metal concentrations. Human exposure to HMs was assessed by ingestion and dermal absorption, following U.S. EPA guidelines (U.S. EPA, 1989). Non-carcinogenic health risk was evaluated using the Hazard Quotient (HQ), while carcinogenic risk was assessed based on lifetime exposure and metal-specific cancer slope factors.

Results: Mean metal levels followed the order: Cu>As>Cd>Pb. Exposure (CDI) showed Cu and As as dominant pathways. Hazard Index (HI) values were below 1, indicating low non-carcinogenic risk. Carcinogenic risk (CR) remained within safe limits (10^{-6} - 10^{-4}).

Conclusion: Health risk assessment showed children are more vulnerable than adults, though HQ and HI remained below 1, indicating low non-carcinogenic risk. Cancer risk values (CR) were within acceptable limits.

Keywords: Aries river, health risk, heavy metals

Acknowledgements: This work was supported by project number 19PED/2025.

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POLYPHENOLIC PROFILE AND ANTIOXIDANT ACTIVITY OF WINES ENRICHED WITH GRAPE POMACE EXTRACTS

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Introduction: Grape pomace, a residual byproduct of winemaking, remains a rich source of secondary metabolites with notable therapeutic properties, including antioxidant, antimicrobial, anti-inflammatory, and antihyperglycemic activities. The phenolic compounds extracted from grape pomace hold significant potential for application in the food and cosmetic industries, where they can be utilized to formulate functional products with enhanced health benefits.

Aims: This study aims to assess the polyphenolic composition of six red wine varieties from two prestigious winemaking regions in Romania, following their enrichment with grape pomace extracts obtained via ultrasound-assisted extraction.

Materials and Methods: In this work, grape pomaces were subjected to ultrasound-assisted extraction to obtain phenolic-rich extracts, which were then incorporated into the wines at specific concentrations under controlled conditions. UHPLC-HRMS/MS analysis and UV-Vis spectrophotometric methods were employed to quantify individual polyphenolic compounds and to determine total phenolic content (TPC) and antioxidant activity of the extracts, control and fortified wines.

Results: The results showed a significant increase in both polyphenolic content and antioxidant capacity in all fortified samples compared to the control wines. Among the identified phenolics, notable increases were observed in flavanols (catechin, epicatechin), anthocyanins (malvidin-3-glucoside), and phenolic acids (gallic, syringic, 3,4-dihydroxybenzoic and caffeic acids). Furthermore, the degree of enrichment varied depending on the wine variety and regional origin, suggesting interactions between the base wine matrix and the added extract.

Conclusion: The findings support the potential of grape pomace extracts as natural fortifying agents, contributing to wine quality enhancement, valorization of winemaking by-products, and development of functional beverages with improved health benefits.

Keywords: bioactive compounds, polyphenolic fingerprint, grape pomace, functional foods.

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UTILIZATION OF BUCKWHEAT HULLS (*FAGOPYRUM ESCULENTUM*) IN BAKERY PRODUCTS: NUTRITIONAL COMPOSITION, FUNCTIONAL BENEFITS, AND SUSTAINABILITY

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Introduction: Buckwheat (*Fagopyrum esculentum*), valued for its superior nutritional composition, generates husks during the dehulling process that are typically regarded as agro-industrial waste. These husks are notably rich in dietary fiber, flavonoids, and various bioactive compounds. Recent researches had demonstrated their potential to enhance the nutritional quality and antioxidant capacity of bakery products.

Aims: This review evaluates the potential use of buckwheat husks as a functional ingredient in bakery items, highlighting its nutritional impact and sustainability.

Materials and Methods: Following PRISMA guidelines, literature from the past 15 years was reviewed using Elsevier and Scopus. Inclusion criteria: peer-reviewed studies in English focusing on edible applications in bakery products. Exclusion: non-edible uses. Seventeen articles were selected.

Results: Adding up to 4.5% buckwheat husks in bakery formulations increased minerals content, mainly K, Mg and Zn amount. On the other hand, fiber reached higher extended amount and fermentation technique is considered a tool used to enhance phenolic acid and flavonoid bioavailability,

Conclusion: Buckwheat husks improve the nutritional profile of baked goods by increasing phenolic compounds, antioxidant activity, minerals, fiber and resistant starch. Their use promotes sustainability through by-products valorisation and enhanced consumer health.

Keywords: bioactive compounds, buckwheat husks, food waste, sustainability.

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AN OVERVIEW OF PHYSICOCHEMICAL AND SENSORY EVALUATION OF FRUIT AND CHEESE BAR FORMULATIONS

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Introduction: Recent studies have investigated the combination of cheese and fruits to improve nutritional value and consumer appeal, while demonstrating favorable sensory properties.

Aims: This work aimed to leverage local plant resources by formulating a fruit and cheese bar, focusing on the sustainable utilization of indigenous fruits. Consequently, ingredients such as prunes, walnuts, and hazelnuts were selected for their nutritional properties and their ability to be incorporated into a contemporary food product with functional advantages.

Materials and Methods: We developed four formulations of fruit and cheese bars, modifying the indigenous fruits: walnuts or hazelnuts, with or without the inclusion of prunes, while examining the impact of the added fruits on their physicochemical properties, sensory qualities, and overall acceptability. Participants (n=120) rated the acceptability of the fruit and cheese bars using a nine-point hedonic scale and assessed attribute intensity via a just-about-right (JAR) scale.

Results: The physicochemical properties (pH, moisture content, acidity, texture analysis), sensory attributes, and overall acceptance of the fruit and cheese bar were examined. The physicochemical characteristics were affected by the indigenous fruits utilized, namely walnuts or hazelnuts, and the inclusion of prunes: pH ranged from 6.43 to 6.60, moisture content varied between 17.7% and 23.31%, and titratable acidity fluctuated between 87 and 104 °T, with the formulation containing walnuts being the hardest. The nine-point hedonic scale included appearance, color, flavor, taste, aftertaste, texture, and overall acceptability, whereas the JAR scale comprised color, hardness, rigidity, adhesion, flavor, sweetness, sourness, aftertaste, and overall acceptability. The sensory analysis results indicated that the majority of participants favored the hazelnuts and cheese bar.

Conclusion: These results suggest that fruit and cheese combinations offer promising opportunities for developing functional foods with enhanced nutritional profiles and consumer acceptance, particularly for older adults and children.

Keywords: fruit and cheese bar, physicochemical characteristics, sensory analysis.

VALORIZATION OF *SACCHAROMYCES CEREVISIAE* IN RED BEAN-BASED VEGETABLE SPREAD: EFFECTS ON COMPOSITION AND QUALITY ATTRIBUTES

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Introduction: Plant-based spreads have gained popularity as nutritious alternatives to animal-derived products, aligning with consumer demand for functional foods. Brewer's yeast (*Saccharomyces cerevisiae*), a by-product of the brewing industry, is recognised for its valuable nutritional and functional properties (Bacher et al., 2022; Marson et al., 2022). Rich in B vitamins, high-quality protein and bioactive compounds, *S. cerevisiae* holds potential for improving both the nutritional profile and sensory attributes of vegetable-based formulations. This study explores its technological and nutritional valorization in red bean vegetable spreads.

Aims: The objective was to assess the impact of incorporating 2%, 2.5% and 3.5% *S. cerevisiae* on the composition, sensory characteristics and overall quality of red bean vegetable spreads.

Materials and Methods: Spreads were prepared following a standard process: selection, boiling, cooling, mixing with ingredients, filling, sterilisation (30 min at 120°C) and storage. Analytical determinations included pH, acidity, moisture, protein, ash, fat content and sensory evaluation by a trained panel.

Results: The sample with 3.5% yeast concentration was associated with higher protein content. The 2% sample exhibited the highest ash and fat levels, a slightly reduced pH and increased acidity. Sensory assessment indicated good acceptability across variants, though higher yeast levels produced a more pronounced umami flavour.

Conclusion: The incorporation of *S. cerevisiae* represents a feasible approach to enhancing the nutritional and sensory qualities of vegetable spreads, while preserving their technological integrity.

Keywords: functional food, plant-based spread, *Saccharomyces cerevisiae*.

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FUNCTIONAL AND SUSTAINABLE RED WINES: INNOVATIVE VINIFICATION STRATEGIES FOR ENHANCING PHENOLIC CONTENT

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Introduction: Red wines rich in phenolic compounds have attracted increasing scientific and commercial interest due to their dual role in enhancing organoleptic quality and offering potential health benefits. Phenolics, especially flavonoids and stilbenes, are responsible for wine color, taste complexity, and antioxidant activity.

Aims: This research aims to develop and apply innovative vinification techniques to enhance the phenolic content of red wines without compromising their sensory characteristics. They also seek to align production with consumer trends, favouring functional, health-promoting products in the premium wine sector.

Materials and Methods: The study reviews advanced methods from recent literature for increasing phenolic extraction and stability. Techniques include high-pressure treatments, pulsed electric fields (PEF), enzymatic maceration, and temperature-controlled fermentation. Additionally, the influence of climatic factors and vineyard management on phenolic composition is highlighted.

Results: Preliminary literature data indicate that increased extraction and retention of phenolic compounds, especially anthocyanins, flavanols, and tannins, can significantly improve a wine's antioxidant capacity and sensory profile. Expected outcomes of the experimental phase include enhanced color intensity, increased structural complexity, and a stable phenolic profile that aligns with premium wine market expectations.

Conclusion: Innovative vinification strategies tailored to red wines can produce wines with high phenolic content, addressing both quality and health-oriented consumer demands. Such approaches support the development of a competitive premium wine category with added functional value.

Keywords: antioxidant activity, high phenolic wines, phenolic compounds.

AGROINDUSTRIAL WASTE AS A SUBSTRATE FOR SUSTAINABLE LOVASTATIN PRODUCTION

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Introduction: Elevated cholesterol is a major risk factor for cardiovascular diseases, responsible for approximately 2.6 million deaths and 29.7 million DALYs annually worldwide (WHO). Lovastatin, a statin drug, inhibits HMG-CoA reductase in the mevalonate pathway, effectively reducing cholesterol levels. Beyond lipid-lowering effects, it also exhibits anticancer and neuroprotective properties. However, the *in situ* production of lovastatin in by-products remains a limited and underexplored area. Fermentation emerges as a sustainable strategy for lovastatin production, offering an eco-friendly and cost-effective solution. Brewer's spent grain (BSG), a lignocellulosic by-product from beer production, presents a promising substrate for microbial fermentation due to its rich nutrient composition. This study investigates the biotechnological production and *in situ* fortification with lovastatin using BSG substrate *via* submerged fermentation (SmF) with *Monascus purpureus*.

Materials and methods: Proximal analyses were applied to BSG (macronutrients (AOAC), structural carbohydrates (IUPAC), and acidity (pH, titratable acidity)). Organic acids, sugars, and phenolics were quantified using HPLC-RID and HPLC-DAD-MS during the fermentation process. Biological activity was assessed *via* DPPH, MIC, and Ames tests.

Results: BSG showed high carbohydrate (~58%), protein (~18%), and lipid (~7%) content. Phenolic and fatty acid profiles confirmed its bioactive potential. Following the optimization of the fermentation process, *M. purpureus* fermentation yielded important lovastatin production, accompanied by low citrinin levels and the retention of antioxidant and antimicrobial activity.

Conclusion: The biotechnological valorization of BSG using *M. purpureus* demonstrated strong potential for lovastatin-enriched functional ingredients. Optimized fermentation enhanced enzymatic activity, nutrient release, and bioactive compound retention, supporting BSG's role as a sustainable substrate for health-promoting applications.

Keywords: brewer spent grain, fermentation, lovastatin production, *Monascus purpureus*

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METABOLIC ENGINEERING OF MICROORGANISMS FOR TAILOR-MADE BIOPOLYMER PRODUCTION: A REVIEW

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Introduction: Growing environmental concerns and the short lifespan of synthetic polymers have intensified the search for sustainable alternatives to these materials. Microbially produced biopolymers, such as bacterial cellulose, hyaluronic acid, polyhydroxyalkanoates, and poly- γ -glutamic acid, have gained attention due to their biocompatibility, non-toxicity, and renewability.

Aims: This work underscores the crucial role of microbial metabolic engineering in advancing next-generation biopolymers, supporting both industrial innovation and global sustainability goals.

Materials and Methods: This review highlights recent advances in metabolic engineering aimed at improving the yield, quality, and functionality of these biopolymers. Key strategies include genetic modifications (e.g., gene overexpression, gene deletion, CRISPR-Cas9) and systems biology tools (e.g., proteomics, genomics, synthetic biology).

Results: The paper synthesizes over 100 relevant articles published in the past 5 years, focusing on metabolic engineering strategies applied to the production of biopolymers such as PHA, BC, HA, and γ -PGA. It presents the model microorganisms used, the modified metabolic pathways, and the yields obtained. The analysis highlights current trends in the design of tailor-made strains, as well as the remaining challenges in optimizing polymer titer and molecular weight to obtain optimized materials for food, medical, and industrial applications.

Conclusion: This work primarily emphasizes advancements in synthetic biology and metabolic engineering techniques, focusing on strain optimization, metabolic flux control, and enzyme specificity improvement for the production of PHAs, HA, BC, and γ -PGA.

Keywords: BC, HA, PHAs, γ -PGA

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ALGINATE AND OLIVE LEAF EXTRACT EDIBLE COATINGS FOR FRESH FRUIT PRESERVATION

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Introduction: Fresh berries spoil quickly due to their high moisture content and susceptibility to microbes, leading to significant postharvest losses. Natural preservation methods are increasingly favored over synthetic ones. Sodium alginate, a seaweed-derived polysaccharide, forms oxygen-resistant edible films, while olive leaf extract (OL) offers antimicrobial and antioxidant benefits. Their combination shows promise for extending berry shelf life.

Aims: This study evaluated the effectiveness of sodium alginate and 9% OL as an edible coating to preserve fresh berries by examining their effects on pH, moisture retention, and microbial growth across various berry types.

Materials and Methods: A 2% sodium alginate solution with 9% OL was sprayed on strawberries, blueberries, raspberries, and blackberries, then stored at 5 °C for 7–14 days. pH, moisture loss, total bacterial count (TBC), and total yeast and mold (TYMC) count were measured, with data analyzed via two-way ANOVA and Tukey's test.

Results: Alginate+OL coatings reduced moisture loss and microbial growth in all berries, with the greatest effects in blackberries and blueberries. In strawberries, TBC dropped fourfold after 7 days. TYMC also declined, and coated berries, especially blackberries, maintained a more stable pH, indicating better preservation.

Conclusion: The alginate–OL coating shows strong potential as a natural, sustainable solution for extending berry shelf life by limiting moisture loss and microbial growth while preserving pH. Further research should address sensory quality, consumer acceptance, and application optimization for commercial use.

Keywords: antimicrobial preservation, edible coating, food waste reduction, fresh berries, olive leaf, shelf life extension, sodium alginate.

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ROASTED *CAPSICUM ANNUUM* L. EXUDATE AS A SUSTAINABLE INGREDIENT IN MOLECULAR GASTRONOMY

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Introduction: Roasted red peppers (*Capsicum annuum* L.) are widely consumed in many culinary traditions. During the roasting and peeling process, they release an aromatic and pigmented aqueous exudate as a result of thermal degradation and tissue softening. While most studies have analyzed the phytonutrient content of pepper tissue after roasting (Hamed, Kalita et al. 2019, Olędzki and Harasym 2024), the resulting roasted pepper exudate (RPE), rich in water-soluble compounds has been largely overlooked. This by-product has a distinctive orange color and a pleasant, sweet flavor, attributed to pyrroles, oxygen-containing heterocyclic compounds, and aldehydes (Kim, Park et al. 2022). Its viscosity suggests that the RPE may contain a high concentration of sugars and hydrophilic bioactive compounds (Hamed, Kalita et al. 2019).

Aims: This study aimed to characterize the antioxidant capacity and phenolic composition of the RPE, and to explore its potential valorisation through molecular gastronomy.

Materials and Methods: The total phenolic content (TPC), flavonoid content, and antioxidant activity were determined in filtered RPE samples using the Folin-Ciocalteu, aluminium chloride colorimetric assay, DPPH, FRAP, and CUPRAC methods. Further identification of phenolic compounds was performed using UHPLC, and volatile constituents were extracted through liquid-liquid extraction with hexane, followed by further analysis with GC-MS.

Results: The RPE showed a high TPC of 1520.58 mg GAE/L and a flavonoid content of 0.09 meq rutin/mL. Antioxidant assays revealed strong activity, with 84.4% DPPH radical inhibition, 42.65 mg GAE/L, 0.52 eq mM Trolox (FRAP), and 1.42 eq mM Trolox (CUPRAC).

Conclusion: This study provides a detailed biochemical characterization of RPE, highlighting its potential use as a bioactive-rich by-product in molecular gastronomy techniques, offering a sustainable approach to food waste utilization.

Keywords: antioxidant activity, *Capsicum annuum*, food waste valorisation, molecular gastronomy, phenolic content.

QUALITY AND SENSORY IMPACT OF BLACK CUMIN FLOUR FORTIFICATION IN TELEMEA CHEESE

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Introduction: Telemea cheese is a traditional Romanian dairy product valued for its brined character and nutritional quality. The use of bioactive plant ingredients to enhance functional properties of dairy products has gained increasing interest (Kooti, 2016). Black cumin (*Nigella sativa*) contains thymoquinone, unsaturated fatty acids, and essential minerals, with demonstrated antioxidant and antimicrobial activity. Its potential in functional food applications has been further highlighted by recent work (Ramadan, 2021). This study explores the incorporation of black cumin flour into Telemea cheese to enhance its functional value without affecting technological properties.

Aims: This study aimed to assess the effects of black cumin flour incorporation at two levels (0.5% and 1% w/w) on the physicochemical composition, microbiological stability, and sensory characteristics of Telemea cheese.

Materials and Methods: Telemea cheese was produced from standardised cow's milk (9% fat, enriched with cream), pasteurised at 83–85°C, coagulated with microbial rennet and starter cultures. Black cumin flour was added after coagulation. Telemea cheese was brined, matured to pH ~4.5, and analysed for composition, pH, microbial counts (*Enterobacteriaceae*, yeasts, moulds), and sensory profile.

Results: The addition of 0.5% black cumin flour resulted in improved protein and salt content, enhanced microbial stability, and favourable sensory attributes. In contrast, 1% flour negatively impacted curd structure and produced an excessively intense flavour, which was less well accepted.

Conclusion: Fortification of Telemea cheese with 0.5% black cumin flour is a promising strategy for enhancing its functional properties while maintaining technological and sensory quality.

Keywords: functional dairy, *Nigella sativa*, telemea cheese

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THE IMPACT OF HOMOGENIZATION ON THE PHYSICOCHEMICAL, RHEOLOGICAL, AND NUTRITIONAL PROPERTIES OF ARTESANA MILK PRODUCER

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Introduction: Milk is a complex biological fluid containing fats, proteins, carbohydrates, and bioactive compounds. Processing techniques such as homogenization can affect the structural, nutritional, and functional properties of the product.

Aim: This study aimed to investigate the preliminary differences between homogenized, non-homogenized, and organic milk in terms of fat globule structure, viscosity behavior, and concentrations of lactose and short-chain fatty acids.

Materials and Methods: Microscopy was used to observe the size and distribution of fat globules. Rheological properties were assessed at 4°C, 25°C, and 45°C, while HPLC was used to quantify lactose, acetic acid, and butyric acid concentrations after ethanolic extraction and protein precipitation. SDS-PAGE electrophoresis was used for profiling major milk proteins and identifying structural changes in the proteins. At the same time, an LC-MS/MS 8040 system with an Intrada Amino Acid high-throughput column was employed for the qualitative and quantitative analysis of free amino acids and peptides after protein precipitation.

Results: Microscopic analysis revealed small, uniformly distributed fat globules in homogenized milk, compared to larger, irregular aggregates in non-homogenized and BIO non-homogenized milk. Rheological testing showed Newtonian flow for homogenized milk and thickening behavior for non-homogenized samples. Viscosity was significantly higher at 4°C, especially in minimally processed milk. HPLC data indicated higher lactose concentrations in homogenized milk and higher butyric acid levels in non-homogenized and BIO samples.

Conclusions: The preliminary findings underscore the importance of processing methods in determining the nutritional and physical properties of dairy products, providing a foundation for further consumer-focused research.

Keywords: homogenization, milk proteins, rheological properties, LC-MS analysis, short-chain fatty acids.

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ESSENTIAL OILS FROM *HYSSOPUS OFFICINALIS* AND *AGASTACHE FOENICULUM* (PURSH) KUTNZE AS PROMISING ANTIMICROBIAL AGENTS FOR THE FOOD INDUSTRY

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Introduction: *Hyssopus officinalis* L. and *Agastache foeniculum* (Pursh) Kutnze, two species from the *Lamiaceae* family, produce essential oils (EOs) with significant biological activities. In the food sector, their EOs enhance organoleptic properties and exhibit antimicrobial effects. This activity can be attributed to their complex chemical composition and high lipophilicity, which enables membrane penetration, disruption, and increased permeability in microbial cells.

Aims: The present study aims to investigate the antimicrobial activity of these EOs against pathogens commonly associated with food contamination.

Materials and Methods: EOs were extracted by hydrodistillation from the dried aerial parts of plants cultivated in the experimental fields of the University of Agricultural Sciences and Veterinary Medicine. The minimum inhibitory concentration (MIC) was determined using a resazurin-based microtiter plate assay. The minimum bactericidal/fungicidal concentration was performed against bacteria species, and also *Candida* species.

Results: Hyssop EO exhibits a better antibacterial activity against both Gram-positive and Gram-negative strains (*S. aureus* – 3.795±1.9 µL/mL; *S. Enteritidis* – 2.45±0.0 µL/mL) and also against yeast strains (*C. albicans* – 7.94±4.0 µL/mL). Meanwhile, agastache EO demonstrated a better antifungal activity against *Aspergillus* strains (*A. niger* – 10.8±0.0 µL/mL; *A. brasiliensis* - 10.8±0.0 µL/mL).

Conclusion: Hyssop and agastache EOs demonstrated high efficiency against Gram-positive and Gram-negative bacteria. Regarding antifungal activity, both essential oils exhibited inhibitory effects against *Candida* species, with even higher effectiveness observed against *Aspergillus* species. These findings support the potential applications of hyssop and agastache EO as natural preservatives and sustainable alternatives to synthetic additives, supporting safer and cleaner-label food products.

Keywords: antibacterial, antifungal, biological activities, food additive.

PHYTOCHEMICAL CHARACTERIZATION OF *MESPILUS GERMANICA* L.: COMPOUND CLASSES AND POTENTIAL APPLICATIONS

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Introduction: *Mespilus germanica* L., commonly known as medlar, is a lesser-known fruit species from the Rosaceae family with a long history of traditional and medicinal use. Its phytochemical richness includes a wide array of organic acids, phenolic compounds, soluble sugars, and pectins, which contribute to both its nutritional value and functional potential. Recent literature has highlighted its relevance as a source of natural antioxidants and functional compounds applicable in the food and pharmaceutical industries (Nistor et al., 2024).

Aims: The aim of this study was to characterize the physicochemical and bioactive profile of *Mespilus germanica* fruits and to explore their potential as a natural ingredient in functional food formulations.

Materials and methods: This study focused on characterizing the biochemical profile of *Mespilus germanica*, particularly examining primary metabolites, including soluble sugars and organic acids, through HPLC-RI and complementary spectrophotometric analyses.

Results: The chemical analysis revealed that *Mespilus germanica* fruits are rich in primary metabolites and bioactive compounds. Fructose was the dominant sugar (27.4 g/100 g DW), followed by glucose (18.8 g/100 g), sorbitol (10.5 g/100 g), and lower levels of sucrose (3.4 g/100 g). Malic acid was the most abundant organic acid (2.91 g/100 g DW), with citric, tartaric, and oxalic acids present in smaller amounts, shaping the fruit's characteristic acidic-sweet taste.

Pectin extracted from the pulp was rich in D-galacturonic acid (45.2%), L-arabinose (18.6%), and D-galactose (13.4%), supporting its gelling potential in food applications. The phenolic profile included 685 mg GAE/100 g DW total phenolics, with catechin, epicatechin, and vanillic acid as key antioxidants. The seed oil contained high levels of oleic (41%) and linoleic acid (43%), beneficial for cardiovascular health and technological functionality.

Conclusion *Mespilus germanica* fruit demonstrates a complex and valuable chemical profile, with high levels of organic acids, functional polysaccharides, and antioxidant phenolics. These characteristics support its potential as a functional food ingredient, particularly for clean-label formulations designed to enhance nutritional quality and shelf life.

Keywords: phenols, *Mespilus gemanica*, pectin, tannin.

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EVALUATION OF DIETARY INTAKE AND EPIDEMIOLOGICAL EVIDENCE OF SEA BUCKTHORN BIOACTIVE COMPOUNDS IN HUMAN HEALTH PROMOTION

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Introduction: Sea buckthorn (SB) is a valuable source of bioactive compounds such as carotenoids, polyphenols, and unsaturated fatty acids, which are increasingly recognized for their role in disease prevention. Evaluating population-level intake and assessing epidemiological links to health outcomes is essential to substantiate their preventive potential. SB polyphenols (e.g., phenolic acids, flavonoids) have antioxidant and anti-inflammatory effects by modulating oxidative stress and inflammation pathways. Carotenoids (e.g., β -carotene, zeaxanthin) support immune function and cellular protection, while SB-derived omega-3 and omega-7 fatty acids contribute to lipid regulation, anti-inflammatory activity, and endothelial health. This study aimed to evaluate the dietary intake of key SB bioactive compounds and examine epidemiological data linking their consumption to disease prevention. It focused on estimating population-specific intake levels and exploring long-term associations with chronic disease risk.

Materials and methods: Information on the intake of key SB carotenoids, polyphenols, and fatty acids was extracted from published studies that included dietary intake assessments and nutritional surveys in global populations. Variables such as country, cohort size, estimated daily intake, gender, and biological effect were recorded.

Results: Reported intake levels of bioactive compounds varied across countries and populations, with carotenoids and phenolics consistently dominant. Their effects include improved lipid profiles, reduced inflammatory markers (e.g., C-reactive protein), and enhanced glycaemic control and body composition.

Conclusion: This literature-based assessment highlights the relevance of these compounds in disease prevention, with consistent intake patterns and epidemiological evidence supporting its potential in nutrition-focused public health strategies.

Keywords: bioactive compounds, dietary intake, disease, epidemiology, sea buckthorn.

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PECTIN FILMS INCORPORATED WITH ROSEMARY OIL-LOADED SOLID LIPID NANOPARTICLES: EFFECTS ON THE SHELF LIFE OF READY-TO-EAT-CHICKEN BREAST

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Introduction: Ready-to-eat (RTE) meat has a short shelf life due to bacterial contamination and lipid oxidation. To increase the shelf life of these products, antimicrobial and antioxidant bioactive compounds can be incorporated into the packaging material. This strategy for reducing microorganism growth and lipid oxidation in RTE meat could be a viable alternative to synthetic preservatives.

Aims: This study aimed to evaluate whether pectin films incorporated with rosemary oil-loaded solid lipid nanoparticles could delay the growth of microorganisms and reduce lipid oxidation in RTE chicken breast, thereby increasing its shelf life.

Materials and Methods: Pieces of RTE chicken breast were packaged in pectin films incorporated with rosemary oil-loaded solid lipid nanoparticles and stored under refrigeration conditions (4 ± 1 °C) for 7 days. Microbial growth was assessed using total viable count (TVC), while lipid oxidation was evaluated through thiobarbituric acid reactive substances (TBARS) analysis.

Results: At the end of storage, samples packaged with pectin films incorporated with rosemary oil-loaded solid lipid nanoparticles showed lower values for both TVC and TBARS compared with unpackaged samples. Therefore, the pectin films acted as a barrier to microorganisms' growth and lipid oxidation.

Conclusion: Considering the microbial and lipid oxidation analysis, pectin films incorporated with rosemary oil-loaded solid lipid nanoparticles have the potential to increase the shelf life of RTE chicken breast.

Keywords: pectin film, nanoparticles, rosemary oil, ready-to-eat chicken breast, shelf life.

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BERRY-POWERED EFFECTS IN MENOPAUSE: MECHANISMS, SYMPTOM RELIEF, AND NUTRITIONAL THERAPEUTIC POTENTIAL

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Introduction: Hormonal fluctuations during the menopausal transition are closely linked to alterations in lipid metabolism, central fat accumulation, and a heightened susceptibility to cardiometabolic disorders. Among emerging nutritional strategies, berries have attracted attention due to their rich profiles of phytoestrogens and other bioactive constituents. These compounds appear to exert modulatory effects on adipose tissue dynamics, systemic inflammation, and oxidative stress—all critical contributors to metabolic dysregulation in midlife women. In addition to their potential metabolic benefits, these berries exhibit properties that may support vascular stability and preserve cognitive function.

Aims: This review aims to critically examine the mechanistic and clinical evidence on sea buckthorn, bilberry, blackberry, and lingonberry as nutritional interventions for menopause.

Materials and Methods: This review undertakes a comprehensive examination of the scientific literature to analyse the effects of selected berries and their potential roles in personalized nutritional strategies.

Results: The results of this review highlight that selected berries modulate oxidative stress, inflammation, lipid metabolism, and vascular function in menopause, highlighting their potential in symptom management and metabolic support, while also underscoring the need for rigorous translational research to standardize bioactive content, enhance bioavailability, and integrate these compounds into clinically effective functional foods and lifestyle-based nutritional strategies.

Conclusion: This review highlights the potential of sea buckthorn, bilberry, blackberry, and lingonberry to support menopausal health by targeting inflammation, oxidative stress, and metabolic dysfunction. Advancing this field requires robust translational research to standardize bioactive content, optimize bioavailability, and support the integration of berry-derived interventions into functional foods and nutraceuticals that align with both clinical efficacy and sustainability principles.

Keywords: berry-derived bioactive compounds, menopausal nutrition, menopausal pathways, polyphenols.

EFFECTS OF MICROWAVE ASSISTED EXTRACTION ON COLOR PROPERTIES OF THYME (*THYMUS VULGARIS*) ETHANOLIC EXTRACTS

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Introduction: *Thymus vulgaris*, thyme, is an aromatic herb used worldwide due to its aroma and flavour. It is suitable for flavouring food products. It consists of thymol, which exerts antimicrobial and antioxidant activity. Microwave-assisted extraction (MAE) is a green extraction method suitable for plant extractions.

Aims: The effect of MAE was assessed on the color properties of the ethanolic extracts of thyme.

Materials and Methods: Thyme ethanolic extracts were obtained by MAE using a Box-Behnken experimental design. Fifteen samples were obtained with different extraction parameters (ethanol concentration, microwave power, and extraction repetition). The color analysis of the resulting extracts was done using a 3nh SC10 Colorimeter, which returns the parameters: a* (red-green), b* (yellow-blue), and L* (lightness). To rate the saturation and the shade of color of the extracts, the chroma (C*) and hue angle (h°) were calculated. The obtained data were analyzed using the XLSTAT statistical software ANOVA, Fisher (LSD) test, and Response Surface Methodology (RSM).

Results: Between the CIELAB parameters, there are no significant differences between the samples. For each parameter, the models created by the RSM were not statistically significant, but the ethanol concentration showed a greater influence upon the color parameters.

Conclusion: MAE had no statistically significant effect on the color parameters of thyme ethanolic extracts, though the ethanol concentration had more influence than the other extraction parameters.

Keywords: CIELAB parameters, microwave-assisted extraction, *Thymus vulgaris*

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EXPLORING THE *IN VITRO* PREBIOTIC POTENTIAL OF TWO DIFFERENT FREEZE-DRIED APPLE POMACE VARIETIES

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Introduction: Apple pomace, a by-product of juice production, is rich in phenolic compounds with potential modulatory effects on gut microbiota. While its antioxidant properties are well established, its specific prebiotic activity remains less defined.

Aims: This study aimed to evaluate the prebiotic activity of apple pomace from Red Delicious and Granny Smith cultivars by assessing its effect on probiotic strains (*Lactobacillus plantarum*, *Lactobacillus casei*, *Saccharomyces boulardii*) and enteric *E. coli*.

Materials and Methods: Phenolic profiles and sugar content were analyzed using HPLC. Fermentation was performed for 48 hours with probiotic and enteric strains using apple pomace as the carbon source. The prebiotic index (PI) was calculated relative to glucose and FOS.

Results: Red Delicious pomace showed higher phenolic and sugar content than Granny Smith, correlating with better support of *L. casei* and *S. boulardii* growth. Minimal stimulation was observed for enteric *E. coli*. However, PI scores remained lower than those for FOS, indicating moderate prebiotic potential.

Conclusion: Apple pomace demonstrated selective stimulation of beneficial microbes and limited impact on enteric strains. Although less effective than commercial prebiotics, its composition supports further exploration as a functional ingredient for gut health.

Keywords: apple pomace, *in vitro* digestion, revalorization.

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APPLICATION OF FRUT AND VEGETABLE BY-PRODUCTS IN THE FOOD INDUSTRY: A SUSTENAIBLE BIOTECHNOLOGICAL APPROACH

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Introduction: The growing demand for food and the shift towards a circular economy underscore the need to valorize agro-food by-products. Residues from fruits and vegetables are rich in bioactive compounds, fibers, and natural antioxidants, offering valuable opportunities for functional and sustainable applications (Gupta et al, 2024).

Aims: This study aims to explore sustainable biotechnological methods for converting these by-products, with a focus on fiber extraction, particularly from carrot vegetables and fruits, to obtain high-value products.

Materials and methods: The Web of Science, Google Scholar, and Science Direct databases were accessed. Keywords such as "sustainable gastronomy", "bioactive compounds", "functional foods", and "fibers" were used for data collection.

Results: According to Oncică et al. (2024), fruits and vegetables generate a significant amount of waste during production, transportation, and processing. Residues such as peels, pulp, seeds, and pomace are often treated as waste materials, although they contain valuable bioactive compounds (antioxidants, fiber, polyphenols, vitamins). Microorganisms involved in fermentation can improve the nutritional profile of products by increasing the bioavailability of vitamins and minerals, synthesizing bioactive compounds such as bacteriocins, organic acids, and antioxidants, and providing probiotic effects by influencing the gut microbiota and strengthening the intestinal barrier (Gupta et al., 2024).

Conclusion: This research has demonstrated that food residues represent a sustainable source, contributing valuable potential for the development of innovative products.

Keywords: food by-products, food waste valorization, dietary fibers, sustainable residues, sustainable products

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NON-THERMAL TECHNIQUES FOR THE INACTIVATION OF MICROORGANISMS IN BLUEBERRIES

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Introduction: Blueberries are valued for freshness, health benefits, and rich organoleptic properties, yet their shelf-life is limited by microbial spoilage and enzymatic activity. Technological advances are needed to mitigate these issues. Study limitations consist of – treatment uniformity, regulatory acceptance, maintaining the nutritional profile, and organoleptic properties of the berries.

Aims: The current study focuses on the non-thermal techniques that can be used for the inactivation of microorganisms in blueberries. They can be used as alternatives to achieve microbial reductions and to maintain quality during storage. While using these techniques, several studies showed that changes in texture and bioactive components may occur.

Materials and Methods: A systematic literature review was conducted focusing on the published studies between 2015 and 2025 in two databases – Web of Science and Scopus. The search terms included blueberries, cold plasma, UV, non-thermal. Articles were screened to identify those specifically addressing non-thermal inactivation techniques.

Results: Studies that met the inclusion criteria were further analyzed, and the data regarding the parameters used, microorganisms tested, and shelf-life were reviewed. Cold plasma, ultraviolet (UV) radiation, and pulsed electric fields (PEF) are promising and emerging technologies.

Conclusion: Non-thermal inactivation technologies are a promising alternative to conventional thermal treatments for ensuring microbial safety while preserving the sensory, shelf-life and nutritional qualities of blueberries. Cold plasma, ultraviolet (UV) radiation, and pulsed electric fields (PEF) have shown promise, but further research is needed to optimize their application and fully understand their effects on the quality attributes of fresh fruits.

Keywords: food microbiology, food safety, non-thermal inactivation, UV, plasma.

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SOIL-TO-PLANT TRANSFER OF HEAVY METALS IN CUCUMBERS AND ZUCCHINIS: A MULTI-REGIONAL STUDY FROM ROMANIA

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Introduction: Monitoring heavy metal accumulation in vegetables is essential for assessing human exposure through diet and ensuring food safety. *Cucumis sativus* (cucumber) and *Cucurbita pepo* (zucchini) are widely cultivated across Romania and may accumulate metals from soils. Literature emphasizes the need for regional monitoring due to variability in soil composition and anthropogenic influence.

Aims: This study evaluated the concentrations of selected micro- and macro-elements in cucumber and zucchini from various Romanian regions to assess regional contamination differences and potential risks from metal accumulation in edible tissues.

Materials and Methods: Soil and vegetable samples were collected from over 20 counties across Romania, including both field-grown and solar-grown crops. Soil samples were taken at depths of 5 cm and 15 cm. Concentrations of several transitional metals and Li were determined using ICP-OES following acid digestion protocols.

Results: Cucumber and zucchini showed varying levels of metal accumulation. Zn in cucumber ranged from 12.2 to 17.78 mg/kg, and Cd levels reached up to 0.03 mg/kg in some solar-grown samples. In zucchini, Zn was slightly higher (up to 22.04 mg/kg in field-grown samples), with detectable Cd in all samples. Essential elements (Fe and Mn) were within expected nutritional ranges, while toxic metals like Pb, Hg, and As were generally found at low concentrations. Regional variation was evident, with specific locations such as Argeş, Mehedinţi, and Galaţi showing slightly elevated levels of Ni or Cr in soil, but limited translocation to plant tissues. Li was generally low, with detectable levels in both field- and solar-grown crops. A slight regional variability was noted, with higher accumulation in samples from Argeş and Mehedinţi, suggesting potential lithogenic influence or localized soil characteristics, remaining below maximum allowable limits in most cases.

Conclusion: This study found that cucumbers and zucchinis in Romania generally contain trace metals at safe levels but highlighted the need for ongoing monitoring, especially in industrial or intensively farmed areas, to inform targeted soil management and support national food safety programs.

Keywords: food safety, metals, regional variability, vegetables.

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FORMULATION OF GINGERBREADS WITH ENHANCED NUTRITIONAL PROPERTIES

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Introduction: Gingerbread is a bakery product that can possess anti-inflammatory effects and can support digestion due to its spices, but industrially it is produced with fats rich in saturated fatty acids, which promote obesity and cardiovascular diseases.

Aims: The present study aimed to develop various assortments of gingerbreads with enhanced nutritional profiles by incorporating bioactive compounds from decoctions in their formulation, and by replacing traditional fats with emulgels confectioned with oleogels obtained from sunflower oil and 10% glycerol monostearate and the decoctions obtained from five types of medicinal plants: *Mentha spp.*, *Melissa officinalis*, *Ocimum basilicum*, *Ocimum basilicum var. purpurascens*, and *Lavandula angustifolia*.

Materials and Methods: The plants were bought from local markets, along with the ingredients for the gingerbreads (000 flour, eggs, honey, margarine, powdered sugar, sodium bicarbonate and the sunflower oil). Glycerol monostearate was purchased from Thermo Fisher Scientific. Methanol, 2,2-Diphenyl-1-picrylhydrazyl, were purchased from Merck, Germany. Folin-Ciocalteu reagent was purchased from Supelco, Germany. The decoction was prepared by boiling the mixture of plant and water (1:2) for 15 min. at 100 °C. The spectrophotometric determination of total polyphenols content and antioxidant potential were conducted for the emulgels and gingerbreads to observe to what extent the aim of the study was achieved. Additionally, the influence of replacing the traditional fat from the composition was analyzed in terms of textural and color parameters on the dough and finished product.

Results: Among the extracts, those prepared from *Ocimum basilicum* contained the highest TPC (575.80 ± 7.37 mg GAE/100 g) and the correspondent gingerbreads exhibited a TPC of 142.91 ± 0.99 , while the reference 121.30 ± 1.05 mg GAE/100 g. While the antioxidant potential of the decoctions was high (84.01-85.93 % RSA DPPH), the gingerbreads exhibited low values. The reformulated gingerbreads exhibited decreased hardness parameters compared to the reference containing margarine, but similar color attributes.

Conclusion: In the present research work, we succeed to obtained a product loaded with biologically active substances (polyphenols), with improved fatty acid profile, without negatively affecting the texture or appearance.

Keywords: decoctions, emulgels, gingerbreads.

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STRUCTURAL AND THERMO-FUNCTIONAL CHARACTERIZATION OF ACORN STARCH FROM *QUERCUS RUBRA* AND *QUERCUS ROBUR*

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Introduction: Acorns, the fruit of *Quercus* trees, represent a naturally abundant source of macronutrients. They are predominantly composed of carbohydrates (up to 90% of dry matter), mainly in the form of starch, also presenting a smaller amount of proteins, fats, and minerals. Due to their nutritional value, acorns represent an important source of nutrients for wildlife. Historically, they also played a role in human diets across various cultures, particularly in Europe, where certain traditional culinary uses have been preserved to this day.

Aims: The aim of this work was to explore the structural and physical properties of starch extracted from *Quercus rubra* and *Quercus robur* acorns.

Materials and Methods: The structure and size of starch granules were determined by Scanning Electron Microscopy (SEM), while the crystalline pattern and degree of crystallinity were assessed by X-ray diffraction (XRD). Thermal behavior was analyzed using Differential Scanning Calorimetry (DSC) to determine gelatinization parameters and thermal stability. In addition, a starch–water paste was prepared and subjected to rheological analysis to evaluate the storage and loss modulus.

Results: Starch granules are structurally intact, without cracks, well-defined with smooth surfaces, usually rounded to oval shape, with some evidence of aggregation. Diffraction patterns of starch from both species show characteristics of A-type starch with a crystallinity degree of 21-25%. For both samples, the storage modulus was higher than the loss modulus until the samples reached a temperature of around 70 °C, where the gelatinization of starch occurred.

Conclusion: The results highlight the suitability of acorn starch as a natural ingredient with promising structural and rheological characteristics for food or biodegradable material formulations.

Keywords: corn, rheology, starch, thermal properties.

IMPACT OF SOURDOUGH FERMENTED WITH *LEUCONOSTOC CITREUM* DSM5577 ON THE STRUCTURAL, PHYSICAL AND SENSORY QUALITY OF SUGAR-REDUCED MUFFINS

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Introduction: Reduced-sugar products developed for specific nutrition support a healthier diet but may face challenges in maintaining texture, taste and overall stability.

Aim: Assessing the impact of sourdough fermented with *Leuconostoc citreum* DSM5577, as mannitol producer, on the structure, physical properties and sensorial quality of the sugar-reduced muffins.

Materials and Methods: Ten muffins formulations with varying sugar (0%, 50%) and different sourdough levels (30%, 50% reported to 100g of the total amount of flour), fermented for 24 or 48 hours were produced. Texture, color, physical parameters and SEM were measured, and a sensorial analysis (Aroma Profile) was also conducted.

Results: Color analysis showed that crust lightness decreased with higher sourdough content and lower sugar levels, while crumb color remained relatively stable. Texture analysis indicated that sourdough-enriched muffins, especially those with 50% sugar and 50% sourdough fermented for 24 hours, had the lowest hardness (5.42 N) and gumminess (3.49 N). Sourdough also contributed to moisture retention, resulting in a softer texture. SEM revealed more porous and uniform crumb structures, particularly with longer fermentation time, suggesting better gas retention. PCA showed clear clustering based on sensory attributes. Muffins with 50% sugar and 24h of fermentation stood up for their sweetness, fine crumb and butter aroma. In contrast, the samples with high-sourdough amounts fermented for 48h showed more sourness and chewiness.

Conclusion: The sourdough doesn't negatively affect the physical properties and texture. Muffins with 50% sugar and 24h of sourdough fermentation had the most desirable sensory attributes. The results suggest that sourdough is a functional ingredient for sugar-reduced muffins.

Keywords: muffins, sourdough, SEM, texture.

STORAGE STABILITY AND QUALITY ASSESSMENT OF SPREADABLE VEGETABLE PASTES BASED ON SUNFLOWER SEEDS, BEECH PASTE, AND ACORN POWDER

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Introduction: Given the world's growing population, as well as ethical and environmental concerns surrounding the production of conventional meat, developing alternative protein sources has emerged as a top strategic priority for ensuring food security, advancing sustainability, and satisfying a range of consumer demands.

Aims: This study focuses on the development of spreadable vegetable pastes formulated with sunflower seeds, beech paste, and acorn powder, with particular attention to their quality assessment and storage stability.

Materials and Methods: Three formulations of vegetable paste (VP) were obtained as follows: VP_c –control formulation based on sunflower seed, VP_{BP} –formulation with 10% beech paste, and VP_{APBP} –formulation with 5% acorn powder and 5% beech paste. The formulations were evaluated for their initial physicochemical properties, volatile compounds, fatty acid profile, and microbiological characteristics; during storage, color, texture, oxidative, and overall stability were assessed.

Results: The formulations of vegetable paste with forest seeds showed variations in chemical composition, texture, and color, while maintaining good oxidative and microbiological stability during storage. The formulation VP_{BP} had the highest lipid content, and VP_{APBP} was noted for increased hardness and high polyphenol content.

Conclusion: The incorporation of forest seeds into vegetable paste formulations led to diverse nutritional and functional profiles. These results highlight the potential of alternative plant-based ingredients in developing sustainable, nutrient-rich, and shelf-stable spreadable products.

Keywords: acorn powder, beech paste, storage stability, sunflower seeds, vegetable paste.

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INCORPORATION OF OILSEED PRESS CAKES INTO SUMMER SALAMI AS A SUSTAINABLE NUTRITIONAL IMPROVEMENT METHOD

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Introduction: The utilization of agro-industrial by-products has become a significant approach in food innovation, amid growing demand for healthier and more sustainable food options. Press cakes resulting from oil extraction processes, such as those made from pumpkin seeds and walnuts, are especially nutrient-abundant, including significant amounts of antioxidants, dietary fiber, protein, and essential fatty acids.

Aims: This study investigates the addition of walnut and pumpkin press cakes to salami recipes, aiming to develop a novel, high-nutrient product that aligns with both consumer demands and sustainability objectives.

Materials and Methods: Five formulations of salami were obtained: SSc-control summer salami, SS3%pp, summer salami prepared by substituting 3% cured meat with pumpkin press cake powder, SS5%pp, summer salami prepared by substituting 5% cured meat with pumpkin press cake powder, SS3%wp, summer salami prepared by substituting 3% cured meat with walnut press cake powder, and SS5%wp, summer salami prepared by substituting 5% cured meat with walnut press cake powder. The formulations were evaluated for their physicochemical properties, energy value, textural characteristics, color attributes, and sensory properties.

Results: The addition of press cake powders to summer salami resulted in a product with a more complex lipid profile, rich in unsaturated fatty acids, a higher fiber and mineral content, and slight texture changes without compromising sensory appeal.

Conclusion: Press cake powders increased the nutrition and lipid profile of salami without increasing production costs, while maintaining quality and supporting sustainability through by-product reuse in a circular economy model.

Keywords: by-products, pumpkin press cake powder, summer salami, sustainability, walnut press cake powder

THE AGRI-FOOD INNOVATION CHALLENGE: AN INTEGRATED, COMPETENCE-BASED PEDAGOGICAL MODEL FOR INTERDISCIPLINARY ENTREPRENEURSHIP EDUCATION

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Introduction: Higher-education institutions are increasingly expected to catalyze innovation ecosystems and provide experiential entrepreneurship training. However, the methodological blueprints that underpin such programs remain under-documented. This study addresses this gap by presenting the complete methodology of IC24—a three-day design-thinking challenge funded by a Fulbright Alumni Institutional Development Grant (FAIDG-4-23) that engaged 36 students, 15 mentors, and an international jury in May 2024.

Aims: This study introduces and validates a novel pedagogical framework—the Interdisciplinary Challenge-Based Entrepreneurship (ICBE) model—designed to cultivate entrepreneurial competencies in students as they address complex, sector-specific challenges.

Materials and Methods: We employ a single case study methodology, analyzing the "AgriTech & FoodTech University Innovation Challenge 2024" (IC24). The ICBE model was developed by integrating the challenge's practical activities with established theories of competence-based education, Design Thinking (DT), Creative Problem Solving (CPS), and Business Model Generation.

Results: The ICBE model, structured in three phases (Opportunity Co-Creation, Venture Conceptualization, and Iterative Validation), provides a robust framework for experiential entrepreneurship education. Analysis of the IC24 case demonstrates the model's efficacy in fostering interdisciplinary collaboration (over 60% of teams were multidisciplinary), enhancing entrepreneurial knowledge (a 35% improvement in participant understanding), and generating viable, market-oriented solutions in the high-tech Agri-Food sector.

Research Limitations: Due to the single case study design, the generalizability of these findings is exploratory. Future research should apply and test the ICBE model in different contexts, ideally with longitudinal tracking of venture creation.

Conclusion and Practical Implications: This study provides a replicable, theoretically-grounded blueprint for educators and university administrators aiming to implement high-impact, challenge-based entrepreneurship programs that bridge academia and industry. Its primary contribution is the formalization of an integrated pedagogical process that sequentially combines distinct cognitive toolkits (DT, CPS, and Business Model Generation) within a competence-based framework, offering a significant advancement over siloed approaches to entrepreneurship education.

Keywords: Agri-Food Tech, Creative Problem Solving (CPS), Design Thinking (DT), Business Model Generation (BMG), Innovation Challenge (IC)

ENABLING THE GREEN AND DIGITAL TRANSITION OF FOOD SMEs THROUGH THE RISE PROJECT

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Introduction: Small and medium-sized enterprises (SMEs) in the food and beverage sector are facing increasing challenges in aligning with sustainability goals and meeting the demands of digital transformation. The RISE project supports these enterprises by providing tailored mentoring resources, practical tools, and digital infrastructure to foster sustainable growth, particularly in rural and less developed regions.

Aims: The project seeks to strengthen SME capacity for green and digital transition through an integrated framework of assessment tools, training resources, and a cross-border mentoring network. Its objective is to provide actionable, context-sensitive guidance to facilitate the implementation of the circular economy, energy optimisation, and digital readiness.

Materials and Methods: Three assessment tools focused on digital transition, energy optimisation, and material circularity were developed, validated, and digitized. These tools were accompanied by real-life case studies and KPI templates, and integrated into the Datamensio platform to support structured evaluations, mentor-SME interaction, and streamlined data collection during the pilot phase.

Results: The project delivered a structured toolbox that allows SMEs to assess their preparedness for transition and receive tailored feedback. The use of the Datamensio platform enabled smooth onboarding, assessment completion, and reporting across all regions. Real-world examples and mentor simulations reinforced the practical application of the tools, while promotional and outreach campaigns secured high engagement from SMEs.

Conclusion: RISE provides a scalable, digital-first support system to guide food SMEs toward sustainable practices and innovation. Through the combination of expert-developed tools, interactive training, and the Datamensio platform, the project enhances regional capacity for circular, energy-efficient, and digital transformation.

Keywords: circular economy, datamensio, digital transition, food SMEs, mentoring tools, sustainability.

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COMPARATIVE EVALUATION OF WILD PLUM (*PRUNUS SPINOSA*) FRUITS AND LEAVES: INSIGHTS INTO NUTRITIONAL, ANTIOXIDANT AND FUNCTIONAL PROPERTIES

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Introduction: Wild plum (*Prunus spinosa*) is a shrub with nutritional potential, yet limited information is available on the composition of its stone fruit and leaves. Both matrices may serve as valuable sources of essential nutrients, and antioxidant compounds, which can contribute to human health and industrial applications.

Aims: The study aimed to investigate and compare the macro and micro nutrients content, fatty acid profiles, and lipophilic antioxidant compounds in the fruits and leaves of wild plum and their potential functional properties.

Materials and Methods: Fruits and leaves samples of wild plum were collected, oven dried at 65 °C and analysed according to AOAC methods for macronutrients (crude protein, fat and fiber). The mineral content (Cu, Fe, Mn, Zn) was measured using flame-atomic absorption spectrometry (FAAS). The fatty acids profile was assessed by gas chromatography (GC). Antioxidant compounds, including lutein, astaxanthin, and vitamin E as tocopherols (α , δ , γ), were identified and quantified using high-performance liquid chromatography (HPLC).

Results: The leaves contained higher crude protein (10.94%) than the fruit (6.46%), but lower crude fiber (13.86% vs. 22.16%). Iron (370.37 mg/kg) and Mn (43.57 mg/kg) were significantly higher in leaves samples than in the fruits (44.87 and 7.02 mg/kg, respectively). The fruit's lipid profile was rich in MUFA (56.8%) and PUFA (32.5%), with a low SFA/UFA ratio (0.11), whereas the leaves exhibited elevated SFA (38.3%) and PUFA (43.7%), and a high PUFA/MUFA ratio (>2.5). Leaves presented significantly higher n-3 content (25.2%) compared with fruits (1.80%). The n-6/n-3 ratio was significantly higher in fruit (17.30), showing a favourable ratio in leaves (0.70). Antioxidant compounds were markedly higher in the leaves, with total vitamin E exceeding 1268 mg/kg, primarily due to elevated α -tocopherol (1214.98 mg/kg), lutein (409.38 mg/kg), and astaxanthin (3.74 mg/kg), compared to only 74.75 mg/kg total vitamin E in the fruits. The fruits also exhibited significantly lower content of lutein (23.18 mg/kg), astaxanthin (0.56 mg/kg), and canthaxanthin (0.39 mg/kg).

Conclusion: The wild plum leaves demonstrated superior antioxidant potential and mineral content compared to the fruit, making it a promising candidate for nutraceutical and functional food applications. Meanwhile, the fruit maintained a healthier lipid profile suitable for dietary fat intake. This comparative analysis highlights the distinct and complementary bioactive roles of wild plum co-products.

Keywords: antioxidants, bioactive compounds, nutrients, *Prunus spinosa*.

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COMPARATIVE STUDY ON THE ANTIOXIDANT POTENTIAL OF MILK THISTLE SEEDS AND SILYMARIN EXTRACT

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Introduction: Milk thistle represents the only known source of silymarin, a compound widely used due to its impressive nutritional profile and antioxidant properties. Interest in using herbals as additives in livestock is growing, but consumers remain sceptical, especially when choosing between extracts and the whole plant.

Aims: The purpose of this work was to conduct a comparative analysis between milk thistle seeds and silymarin extract, focusing on their nutritional composition and antioxidant activity, to evaluate their effectiveness in combating oxidative stress.

Materials and Methods: The mineral content (Cu, Fe, Mn, Zn) was obtained using flame atomic absorption spectrometry. Liposoluble antioxidants (vitamin E isomers, carotenoids) were determined using HPLC. The hydro-soluble antioxidants (total polyphenols, flavonoids) and antioxidant potential were determined using spectrometric methods.

Results: Milk thistle seeds exhibited higher Fe content than silymarin extract (97.87 vs. 61.31 ppm), while the contents of Cu, Mn, and Zn were under the limit of detection in the extract. Milk thistle seeds presented an impressive composition of vitamin E isomers and carotenoids. In contrast, the hydro-soluble compounds (total polyphenols and flavonoids) were abundant in the extract. In terms of antioxidant potential, the total antioxidant capacity was higher in the extract, along with a higher efficiency in neutralising free radicals, as confirmed by the ABTS test (231.68 vs. 69.68 μM Trolox equiv.). However, the DPPH activity was comparable between both silymarin sources, while the iron chelation capacity was higher in seeds.

Conclusion: The study highlighted the differences in the antioxidant potential between milk thistle seeds and extract. Both were rich sources of antioxidants; milk thistle had a high content of vitamin E and carotenoids, while the extract was rich in total polyphenols and flavonoids. Both silymarin sources had a great antioxidant activity, with potential benefits for livestock.

Keywords: antioxidants, milk thistle, silymarin.

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GREEN RECOVERY OF BIOACTIVE EXTRACTS FROM PLANTS AND ALGAE FOR SUSTAINABLE FISHFEED APPLICATIONS

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Introduction: Edible plants, herbs, and algae are rich sources of natural compounds with antimicrobial and antioxidant properties. Within the Horizon Europe FEEDACTIV project (Grant No. 101086261), we investigated their potential for use in fishfeed, focusing on sustainable recovery through green extraction technologies.

Aims: To identify and recover bioactive ingredients from selected species using eco-friendly techniques and to evaluate their antimicrobial and antioxidant capacity for feed supplement development.

Materials and Methods: Agro-industrial by-products such as olive leaves, lemon and orange peels, and blueberry leaves, along with herbs (thyme, garlic, rosemary, eucalyptus) and algae (Spirulina, Chlorella, Ulva), were selected based on literature and bioactivity. Extraction was carried out using ultrasound-assisted extraction (UAE), pressurized liquid extraction (PLE), high-pressure extraction, Soxhlet, and combined ultrasound-microwave assisted extraction. The extracts were analyzed for total phenolics, flavonoids, antioxidant activity, and chemical composition (HPLC, GC-MS).

Results: Citrus peel and olive leaf extracts showed high phenolic content (up to 93 mg GAE/g), especially using UAE and PLE with water or ethyl acetate. Essential oils of garlic and thyme exhibited superior antimicrobial activity, outperforming gentamicin and fluconazole in vitro. Microalgal extracts were rich in proteins and phycocyanin, with antioxidant activity exceeding 300 µg Trolox/g dry weight. GC-MS profiles revealed compound-specific potency (e.g., thymol, carvacrol, eucalyptol).

Conclusion: Selected herbs, plants, and algae demonstrate high bioactivity when recovered via green extraction. These results support their integration as natural, sustainable additives in aquafeed to enhance health, immunity, and environmental performance.

Keywords: algae, bioactive compounds, essential oils, fishfeed, green extraction.

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CIRCULAR VALORIZATION OF INVASIVE MACROALGA *SARGASSUM MUTICUM*: A MARINE BIOMASS RESOURCE FOR SUSTAINABLE AQUAFEED PRODUCTION

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Introduction: *Sargassum* spp. brown algae blooms, invasive in Europe and North America, intensified by eutrophication and ocean warming, pose ecological challenges but offer valuable biopolymers such as alginate, fucoidan, and laminarin. These polysaccharides have gelling and antioxidant properties suitable for bioactive encapsulation. Olive leaf extract (OLE), rich in phenolics, is bioactive but unstable, requiring protection for practical aquafeed application.

Aims: This study aimed to design and assess microparticle systems based on *Sargassum* polysaccharides for the stabilization and release of OLE in aquafeeds.

Materials and Methods: Polysaccharides were sequentially extracted from *Sargassum muticum* and purified by ethanol precipitation and dialysis. OLE was extracted using 70% ethanol (1:20 w/v) and analyzed for total phenolics (Folin–Ciocalteu), antioxidant activity (DPPH), and phenolic composition (HPLC). Microparticles were formed by CaCl₂-induced ionic gelation using i) alginate, ii) alginate–fucoidan, and iii) alginate–fucoidan–laminarin matrices. SEM, FTIR, size analysis, and encapsulation efficiency via TPC were used for characterization. In vitro digestion simulated pH 3–7.5 of *Dicentrarchus labrax*.

Results: Yields were 21.6% w/w dry mass alginate, 7.8% w/w dry mass fucoidan, and 4.2% w/w dry mass laminarin. OLE yielded 15.3% w/w dry mass extract with 73.5 mg GAE/g phenolics and 851.6 µmol TE/g antioxidant activity. Encapsulation efficiency rose from 62.4% (alginate) to 85.1% (ternary). The ternary matrix retained 91.4% antioxidant activity and showed controlled release: 28.5% phenolics at one hour and 68.1% at four hours, versus >85% burst in alginate-only systems.

Conclusion: *Sargassum muticum* polysaccharides can effectively encapsulate OLE for aquafeeds. The ternary matrix showed superior efficiency, protection, and sustained release. This approach promotes circular valorization of marine and agro-industrial biomass in sustainable fish nutrition.

Keywords: aquafeed, encapsulation, polysaccharides, *sargassum muticum*, sustainable aquaculture.

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BIOPROCESSING OF GRAPE POMACE FOR VALUE ADDED INGREDIENTS WITH UTILISATION IN BREADMAKING

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Introduction: Bioprocessing grape pomace (GP) presents a sustainable solution aligned with circular economic principles and transforms it into a valuable functional ingredient.

Aims: This review aims to investigate current bioprocessing techniques applied to grape pomace to enhance its nutritional and functional properties and on its potential use in bread fortification.

Literature Review: A literature survey was conducted on articles published in 2020-2025 to examine various valorization techniques of GP, including enzymatic treatments, solid-state fermentation, and innovative extraction methods. Additionally, studies focusing on microbial fermentation of GP using specific bacteria and fungi and its integration into bakery products were reviewed.

Results: The studies revealed that the bioprocessing of GP effectively recovers bioactive compounds like dietary fiber, polyphenols, and proteins. Integrating GP into bakery products, particularly bread, allows for an improved nutritional and functional value. It can increase the total phenolic content and the antioxidant activity of bread. GP can be fermented using specific strains of bacteria and yeast, such as *Lactiplantibacillus plantarum* to improve the antioxidant and anti-inflammatory potential of bread. Solid-state fermentation of GP with *Aspergillus niger* and *Aspergillus oryzae* to enhance the extraction of polyphenols can also be used, which shows the positive effect of targeted fermentation on fruit waste. Moreover, grape pomace naturally contains diverse lactic acid bacteria and wild yeasts capable of spontaneous fermentation, which can contribute to enhancing the nutritional and sensory qualities of fortified bread.

Conclusions: Bioprocessing GP is an effective way to transform it into a sustainable, value-added ingredient in bakery products. Future research should focus on exploring the role of GP's native microbiota to further improve its functional benefits.

Keywords: bread fortification; functional ingredients; grape pomace.

VALORIZATION POTENTIAL OF INVASIVE MACROALGA *ASPARAGOPSIS ARMATA* FOR FOOD, FEED AND COSMECEUTICAL APPLICATIONS

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Introduction: *Asparagopsis* spp. are invasive red macroalgae of the Mediterranean with bioactive potential in food, feed, and cosmeceuticals. They provide proteins, polysaccharides, and unique halogenated metabolites, though their valorization remains limited.

Aims: This study investigated the biochemical composition of *Asparagopsis armata* and assessed its potential for sustainable applications.

Materials and Methods: Proteins were recovered by aqueous enzymatic extraction and quantified using the Kjeldahl method. Polysaccharides were isolated via water extraction and ethanol precipitation, and their concentration was measured using a UV–Vis/DMB assay. Phenolics were extracted by 70% ethanol maceration and assessed with the Folin-Ciocalteu assay. Lipids and PUFAs were extracted using the Bligh and Dyer method and analyzed with GC-MS. HS-SPME/GC-MS was used to determine volatile halogenated metabolites.

Results: *A. armata* contained high protein ($21.4 \pm 2.1\%$ w/w dw) and polysaccharide levels ($18.7 \pm 1.1\%$ w/w dw). Phenolics were present at low concentrations. PUFA levels were low, but halogenated metabolites, notably bromoform, were confirmed. These results indicate that proteins and polysaccharides are primary valorization targets, with halogenated compounds providing additional antimicrobial and methane mitigation potential.

Conclusion: *Asparagopsis armata* shows promising valorization potential: (i) proteins as nutritional supplements in aquafeeds, (ii) polysaccharides as functional hydrocolloids for food and cosmeceutical applications, and (iii) halogenated metabolites as bioactives with antimicrobial and environmental benefits. Integrating sustainable extraction and formulation strategies could transform *A. armata* from an invasive burden into a source of high-value bioproducts.

Keywords: *Asparagopsis armata*, Marine bioactives, Proteins, Polysaccharides, Halogenated metabolites

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SESSION 3: HORTICULTURE AND LANDSCAPE

THE INFLUENCE OF HYBRIDS AND PLANTING DENSITY ON KOHLRABI GROWTH AND YIELD

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Introduction: Kohlrabi (*Brassica oleracea* var. *gongylodes*) is an important vegetable appreciated for its nutritional value, containing vitamin C, potassium, dietary fibers, and other bioactive compounds. It is cultivated for its swollen stem, consumed fresh or cooked, and represents a promising alternative crop due to its short growing season and adaptability. In Romania, hybrid cultivars are increasingly preferred for their uniformity, early maturity, and higher yield potential

Aims: The study aimed to evaluate the influence of three kohlrabi hybrids and different planting densities on growth, development, and yield under field conditions in Covasna county, Romania.

Materials and Methods: A bifactorial experiment was conducted in 2022, including three hybrids ('Volturmo F1 RZ', 'Cindy F1 RZ', 'Kolibri F1') and three planting densities (185,186; 148,148; 123,457 plants/ha). Experimental plots were arranged in three replications. Morphological and yield parameters were recorded throughout the vegetation period, including plant height, number of leaves, rosette diameter, tuber diameter, and weight. Data were statistically analyzed to assess significant differences.

Results: Both hybrid and planting density significantly influenced growth and yield. The 'Kolibri F1' hybrid recorded the highest yield (71.14 t/ha) at the highest density (185,186 plants/ha), being 32.18% higher than the control ('Cindy F1', 59.25 t/ha at 123,457 plants/ha). 'Volturmo F1' also performed well at higher density, while 'Cindy F1' showed lower productivity. Higher densities favored increased yields, although tuber size was slightly reduced. Average yield across all variants was 63.68 t/ha.

Conclusion: Planting density and hybrid choice are key factors in optimizing kohlrabi production. The 'Kolibri F1' hybrid at 185,186 plants/ha proved the most productive combination under the studied conditions. These results highlight the importance of using suitable hybrids and planting strategies to enhance yield and marketability of kohlrabi.

Keywords: hybrid, kohlrabi, planting density, yield

SOLAR, AN EXPERIMENTAL DEMONSTRATIVE PROJECT AIMING THE EXPLOITATION OF WILD POTATO GERMPLASM

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Introduction: A significant reduction of plant protection products (PPP) usage in agriculture is a goal we must persevere to achieve. One of the most desirable ways of coping with aphids infestations in potato plants would be through integrated resistance. Currently, there is a series of accessions of wild potato species manifesting this resistance. Nevertheless, their use for breeding potato cultivars is often very difficult, but, by somatic hybridization, a short-cut can be made in the transfer of genes associated with the resistance phenotypes to potato.

Aims: By SOLAR (Solanum Aphids Resistant) we want to reiterate the former experience and to create some more resilient potato cultivars which hopefully would require less PPP treatments.

Materials and Methods: Potato cultivars are to be used in sessions of somatic hybridization with wild potato species, *S. berthaultii*, *S. bulbocastanum*, *S. chacoense*, *S. stoloniferum*, from GRIN, USDA-ARS, USA. The aphid's (*Brachycaudus helichrysi*) behavior toward the hybrids and parents is to be assessed in greenhouse and field trials.

Results: Currently, there is knowledge available regarding the mechanisms of resistance to aphids. This, combined with our personal experience, provided a substantial background to pursuing the idea of further developments in obtaining potato lines with integrated resistance to aphids. The formal partners of the project are USAMV Cluj-Napoca and a small farm, namely Colina Farms, which is dedicated to green agriculture. The starting material, represented by Romanian potato cultivars is received from the informal partner, INCDCSZ, Braşov, Romania, focused on potato breeding. After obtaining and phenotyping, the most valuable potato hybrids would be subsequently used freely by the partners for future developments, independently or in collaboration.

Conclusion: A collaboration loop will be established during SOLAR between the following: researcher, breeder and farmer, who will join forces to support eco-farming.

Keywords: protoplast electrofusion, resistance to aphids, somatic hybridisation, wild potatoes

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THE INFLUENCE OF VINTAGE AND VINE AGE ON GRAPE AND WINE QUALITY OF THE ROMANIAN BLACK VARIETY FETEASCA NEAGRĂ

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Introduction: In the wine industry, vine age is widely believed to correlate with grape and wine quality. However, previous studies showed that the effect of vine age might differ with plantation management practices, climatic year and variety.

Aims: The aim of this study was to assess the effect of vine age, vintage and their interaction on grape and wine quality parameters.

Materials and Methods: This study aimed to assess the effects of vine age, vintage, and their interaction on key grape and wine quality parameters. Two vine age categories were investigated - Fetească Neagră young vines (8 years) and old vines (58 years) - at the Tohani vineyard in the Dealu Mare region over three consecutive vintages (2015–2017). Grape sugar content and total acidity, as well as wine total acidity, dry extract, non-reducing dry extract, and alcohol content, were determined using standardized laboratory methods. All measurements were performed in triplicate.

Results: Considering vintage as an independent factor, the 2017 vintage exhibited significantly higher values for grape sugar content (249.83 g/L), wine alcohol content (14.9% v/v), and total dry extract (38.19 g/L). Grape total acidity, wine total acidity, and non-reducing dry extract remained relatively constant across the 2015–2017 vintages. The interaction between vine age and vintage revealed that older vines showed significantly higher values for grape sugar concentration (g/L), wine alcohol content (% v/v), total dry extract (g/L), and non-reducing dry extract (g/L) in 2015 and 2016, but not in 2017. When analyzing vine age as an isolated factor, older vines consistently exhibited higher grape sugar concentrations (245.44 g/L), alcohol content (14.63% v/v), and both total (37.51% v/v) and non-reducing dry extract (33.92 g/L) values. No statistically significant differences were observed for total titratable acidity in either grapes or wine.

Conclusion: In this study, we showed that older vines exhibit a higher potential for producing superior quality grapes and wines, although this potential is partially influenced by vintage variation.

Keywords: grape quality, vine age, vintage, wine quality

IMPACT OF BIOSTIMULANT APPLICATION ON THE ROOTING SUCCESS OF VARIOUS GRAPE VARIETIES

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Introduction: The grape plant materials have a high value mainly due to the competitive nature of the grape nursery business, but also due to the rapid globalization of the grape and wine community. This results in some fundamental changes in the availability of some grape selections, varieties, and clones that are appropriate for the different climates in the world.

Aims: This work aims to evaluate the impact of biostimulant application on the rooting success of various grape varieties.

Materials and Methods: The manuscript provides information regarding the behaviour of four grape varieties: ‘Merlot’, ‘Fetească neagră’, ‘Napoca’, and ‘Fetească regală’ on rooting success after the application of three biostimulation products: Product A – based on alfa-cipermetrin 6%, Product B – based on nitrogen, macro- and micro-elements, and aminoacids, and Product C – based on aminoacids and microelements.

Results: Following the comparative analysis of the three biostimulators used in the experiment, Product A proved to be consistently the most effective product in stimulating the rhizogenesis process in most of the tested varieties, especially in ‘Napoca’, ‘Fetească neagră’, and ‘Merlot’. This effect was maintained during the study, indicating consistency in the results and increased reliability in application, regardless of the variety.

Conclusion: In addition to the biological efficiency demonstrated by the significant increase in the number and length of roots, Product A also presented an important economic advantage, having a lower acquisition cost compared to the other products analyzed. This aspect makes it particularly accessible for practical use, especially in nurseries and in the production of large-scale vine seedlings. Therefore, Product A can be recommended as a suitable biostimulator in vegetative propagation technologies of vines, being a product that combines agronomic efficiency and affordable application costs.

Keywords: amino acids, biostimulants, grapevine, microelements, roots

STRATEGIES FOR ESTABLISHING THE OPTIMUM TIME TO HARVEST GRAPES FOR WHITE WINES - VINEA APOLDIA MAIOR WINERY USAMV CLUJ-NAPOCA

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Introduction: The grape quality is based on climate, soil and the human factors (cultivation techniques, production, harvest methods) (Bora *et al.*, 2015). Grape harvesting is one of the most critical stages in both wine and table grape production, as it directly affects crop quality, economic efficiency, and overall sustainability in viticulture (Kaan Kurtural and Fidelibus, 2021). The moment of grape harvest plays a pivotal role in obtaining the proper wine.

Aims: The paper aims to determine the optimal harvest time for five grape varieties used in white wine production, in specific climatic conditions.

Materials and Methods: Five grape varieties used in white wine production – Muscat Ottonel, Pinot Gris, Italian Riesling, Sauvignon Blanc, and Traminer Roz – within the Apoldia Maior Winery, located in Apoldu de Sus locality, Sibiu, were investigated. The research includes observations on the evolution of the quantity and quality of production during 2024. The optimal harvest time was established by taking samples on August 20th, 23rd, 26th, and 29th. The harvest quantity was estimated by: the average weight of a grape (g); the mass of 100 berries (g). The harvest quality was expressed by the sugar content (g/L) using the refractometric method, total acidity (g/L sulfuric acid), and pH.

Results: The quality of the harvest expressed by the sugar content of the grapes and total acidity was influenced by the climatic conditions of the year (solar insolation and temperatures above the usual limits; the sum of annual precipitation in normal, but insufficient during the period of intensive growth of shoots and grapes; relative air humidity below the optimal level).

Conclusion: The analyses carried out aimed to gain better knowledge of the behavior of these varieties, their suitability for cultivation, and to obtain new information about their production and quality in the geographical area of interest.

Keywords: 100 berries weight, acidity, grape weight, optimal time of harvest, sugar content

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CRYPTOGAMIC DISEASE INCIDENCES FOR SOME GRAPEVINE VARIETIES UNDER THE CLIMATIC CONDITIONS IN THE SILVANIA VINEYARD

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Introduction: Grapevines, as field-cultivated plants, are naturally subject to multiple biotic and abiotic stress factors, and frequently a combination of them (Munteanu *et al.*, 2023). Romania has a rich and long tradition in the field of viticulture and is an important wine-producing country (Heizer *et al.*, 2023). For that reason, one should be paying attention to cryptogamic diseases as they have serious repercussions upon productivity and longevity of vineyards.

Aims: To evaluate the incidence of cryptogamic diseases for different grapevine varieties according to a phytosanitary treatment protocol, in specific climatic conditions.

Materials and Methods: The research was conducted in the vineyard located outside the village of Nușfalău, Sălaj County, on grapevine varieties Fetească neagră, Merlot, and Cabernet Sauvignon. The resistance level to the main cryptogamic diseases: *Plasmopara viticola*, *Uncinula necator*, and *Botrytis cinerea* was evaluated under the climatic conditions of the year 2024. Several series of observations and determinations were performed during different “BBCH” phenophases, during which the frequency and intensity of the attacks were assessed, data that formed the basis for calculating the attack degree “GA”. The evaluated varieties behaved differently, depending on the genetic peculiarities, but exhibited “Good” and “Very Good” resistance levels.

Results: The research results highlighted the sensitivity and resistance levels to the pathogen attack of the three studied varieties. Thus, the highest resistance to cryptogamic disease was exhibited by the Cabernet Sauvignon variety, while the lowest resistance was found in the Fetească neagră variety.

Conclusion: Knowing the sensitivity and resistance levels of grapevine varieties cultivated in a specific vineyard/area allows for the introduction of varieties with higher resistance on larger surfaces and the development of differentiated phytosanitary treatment schemes, thus reducing costs and effectively controlling cryptogamic diseases.

Keywords: cryptogamic diseases, grapevine, gray mold, oidium, powdery mildew

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REVEALING THE POTENTIAL OF *ARTEMISIA* SP. HYDROSOLS: CHEMICAL COMPOSITION AND VALORIZATION OF ESSENTIAL OIL BYPRODUCTS FROM FOUR VARIETIES

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Introduction: Hydrosols, also known as hydrolates, are a promising yet underexploited aqueous byproduct of essential oil distillation. They contain a complex blend of residual essential oil components and water-soluble phytochemicals, many of which possess notable bioactive properties. Hydrosols have shown a wide range of biological activities, including antimicrobial effects - particularly in preventing biofilm formation - and antioxidant capabilities that help mitigate oxidative stress. These biofunctional qualities make hydrosols versatile candidates for applications in agriculture (as biopesticides), food preservation (as natural additives and anti-browning agents), pharmaceuticals (as antimicrobial and antitumor agents), and cosmetics (as bioactive ingredients).

Aims: This paper aims to analyze the chemical characteristics of hydrosols obtained from four *Artemisia* varieties and their potential applications.

Materials and Methods: Water distillation remains the most commonly used, accounting for approximately 93% of global EO production. This process can be carried out using either hydro-distillation (HD) or steam distillation (SD), depending on the interaction between water and aromatic plant material during extraction. During the condensation phase of distillation, two immiscible layers are formed: the essential oil and an aqueous byproduct known as the hydrosol.

Results: The analytical results confirm the presence of a diverse range of bioactive compounds in *Artemisia* sp. hydrosols, supporting their potential as a multifunctional natural products with antimicrobial and antioxidant properties, and reinforcing their applicability in sustainable formulations across various industries. Moreover, the demonstrated bioactivity of compounds reinforces its suitability for applications in fields such as cosmetics, pharmaceuticals, food preservation, and agriculture, aligning with the growing demand for environmentally friendly and health-conscious alternatives. Analysis revealed the presence of several principal compounds, including: trans-Pinocarveol, (+)-2-Bornanone, Bicyclo[3.1.0]hexan-3-one, 4-methyl-1-(1-methylethyl)-, 1.8-Cineole, (+) spathulenol.

Conclusion: This study underscores the emerging relevance of essential oil industry byproducts -particularly hydrosols - as novel and promising sources of bioactive compounds with substantial potential for the development of sustainable ingredients across diverse sectors. From a circular economy standpoint, the valorization of such byproducts represents a strategic opportunity to recover materials traditionally considered waste, thereby enhancing resource efficiency and sustainability.

Keywords: *Artemisia* sp., byproduct, circular economy, hydrosols

EFFECT OF AGAR TYPE ON *IN VITRO* PROPAGATION OF MEDICINAL PLANTS

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Introduction: *In vitro* culture is based on a solid or semi-solid medium, where the gelling agent plays an essential role (Ebile *et al.*, 2022). Thus, among the components of the culture medium, the type of agar used can significantly influence morphogenic responses such as shoot multiplication, rooting, and callus formation.

Aims: This study aimed to evaluate six commercially available agar types - Daishin agar, Gelcarin, Gelrite, Microagar, Phytoagar, and Plant agar - on the *in vitro* propagation of three medicinal species: *H. perforatum*, *M. piperita*, and *S. rebaudiana*.

Materials and Methods: The culture medium used was Driver and Kuniyuki Walnut (DKW) supplemented with 30 g/L (w/v) sugar and without PGRs, pH 5.8. The types of agar used for gelation of the culture media were: Daishin agar (6 g/L), Gelcarin (4 g/L), Gelrite (2 g/L), Microagar (4 g/L), Phytoagar (6 g/L), and Plant agar (5 g/L). After four weeks of *in vitro* culture, the following parameters were determined: number of shoots/explants, shoot length, number of roots/explant, root length, and shoot water content.

Results: The five agar types did not significantly affect the number of shoots per explant in *S. rebaudiana* and *M. piperita*, while in *H. perforatum*, Microagar and Phytoagar resulted in a decreased shoot number per explant. Microagar also had a negative effect on shoot length in *H. perforatum* (2.13 ± 0.26 cm). Compared to the other species, *M. piperita* developed the highest number of roots across all agar types, with a maximum of 9.75 ± 0.63 on medium solidified with 4 g/L Gelcarin. The highest water content for all species was recorded on medium solidified with 5 g/L Plant agar: 80.36% in *H. perforatum*, 90.19% in *M. piperita*, and 90.88% in *S. rebaudiana*.

Conclusion: The results indicate that the type of agar influences the *in vitro* multiplication process in the three medicinal plant species. For *M. piperita* and *S. rebaudiana*, Gelcarin (4 g/L) improved growth parameters, while for *H. perforatum*, Gelrite (2 g/L) proved to be the most effective.

Keywords: daishin agar, gelcarin, gelrite, microagar, phytoagar, plant agar

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THE INFLUENCE OF CLIMATIC FACTORS AND PHYTOSANITARY TREATMENTS ON VINE HEALTH AND GRAPE QUALITY IN CHASSELAS DORÉ AND FETEASCĂ ALBĂ CULTIVARS IN THE DEALURILE BIHARIEI REGION

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Introduction: Grapevines, as field-cultivated plants, are naturally subject to multiple biotic and abiotic stress factors, and frequently a combination of them. Romania has a rich and long tradition in the field of viticulture and is an important wine-producing country. For that reason, one should pay enough attention to cryptogamic diseases because they have serious repercussions for the productivity and longevity of vineyards.

Aims: This work aims to evaluate the incidence of cryptogamic diseases for different grapevine varieties according to a phytosanitary treatment protocol, in specific climatic conditions.

Materials and Methods: This research is focused on the relationship between key meteorological parameters (temperature, air humidity, precipitation, and solar radiation) and the development of cryptogenic diseases, as well as the timing and efficacy of phytosanitary treatments at phenological stages, while also accounting for the official warning bulletins (provided by the National Phytosanitary Agency). The data used in this study were collected from a private plantation in the viticultural region Dealurile Bihariei (Bihar County, Romania) over the 2021-2022 growing season.

Results: The findings highlight a significant correlation between climatic variability and the occurrence of downy mildew, powdery mildew, and grey rot, particularly during periods of high humidity and rainfall. Phytosanitary treatments – applied both preventively and curatively – proved effective when synchronized with the risk diseases, risk periods, and vegetative development. The Chasselas Doré vines showed higher susceptibility to downy and powdery mildew, while Feteasca Albă was more affected by the *Botrytis cinerea*, especially during the ripening phase.

Conclusion: The study emphasizes the importance of applying site-specific and adaptive disease management strategies, taking into account local climatic conditions and phenological phases. These results provide valuable insights for improving sustainable phytosanitary practices in regional viticulture.

Keywords: climatic factors, cryptogamic diseases, Feteasca Albă, grapevine, phytosanitary treatments

BIODIVERSITY IN PLAIN SIGHT: A RAPID ASSESSMENT OF A SEMI-NATURAL GRASSLAND ON THE EDGE OF AN URBAN AREA

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Introduction: The global decline of biodiversity is a frequent research focus, and semi-natural grasslands are among the most vulnerable habitats. Biodiversity loss in Central and Eastern Europe is largely attributed to intensive agriculture and unsustainable urbanization, with these ecosystems particularly affected by fragmentation and insufficient legal protection (Feurdean *et al.*, 2018; Paudel *et al.*, 2023).

Aims: This study aimed to conduct a rapid assessment of plant diversity in a semi-natural grassland on the outskirts of Cluj-Napoca, Romania, to evaluate its ecological, infrastructural, and conservation significance.

Materials and Methods: The study site covered approximately 8,000 m². The area was divided into 1 m² plots, and 25–30 plots were randomly selected for analysis along the approximate transects of the two diagonals to ensure spatial representation. All vascular plants within each plot were identified to species level. Ecological indices, including the Shannon diversity index and Simpson's index, were calculated to assess species richness, dominance, and evenness.

Results: Preliminary observations indicated a diverse flora, dominated by species from the Poaceae (Gramineae), Fabaceae, Asteraceae and Lamiaceae families. The area exhibited above-average diversity, with a relatively balanced species composition.

Conclusion: Peri-urban grasslands can serve as vital biodiversity refuges and should be integrated into urban green infrastructure planning. Rapid ecological assessments, like this one, underscore the conservation value of such spaces and advocate for their protection in policy frameworks.

Keywords: biodiversity, conservation, grassland, green infrastructure, urban ecology

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CHANGES IN SOIL MICROBIOME ASSOCIATED TO REDUCED FERTILIZATION AND GRAFTING

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Introduction: Soil microbial communities are critical for nutrient cycling, plant health, and agroecosystem resilience. Both fertilization regimes and grafting practices are known to alter soil microbiome composition and function, yet their combined effects remain underexplored. Understanding how fertilization intensity and graft usage modify soil microbial communities is essential for a sustainable management.

Aims: This study aimed to investigate the impact of (i) fertilization level (low vs. conventional) and (ii) graft rootstock (pattern vs. control) on soil microbiome.

Materials and Methods: Soil samples were collected from treatments combining fertilization regimes (conventional and 75% reduction) and pepper grafted or ungrafted. DNA was extracted and sequenced. Microbial diversity indices and community structure were evaluated.

Results: The results revealed distinct clustering by treatment, but also by graft variant, indicating significant shifts in community structure. Richness and evenness varied notably across treatments, corroborating that fertilization intensity modulates microbial diversity (Wang *et al.*, 2020). Furthermore, grafting influence community composition and plant-soil feedbacks (Jin *et al.*, 2024).

Conclusion: Together, these findings highlight that combining fertilization strategies with graft use can reshape soil microbiomes, potentially enhancing beneficial taxa, while reducing diversity uniformity. This has implications for optimizing soil health and plant performance in agroecosystems.

Keywords: microbial communities, pepper, soil diversity

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THE POTENTIAL OF PEPPER ROOTSTOCKS TO MINIMIZE FERTILIZER USAGE

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Introduction: Excessive fertilizer causes environmental issues such as nitrate leaching and eutrophication, while also increasing production costs. Sustainable alternatives are thus required (Smith *et al.*, 2020). In pepper, grafting offers a promising strategy, yet commercial rootstocks remain limited. Recent research (Pérez-Cordoba *et al.*, 2024) found promising parental lines with contrasting root traits to produce experimental hybrids suited for use as pepper rootstocks under low-input conditions.

Aimes: The objective of the present study was to evaluate the productivity of two experimental pepper hybrids ‘A’ and ‘B’ under standard and reduced fertilization regimes.

Materials and Methods: Plants were grown under standard fertilization and a reduced regime (–75% fertilizer units) in a triplicate block design with 15 plants per block. Nitrate, calcium and potassium leaf levels were analysed. Yield, commercial classification and economic value were recorded.

Results: ‘Nelto’, the variety used as scion, showed similar yield under the two fertilizing regimes. Both rootstocks showed better economic value compared with ‘Nelto’, but with differing response to the low fertilization. The ion leaf contents indicate that the absorption and translocation of minerals was different for the grafted pepper plants.

Conclusion: The generation of hybrids based on the root efficiencies of the parental lines seems a good strategy to create new pepper rootstocks.

Keywords: breeding, low input, root architecture

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GENETIC VARIABILITY OF PLUM CULTIVARS DEVELOPED AT BISTRIȚA, ROMANIA

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Introduction: The plum tree (*Prunus domestica* L.) is one of the most important fruit tree species cultivated in Romania and across Europe. Due to its high ecological plasticity and adaptability, a wide range of cultivars with diverse morpho-phenological and technological traits has been developed and officially registered. In the current context of climate change and increasing consumer demands, the understanding genetic variability is important for the conservation of plant genetic resources and for supporting modern breeding programs. In this context, the CAPS (Cleaved Amplified Polymorphic Sequence) marker system represents an efficient and reliable molecular approach, widely used for the assessment of genetic variability and for elucidating genetic relationships among fruit tree cultivars.

Aims: The objective of this study was to assess the genetic diversity among 12 registered plum cultivars using CAPS markers, in order to provide a molecular characterization that can support breeding strategies and germplasm management.

Materials and Methods: Twelve plum cultivars ('Delia', 'Iulia', 'Ivan', 'Jubileu 50', 'Dani', 'Doina', 'Geta', 'Matilda', 'Elena', 'Romaner', 'Zamfira', and 'Zandra') as a results of breeding program from Fruit Research & Development Station (FRDS) Bistrița, Romania, were selected for analysis. Genetic polymorphism was investigated using three CAPS primers pairs (PR56, PR69, PR72). DNA digestion was performed with two restriction enzymes, HpyF3 and HincII. Genomic DNA was extracted from young leaves using the Omega BIO-TEK kit (Bioline), and target fragments were amplified through PCR in a thermal cycler. The resulting molecular profiles were subsequently analyzed using Minitab software to assess genetic variation among cultivars.

Results: The genotyping analysis of plum cultivars developed at FRDS Bistrița revealed a moderate level of polymorphism, corresponding to a medium degree of genetic diversity within the studied set. Digestion with the HpyF3 enzyme of the PCR product obtained with the PR69 marker revealed similar allelotypes for the 12 cultivars included in the study, with two restriction sites identified in all the cultivar. The PR72 marker revealed restriction sites in only two of the analyzed cultivars ('Jubileu 50' and 'Zamfira'). The highest level of variability was observed with the PR56 marker, which generated distinct fragments even in the absence of enzymatic digestion, thus highlighting its higher discriminatory capacity among the analyzed genotypes.

Conclusions: This study confirmed the presence of genetic diversity among the 12 analyzed plum cultivars, with a moderate overall level of polymorphism. Among the tested markers, PR56 proved the most informative, while PR69 and PR72 revealed limited variability. These results confirm the usefulness of CAPS markers in assessing genetic relationships and aiding *Prunus domestica* breeding and conservation.

Keywords: CAPS markers, genotyping, genetic diversity, plum

IN VITRO ASSESSMENT OF DROUGHT TOLERANCE IN THREE ROMANIAN GRAPE CULTIVARS USING OSMOTIC STRESS INDUCED BY PEG6000

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Introduction: *In vitro* techniques offer controlled environments for screening drought tolerance in plants during early developmental stages. Therefore, this study evaluates the response to osmotic stress simulated with polyethylene glycol 600 (PEG600) in three Romanian grapevine cultivars – ‘Galbenă de Odobești’, ‘Grasă de Cotnari’, and ‘Frâncușă’ - by analysing shoot proliferation, elongation, and water content.

Aims: To evaluate the effect of PEG600-induced drought stress on *in vitro* development and compare the drought tolerance of grapevine varieties under increasing PEG600 concentrations.

Materials and Methods: Explants with a length of 2-2.5 cm from three *Vitis vinifera* L. varieties (‘Galbenă de Odobești’, ‘Grasă de Cotnari’, ‘Frâncușă’) were cultured on Murashige and Skoog (MS) medium supplemented with 0.5 mg/L benzyladenine (BA) and four levels of PEG600: 0 (control), 5, 10, and 20 g/L. After six weeks of cultivation under controlled environmental conditions, the following parameters were assessed: number of shoots per explant, shoot length (cm), and water content (%), which was calculated by the difference between fresh and dry weight.

Results: ‘Grasă de Cotnari’ recorded the highest average shoot proliferation across all PEG concentrations (5.73 at PEG0; 5.40 at PEG20). ‘Frâncușă’ showed a moderate decline (3.40 to 2.87), whereas ‘Galbenă de Odobești’ exhibited the lowest shoot number and a significant reduction (1.81 to 1.40). Regarding the decrease in shoot length after hydric stress, ‘Frâncușă’ and ‘Grasă de Cotnari’ showed a moderate decline (3.17 cm at PEG0 and 2.48 cm at PEG20; 3.16 cm at PEG0 and 2.33 cm at PEG20), while ‘Galbenă de Odobești’ fluctuated with a notable drop at PEG5 (1.19 cm). ‘Grasă de Cotnari’ maintained the highest water content across treatments (86.17% at PEG0 to 84.36% at PEG20), and ‘Galbenă de Odobești’ showed the most significant decline in water content (84.25% at PEG0 to 80.97% at PEG20).

Conclusion: Therefore, despite differences in vigour among the studied varieties, analysis of parameter changes under osmotic stress indicated that ‘Frâncușă’ exhibited the best overall stability in shoot length and water content, with moderate declines as PEG600 concentration increases. ‘Grasă de Cotnari’, although the most vigorous variety, showed a more significant decrease in length, and ‘Galbenă de Odobești’ was the most sensitive. Consequently, ‘Frâncușă’ stands out as the most tolerant to water stress induced under *in vitro* conditions.

Keywords: drought stress, hypertonic polyethylene glycol, *in vitro* culture, *Vitis vinifera*

IN VITRO* TUBERIZATION OF *SOLANUM CHACOENSE

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Introduction: *Solanum chacoense*, although not intended for human consumption, could play a crucial role in breeding programs aimed at enhancing *Solanum tuberosum*, particularly due to its inherent resistance to various pathogens.

Aims: This research focused on refining the vegetative *in vitro* propagation protocol for the wild potato species *Solanum chacoense* via tuberization.

Materials and Methods: The study induced tuberization *in vitro* using plantlets grown on four MS culture media with varying sucrose concentrations (6, 8, 10 and 12%).

Results: Microtubers developed in both root and aerial parts of the plantlets, with an average size of 1 cm. Among the tested sucrose concentrations, 12% was optimal for increasing both the tuberization rate and microtuber count per plant. In contrast, a 6% sucrose concentration promoted taller plantlet growth.

Conclusion: The findings suggest that a higher sucrose concentration in the culture medium is optimal for *in vitro* microtuber production, serving effectively for propagation and germplasm preservation.

Keywords: *in vitro*, microtubers, *Solanum chacoense*, sucrose, tuberization

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IMPACT OF LATE FROSTS ON PHYSICO-CHEMICAL PARAMETERS AND PRODUCTIVITY IN SWEET CHERRY (*PRUNUS AVIUM* L.) IN THE ROMANIAN PLAIN

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Introduction: Sweet cherry is a horticultural crop of major importance both nationally and internationally (Jakab-Ilyefalvi *et al.*, 2021). Spring frosts are a limiting factor for production, while data on the susceptibility of new cultivars remain scarce (Kappel, 2010). Thermal variability during critical flowering and fruiting stages necessitates the assessment of cultivar resilience to thermal stress. This 2025 study at the Moara Domneasca Experimental Station, in a 2021 plantation, evaluates sweet cherry resilience to thermal stress in a frost-prone continental climate.

Aims: The study aimed to assess the resilience of sweet cherry cultivars to thermal stress from late frosts by comparing their morphological and physiological performance under subcritical temperatures. The research sought to identify highly adaptable cultivars suitable for cultivation under current climate change conditions.

Materials and Methods: Two commercial cultivars of interest, ‘Kordia’ and ‘Regina’, were analyzed under similar soil and agricultural technology conditions. Post-frost assessments included fruit weight, size (height and diameter), firmness, pH, sugar content (%BRIX), titratable acidity, and dry matter, with data collected using standardized laboratory methods and statistical analysis, while meteorological conditions were monitored via an automated weather station.

Results: ‘Kordia’ showed superior fruit quality after late frost, with higher weight (6.87 g vs. 4.42 g), diameter (22.93 mm vs. 18.79 mm), height (23.64 mm vs. 20.58 mm), and sugar content (16.33 %Brix vs. 15.48 %Brix). Frost damage to buds was similar: 29% for ‘Regina’ (on Gisela 5) and 30% for ‘Kordia’ (on Gisela 6). Despite this, ‘Regina’ yielded more, indicating better production tolerance to frost. Differences in firmness, pH, and citric acid were minor. Overall, ‘Kordia’ excelled in quality, ‘Regina’ in yield under frost-prone conditions.

Conclusion: Assessing sweet cherry resilience to late frosts supports climate change adaptation and informed cultivar choice. ‘Kordia’ offers high fruit quality for frost-prone markets, while ‘Regina’ ensures better yields in stable climates. Matching cultivars to site conditions can optimize profitability and reduce economic losses from frost damage.

Keywords: cherry cultivars, climate change, fruit quality, late frost

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STRATEGIES FOR OVERCOMING RECALCITRANCE IN *JUGLANS REGIA* L. TISSUE CULTURE INITIATION

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Introduction: Walnut (*Juglans regia* L.) is a high-value woody species with significant economic and ecological importance. Despite its relevance, *in vitro* propagation remains challenging due to its recalcitrant nature, primarily caused by intense phenolic exudation, browning, and high contamination rates during the initiation phase. This study aims to evaluate the efficiency of different culture media and explant types in overcoming these limitations and to identify suitable strategies for improving the initiation success in walnut tissue culture.

Aims: This study aims to evaluate the efficiency of different culture media compositions and explant types in overcoming these limitations and to identify suitable strategies for improving the initiation success in walnut tissue culture. The role of additives such as activated charcoal (CA) (for phenolic adsorption), PVP (as a phenolic scavenger), and Plant Preservative Mixture (PPMTM) (as a broad-spectrum biocide) was investigated. Cultures were maintained under controlled conditions and monitored for regeneration rates phenolic exudation, browning severity, and contamination frequency.

Materials and Methods: Four types of explants were tested for *in vitro* culture initiation: meristems, dormant buds, nodes from lignified shoots, and nodes from herbaceous shoots. The explants were grown on culture media based on ½ Murashige and Skoog MS (1962) and DKW (Driver and Kuniyuki Walnut), supplemented in various combinations with plant growth regulators, CA, PVP, and PPM.

Results: The highest levels of phenolic exudation and explant browning were observed in nodal segments from lignified shoots and in dormant buds especially in the early days of culture. The meristems and herbaceous nodal segments showed lower browning and higher regeneration rates. Basic MS and DKW media were insufficient to prevent browning. The addition of PVP significantly reduced phenolic exudation. However, contamination remained a critical issue. The use of PPM in combination with PVP and PGR in DKW culture media significantly reduced endogenous bacterial contamination.

Conclusion: Effective initiation of walnut tissue culture requires tailored approaches to mitigate recalcitrance. The choice of explant type plays a critical role, with herbaceous nodes showing superior responses. Among the tested variants, DKW + 2 mg/l BAP + 0.01 mg/l IBA + PVP + PPM emerged as the most promising strategy for initiation, representing a solid foundation for further micropropagation protocols.

Keywords: anti-browning agents, contamination control, walnut micropropagation

DEVELOPMENT OF ORGANIC HETEROGENEOUS MATERIALS IN PEPPERS: EFFECTS OF SELECTION ON YIELD AND FRUIT WEIGHT

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Introduction: Organic Heterogeneous Materials (OHMs) are plant populations obtained crossing several varieties (e.g. cross composite populations/CCP) and bred in organic farming by mass selection and open pollination. This procedure allows homogeneity for many morphological traits, while keeping diverse genetic background for others. As a result, OHMs are expected adaptable to changing environments thanks to their genetic structure and may be useful to achieve resilient agrifood systems

Aims: The work evaluates the performance of a *C. annuum* CCP after two cycles of breeding, comparing the effect of selection on main agronomic traits

Materials and Methods: A 250 individuals CCP (by double hybrid crossing Blocky breeding lines with landraces Valenciano/Bell and Piquillo) were grown open field in organic farming (Horta Sud, Spain) in summers 2023 (G1) and 2024 (G2), simulating drought (75% irrigation) as additional selection factor. Yield (kg/plant) and fruit weight (g/fruit) were estimated individually.

Results: As expected in double-hybrid offspring, a considerable segregation was found in CCPs. With parents showing a mean yield of 1.5-2.0 kg/plant, G1 and G2 ranged 0.5-2.0 kg/plant and 1.0-4.0 kg/plant, respectively. Moreover, most G1 individuals concentrated in 1-1.5 kg/plant interval, while G2 individuals concentrated in 1.5-2.5 kg/plant and some in 3.5-4.0 kg/plant. This was still more remarkable in fruit weight: parents ranged 55-155 g/fruit, while G1 and G2 ranged from 35-115 g and 15-175 g, respectively. Most G1 individuals concentrated in the 55-95 g interval, while G2 individuals concentrated in 75-135 g, with several >155g.

Conclusion: The selection performed on 2023 improved considerably yield and fruit weight in CCP, demonstrating an efficient response to selection in these traits during the development of OHMs in peppers.

Keywords: *Capsicum*, composite cross population, food security, organic breeding, resilience

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EFFECT OF DROUGHT ON THE CONTENT OF ANTIOXIDANTS ON PEPPERS LANDRACES UNDER MEDITERRANEAN CONDITIONS

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Introduction: Common peppers (*C. annuum*) are rich in antioxidants and one important vegetable in Spain, a center of diversity with a plethora of ecotypes. Organic farmers in Spain are facing challenges like scarcity of water and work on identifying the best adapted varieties. Also, knowledge on the effect of water deficit on main antioxidants in peppers is still scarce.

Aims: Here we studied the response of a collection of peppers to limited irrigation on the content of ascorbic acid (AAC) and total carotenoids (TC) in fully ripe fruits.

Materials and Methods: 12 *C. annuum* peppers, mostly Spanish landraces selected from 2023 trials, were grown in open field conditions during 2024 spring-summer season, in organic farming (Horta Sud, Valencia, Spain), under two treatments: i) usual irrigation and ii) 60% irrigation dose. Fully ripe fruits were analysed for content in ascorbic acid (AAC, HPLC) and total carotenoids (TC, spectrophotometry).

Results: A great genotype variation was found in AAC content, ranging between 530 and 1546 mg·kg⁻¹ in ‘Serrano’ and ‘Padrón’ peppers, respectively. Drought increased AAC on average (1055 vs. 1220 mg·kg⁻¹) and many varieties, like ‘Topepo’ (1030 vs. 1336 mg·kg⁻¹) or ‘Villena’ peppers (944 vs. 1644 mg·kg⁻¹), while others remained stable, indicating remarkable effect of the genotype and genotype×treatment. TC ranged from 819 to 4569 µg·g⁻¹ dw in ‘Villena’ and ‘Pasilla’, respectively. By contrast, drought decreased average TC (1787 vs. 11378 µg·g⁻¹) and most varieties, particularly ‘Valenciano’ (2559 vs. 972 µg·g⁻¹), indicating remarkable genotype and treatment effects.

Conclusion: Depending on variety, hard water deficit may positively affect the levels of AAC, while TC usually decreased, although some varieties may keep stable. Genotype×treatment interaction may be useful to select the best varieties for drought.

Keywords: ascorbic acid, *Capsicum*, carotenoids, drought adaptation

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STUDIES ON RED WINES PRODUCED BY SMALL-SCALE WINEMAKERS IN DEALU MARE VINEYARD

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Introduction: The Dealu Mare vineyard area is classified by the European Union as a wine-growing region in zone CII. In this region, alongside authorized wineries, numerous small-scale household producers have emerged and continue to develop. In some cases, wines produced by these artisanal producers are sold on unregulated markets, often without undergoing quality control nor holding all the necessary authorizations for market access.

Aims: This study aims to evaluate the quality of red wines produced by household winemakers all over the Dealu Mare vineyard and to compare the findings both with current legislation and with the benchmark parameters of established wines produced by authorized wineries in the same area.

Materials and Methods: The wines analyzed were reported to belong to the 'Merlot' and 'Fetească neagră' grape varieties (according to seller declarations). The methods used for analysis are those approved by the European Union and by the International Organisation of Vine and Wine (OIV, 2020) and respect the procedures in specialty literature (Cotea and Cotea, 2006).

Results: The analyses revealed a wide range in alcoholic strength, from 6.85% to 15.02%. Volatile acidity varied between 0.49 g/L and 2.17 g/L acetic acid. The presence of added colorants was identified in some samples, suggesting attempts to "enhance" the final product's color. Other parameters analyzed included total acidity (expressed as g/L tartaric acid), free and total sulfur dioxide content (mg/L), relative density, and total dry extract (g/L).

Conclusion: The results suggest that some household producers may lack access to or familiarity with appropriate winemaking technologies and the legal requirements in the field. Encouraging the adoption of best practices and regulatory compliance could support quality improvements and facilitate the integration of these products into the regulated wine market.

Keywords: artisanal producers, physico-chemical analysis, red wines

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POLLEN VIABILITY STUDY ON A MAGIC POPULATION (MULTIPARENT ADVANCED GENERATION INTER-CROSS) OF *CAPSICUM* PEPPERS

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Introduction: Multiparent Advanced Generation Inter-Cross (MAGIC) are used to perform exhaustive studies of traits recombination and QTL identification in plants. MAGICs are usually obtained combining 8 founder parents and cover a range of phenotypes and agronomic traits. Recently, the *Capsicum* Breeding team of COMAV Institute (UPV) developed the 1st interspecific MAGIC of *Capsicum* sp. in the world. However, merging genomic backgrounds from different species might cause fertility problems or unviable strains.

Aims: Here we studied the pollen fertility on a subset of the mentioned MAGIC to check how the recombination of the 8 genomes may have affected to fertility.

Materials and Methods: 120 MAGIC S₃ lines and the 8 parents were evaluated for pollen fertility at i) morphological and ii) biological/enzymatic levels. Pollen from 3 flowers of each S₃ plant were bulked, separated in two subsamples and stained with i) acetic carmine glycerine (morphological viability) and ii) blue tetrazolium (biological) and observed at microscope. At least 100 pollen grains per S₃ plant were counted for viability at both levels, expressed in %.

Results: Pollen viability ranged considerably in founder parents: 23-94% in morphological tests (78% average, 31% coefficient of variation) and 22-94% in biological (77% average, 31% c.v.), ‘Chile Serrano’ being the lowest one and ‘California’ and ‘Ají Dulce’ (*C. chinense*) the highest. In contrast, in the S₃, morphological viability ranged between 0-98% (average 45%, c.v 62%) and biological viability was between 0-97% (average 41%, c.v. 70%), with several S₃ plants showing <5% viability or >75%.

Conclusion: After 3 selfing cycles (and indirect selection by viability), the MAGIC achieved high levels of fertility, like the best parents (>90%), but the huge variation still present may cause very low levels of viability in some individuals, probably due to chromosome incompatibilities.

Keywords: experimental populations, fertility, pollen viability, sterility

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PRELIMINARY STUDY OF PLANT TRAITS ON THE S3 GENERATION OF A MAGIC POPULATION (MULTIPARENT ADVANCED GENERATION INTER-CROSS) OF *CAPSICUM* PEPPERS

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Introduction: Multiparent Advanced Generation Inter-Cross (MAGIC) are experimental populations used to achieve in-depth studies of traits recombination and QTL identification. Obtained from 8 parents, and covering a plethora of traits, their accuracy for genome wide association studies (GWAS) is higher than conventional populations. Recently, the *Capsicum* Breeding team at COMAV Institute achieved the first MAGIC of *Capsicum sp.* in the world.

Aims: This work reports the diversity in plant and flower traits in a *Capsicum* MAGIC population to assess its variation, checking i) level of recombination and ii) balanced distribution.

Materials and Methods: 300 MAGIC S3 lines and the 8 parents were evaluated for plant (3), leave (3) and flower (7) traits. Plants were grown under glasshouse at the COMAV (UPV-Campus Vera) in autumn-spring season 2024/25. Temperatures were 20°C/25 °C (night/day).

Results: S3 showed a considerable segregation of the phenotypes observed in founder lines, including new phenotypes. Thus, all parents but one showed scarce or nil hairiness in plant pubescence, while 75.2%, 21.5% and 3.3% of S3 showed scarce, intermediate and dense hairiness, respectively. Similar in stem colour (parents: 6 green, 2 green and purple stripes; S3: 59% green, 38% green purple and 3% purple), and leaf density, colour and shape. The same in flower traits, including some new phenotypes like flower position (50%/50% erect/intermediate in parents; S3: 30.5% erect, 41% intermediate, 28.5% pending).

Conclusion: This MAGIC covers an outstanding variation, encompassing all the phenotypes observed in the parents, and new other phenotypes, presumably due to recombination. The balanced distribution suggests that 8 genomes are well shared and, thus, the population will facilitate accurate and unbiased GWAS.

Keywords: experimental populations, flower, leaf, trait recombination, variation

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ECONOMIC ANALYSIS OF THE CULTURE OF AUGUSTINES AND PEPPERS GROWING IN PROTECTED SPACES IN CONVENTIONAL AND ORGANIC SYSTEMS - CASE STUDY

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Introduction: This paper provides a comprehensive analysis of the profitability threshold for growing bell peppers in a solar system, comparing the economic performance of conventional and organic agriculture, in the context of the 2024/2025 agricultural year.

Aims: Taking into account the former experimental models of elicitation, and considering that dimeric alkaloids are produced at very low levels in *Catharanthus roseus*, cell cultures were studied as a potential way to produce these compounds as monomers. Among different strategies to increase alkaloid production, elicitation could be one efficient strategy to provoke important increases in product yield.

Materials and Methods: The study is based on a rigorous set of specific economic indicators, result indicators and profitability indicators, which allow for a detailed estimation of production costs, capitalization prices and the degree of profitability per product unit.

Results: The results obtained highlight the importance of efficient resource management and continuous adaptation of agricultural technologies to specific crop conditions in order to optimize economic performance. They also highlight the need for financial support from authorities and agricultural policies, especially for organic farms, to ensure long-term sustainability and competitiveness.

Conclusion: This research contributes to the development of knowledge about how production strategies influence the profitability of vegetable crops, providing farmers with a valuable analytical tool for decision-making to improve economic efficiency and agricultural sustainability.

Keywords: eggplant, pepper, profitability, production

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SESSION 4: ECONOMICS AND RURAL DEVELOPMENT

INTEGRATING FOREST ECOSYSTEM SERVICE PROVISION INTO THE SUSTAINABILITY FRAMEWORK

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Introduction: Biodiversity loss and ecosystem service decline remain major global threats. Protection mechanisms based on land-sparing have led to the designation of protected areas worldwide, yet their effectiveness is still unclear, despite continuous expansion in recent decades. Alternatively, land-sharing grounded in the three pillars of sustainability offers strong potential for delivering diverse ecosystem services.

Aims: This paper aims to analyze the ecosystem services approach in the scientific literature using systematic literature review.

Materials and Methods: The literature review was conducted using four major scientific databases - Scopus, Elsevier, Science Direct, and Web of Science - covering publications from 2010 onward. The selected keywords guiding the search were: ecosystem services, forest, trade-offs, and sustainability.

Results: We identify two dominant perspectives: the utilitarian approach, based on supply and demand (Winkel *et al.*, 2022), and the ecological approach, where forest integrity is key to human well-being through its influence on ecosystem service provision. Each has limitations - utilitarianism may overlook ecological thresholds, while the ecological view may underplay socio-economic needs. We propose an integrated framework to reduce forest ecosystem service trade-offs and reconcile both perspectives under the sustainability concept.

Conclusion: This approach is grounded in the idea that each sustainability pillar (ecological, economic, and social) is supported by corresponding ecosystem services: regulation/maintenance, provisioning, and cultural ones.

Keywords: ecosystem services, forest, trade-offs, sustainability

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ANALYSIS OF THE IMPACT OF CLIMATE CHANGE ON VEGETABLE FARMING IN ROMANIA: FARMERS' ADAPTATION STRATEGIES

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Introduction: Climate change represents a major risk factor for agricultural production and food security, while its impact is already being felt in regions such as South-Eastern Europe, including Romania. The adaptation of agriculture to new climatic conditions has become essential, requiring the implementation of targeted solutions - even within protected production systems. National studies and reports confirm the high vulnerability of the vegetable sector, which is increasingly affected by phenomena such as prolonged drought, torrential rainfall, hail, floods, and wildfires. Although protected cultivation systems offer greater control over environmental conditions, they remain susceptible to the broader impacts of climate change. This paper intends to analyze the effects of these climatic phenomena on protected vegetable production in Romania, identifying major risks and the adaptation strategies employed by farmers.

Aims: The aim of this paper is to identify and present the measures adopted by Romanian farmers to cope with the intensification of extreme weather phenomena.

Materials and Methods: The work includes statistical analysis of temperatures and precipitation trends (based on the INS database) and, additionally, interviews with farmers practicing vegetable cultivation in protected areas, focusing on the impact of climate change on crops and specific adaptation measures.

Conclusion: Climate change directly impacts vegetable farming, even in protected areas, leading to production instability and increased costs for farmers. Common challenges include diseases caused by heavy rains, crop damage from extreme temperatures, and harm to infrastructure such as plastic coverings and ventilation systems. Farmers implement rapid and effective adaptation measures, including limewash shading, adjusting the cropping calendar, and cultivating resistant varieties. This study emphasizes the necessity to improve access to technological and financial resources, alongside the development of public policies that support the adaptation of the vegetable sector to changing climatic conditions, ensuring its long-term viability and competitiveness.

Keywords: climate change, protected cultivation, Romania, vegetable cultivation

STUDY ON THE AGRICULTURAL LABOR FORCE IN ROMANIA

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Introduction: According to economic theory, labor, land, and capital form the core production factors in agriculture. In Romania, agriculture relies heavily on an aging workforce, with a large share of the active population involved in farming. Despite contributing significantly to GDP, this reflects the underperformance of other sectors. Family farms dominate, and labor shortages are increasing due to migration and demographic decline. Although digitalization may reduce the need for labor, it also offers opportunities to improve productivity and farm structure. The shift toward non-agricultural rural activities highlights the need for a sustainable and adaptive agricultural labor force.

Aims: determining the current context regarding the labor force used in agriculture.

Materials and Methods: The study is based on data from the National Institute of Statistics (insse.ro). To achieve its main objective, it analyzes key statistical indicators from 2018 to 2023, including the dynamics of wage earnings, labor costs, job vacancies, and the number of employees in the agricultural sector. The research uses analysis, statistical, graphical, and tabular methods.

Results: Between 2018 and 2023, Romania's population decreased by 1%, with a growing rural-urban divide. The agricultural workforce declined but stabilized after 2021. Agriculture's share in total employment dropped significantly, while wages and labor costs in the sector rose, with the average salary increasing by 46% from 2018 to 2022. Despite higher income and wages, the agricultural sector still faces challenges in recruitment and retention, with a decrease in job vacancies and full-time employees. The sector's labor costs saw a sharp rise, indicating efforts to remain competitive amidst persistent workforce shortages.

Conclusion: Romanian agriculture faces challenges due to low wages, which result in a lower income for farming households compared to other sectors. The overabundance of cheap labor discourages modernization, while migration depletes the workforce. Although digitalization could improve efficiency, it requires better digital skills from workers. Despite wage increases, the sector struggles with fluctuating employment and difficulty filling job vacancies, especially among younger workers. To address these issues, the study calls for policies, training programs, and incentives to attract and retain workers, ensuring the sector's long-term sustainability.

Keywords: agriculture, labor force, Romania, wage earnings

SCENARIOS FOR CALCULATING PROFITABILITY FOR EGGPLANT CULTIVATION IN PROTECTED AREAS

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Introduction: In the context of current climate challenges that determine the migration of vegetable crops from the field to protected areas and the need to increase efficiency in agriculture, greenhouse and solarium crops are becoming a viable solution to ensure the continuity and quality of production. Eggplant, appreciated for its economic and nutritional value, is one of the horticultural crops that benefits considerably from technologies applied in protected areas. In order to support agricultural producers and encourage the development of these systems, Government Decision no. 325/2025 establishes eligibility criteria, financial support rules and guidelines regarding the economic performance of these farms. In this context, a rigorous analysis of economic profitability is necessary, comparing – without subsidies and with the subsidies provided for by GD no. 325/2025 – taking into account the income and expenditure budget for a standard area of 1,000 sq m.

Aims: The paper aims to evaluate the profitability of eggplant cultivation in protected areas through economic scenarios, with and without support according to GD no. 325/2025. Economic indicators such as gross income, expenses, net profit and rate of return will be calculated, in order to highlight the economic efficiency under these conditions, in order to substantiate investment decisions.

Materials and Methods: The analysis is based on the income and expense budget for eggplant cultivation cultivated on a protected area of 1,000 m², according to standard technology for the spring-summer cycle. Direct expenses (planting material, fertilizers, phytosanitary treatments, labour) and indirect expenses (energy, depreciation, water) were taken into account, as well as estimated income from the sale of production on the local market. Two profitability scenarios were built: without financial support and with financial support, according to the eligibility criteria in GD no. 325/2025.

Results: The present research outcomes are represented by the two main scenarios in order to calculating the profitability for eggplant cultivation in protected areas.

Conclusion: Eggplant cultivation in protected areas has high economic potential, becoming a profitable and viable option in the current context, especially in the presence of the financial support offered by GD no. 325/2025. This crop has the potential to contribute significantly to the development of high-performance agriculture, and investments in this field are justified from an economic point of view.

Keywords: budget, economic efficiency, eggplant, profitability, protected areas

LIFE SCIENCE INNOVATIONS IN AGRICULTURE AND HEALTH FOR SUSTAINABLE ECONOMIC AND RURAL DEVELOPMENT IN THE GAMBIA'S LOWER RIVER REGION

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Introduction: The integration of life science into community-level agriculture and health systems presents a powerful strategy for advancing sustainable economic and rural development, particularly in low-income regions. In The Gambia's Lower River Region (LRR), where the majority of the population depends on subsistence agriculture and where access to health services remains limited, life science holds the potential to transform livelihoods and strengthen resilience against socio-economic and environmental shocks.

Aims: This study explores the role of life science-based interventions in improving agricultural productivity, food security, and public health outcomes in LRR. Through a multidisciplinary approach combining agronomy, biotechnology, community health, and rural development planning, the research assesses current gaps and identifies practical, low-cost innovations adaptable to the local context.

Results: In agriculture, the introduction of improved seed varieties, organic biofertilizers, and integrated pest management systems has increased yields, reduced crop loss, and improved soil health. These innovations have enhanced farmers' incomes while reducing environmental degradation. Simultaneously, the development of climate-smart agriculture training programs has empowered local farmers - especially youth and women - with the knowledge to sustain these practices. On the health front, the study highlights how mobile health (mHealth) platforms, community-based disease surveillance, and nutritional education campaigns - grounded in life sciences - have improved maternal and child health, reduced preventable illnesses, and promoted hygiene and sanitation. The synergy between agricultural advancement and improved public health has led to better nutrition and overall quality of life in the region.

Conclusion: Importantly, the research emphasizes the importance of partnerships between researchers, local government, non-governmental organizations, and community leaders. By integrating scientific knowledge with indigenous practices, the project fosters local ownership and long-term sustainability. The findings underscore that science-driven, locally adapted solutions can catalyze meaningful change in rural economies. Life sciences offer not just tools for innovation, but a bridge to economic empowerment, health equity, and sustainable development.

This presentation aims to share these experiences, promote knowledge exchange, and invite collaboration with stakeholders committed to sustainable rural development across Africa and beyond.

Keywords: agriculture, health, rural development

SESSION 5: ANIMAL SCIENCE AND BIOTECHNOLOGIES

CURRENT TRENDS IN ADVANCED ALGINATE-BASED WOUND DRESSINGS USED FOR CHRONIC WOUNDS

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Introduction: Chronic wounds strain healthcare systems due to delayed healing and infection risk. Alginate dressings offer advanced solutions, valued for their biocompatibility, biodegradability, and moisture retention.

Aims: A systematic review of recent advances and trends in alginate-based dressings, highlighting innovations to improve their efficacy.

Materials and Methods: Data were gathered from peer-reviewed journals and synthesized to identify trends and potential research gaps. The review focuses on material composition, functional enhancements, and clinical applications.

Results:

1. Material innovations: nanotechnology and composite dressings.
2. Enhanced wound healing: faster re-epithelialization, more granulation, angiogenesis.
3. Clinical outcomes: reduced pain, fewer dressing changes, improved healing; modified alginates show superior efficacy.
4. Challenges: high production cost; variable performance across wound types.
5. Future directions: strengthen mechanics, enhance cell–tissue interactions, integrate with gene therapy and 3D printing.

Conclusion: Advanced alginate-based wound dressings offer a promising approach for managing chronic wounds by combining biocompatibility with tailored functionalities. Key advancements include the integration of bioactive agents and nanotechnology, which enhance antimicrobial activity and promote faster wound healing. Future research should focus on large-scale clinical trials and cost-effective production techniques to increase accessibility.

Keywords: alginate, chronic wounds, wound dressings

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EVALUATION OF ECONOMIC RISK DETERMINANTS IN MILK PRODUCTION

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Introduction: The changes in recent period in the dairy sector affect farm efficiency and profitability (Bórawski et al., 2020). Sustainable milk production is vital for nutrition and health (Tricarico et al., 2020), yet it faces economic risks from price volatility, rising costs, and climate change.

Aims: The study aims to analyse the determinants of economic risk in cow, sheep, and goat milk production, which can highlight the degree of economic vulnerability.

Materials and Methods: The study carries out a comparative analysis of the levels of profitability and economic risk in the production of cow, sheep, and goat milk, based on the calculation of indicators such as production value, expense structure, unit cost of production, income rate, operating risk rate, security index etc., based on the allocations of factors provided in the calculation of expenditure estimates and in the income and expenditure budgets.

Results: The study highlights differences in terms of profitability and degree of risk associated with milk production of different species. In dairy cows, a low level of production, expenses exceed income, generates losses and increased economic risk. Sheep milk production presents a precarious balance between income and expenses. Profitability is low and dependent on financial support. Goat milk production stands out for its more stable economic viability, with a relatively lower risk.

Conclusion: The paper highlights that the economic risk in milk production is influenced by the level of technical-economic efficiency, the cost structure and the income obtained. Without careful management of these factors, the activity becomes economically vulnerable and financially unstable.

Keywords: milk, risk, profitability

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Acknowledgement: The work is part of the ADER Project 22.1.2 "Technical-economic models for reducing the vulnerability of livestock farms' incomes to climate change", financed by the Ministry of Agriculture and Rural Development.

ASSESSING GROWTH DYNAMICS AND EXPLOITATION OF *ALOSA IMMACULATA* IN RELATION TO THERMAL CONDITIONS IN THE LOWER DANUBE IN 2025

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Introduction: The Pontic shad (*Alosa immaculata*) is an anadromous species of ecological and commercial importance in the Danube River. Understanding its biological and ecological status during the spawning migration is essential for sustainable management, especially in the context of increasing environmental and anthropogenic pressures.

Aims: This study aimed to evaluate the biological condition and ecological dynamics of the Pontic shad population during the 2025 spawning migration season in the Galați–Brăila sector of the Danube River, integrating environmental and biometric data to support future conservation strategies.

Materials and Methods: A total of 576 specimens were sampled between March and June 2025. Environmental parameters, especially water temperature, were analyzed using the Growing Degree Days (GDD) method to estimate thermal energy accumulation relevant for migration and reproduction. Growth was assessed using the Von Bertalanffy Growth Function (VBGF), and mortality parameters were estimated to evaluate population dynamics and exploitation status.

Results: GDD accumulation revealed clear thermal thresholds, with peak values in April and May corresponding to critical periods of metabolic activation and gonadal maturation. The VBGF parameters indicated moderate growth potential ($L_{\infty} = 34.65$ cm; $K = 0.48$ year⁻¹; $\Phi' = 2.76$). Mortality rates were estimated as follows: total mortality (Z) = 1.54 year⁻¹, natural mortality (M) = 0.74 year⁻¹, fishing mortality (F) = 0.80 year⁻¹, and exploitation rate (E) = 0.52.

Conclusion: The integration of thermal and biometric indicators offers a comprehensive view of *Alosa immaculata*'s spawning migration dynamics and biological condition in 2025. The results highlight the need for sustained monitoring and adaptive management to ensure the resilience and sustainability of the species under growing environmental pressures.

Keywords: Exploitation rate, fishing mortality, Growing Degree Days (GDD), Phenology, Pontic shad, von Bertalanffy.

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PRODUCTIVE TRAITS RESPONSE OF SILKWORM FED ON MULBERRY LEAVES SUPPLEMENTED WITH PEA PROTEIN

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Introduction: In sericulture research, efforts have been made to enhance *B. mori* productivity by enriching mulberry leaves with leguminous plant protein sources, e.g. soybean, cowpea, or lentil. To date, the supplementation of mulberry leaves with pea protein in silkworms has not been investigated.

Aims: To determine the impact of feeding mulberry leaves fortified with pea protein on productive traits of the J93 Romanian monovoltine silkworm breed.

Materials and Methods: Three hundred silkworm larvae in 5th instar were randomly allocated into 3 groups (100 larvae/group) and fed 3 dietary treatments: mulberry leaves-ML (C), ML+2.5% pea protein (V1) and ML+5% pea protein (V2) for 7 days. The larval measurements included weight (LW) and length (LL) at the first, 5th, and 7th days. Average daily gain (ADG) and feed conversion ratio (FCR) were calculated. Silk gland weight (SGW) was measured on the 5th and 7th days to calculate tissue somatic index (TSI). The raw cocoon traits determined were cocoon, shell and pupae weights, shell percentage, longitudinal and transversal axes, and silk productivity.

Results: Feeding silkworms with V1 improves the LW, ADG, and FCR compared to C and V2 ($p < 0.05$). The SGW increased in V1 (~11%) vs C and V2, and TSI was higher by 6.5% in V1 than V2 group ($p < 0.05$). Cocoon traits results indicate a better response of V1 group compared to V2 in terms of cocoon, shell and pupae weights, transversal axis, and silk productivity ($p < 0.05$). Strong positive correlations were noticed between the productivity parameters: LW with LL, ADG, and FCR, SGW with TSI, respectively, cocoon weight with shell and pupae weights, shell percentage, transversal axis, and silk productivity ($p < 0.01$).

Conclusion: The results showed that feeding mulberry leaves fortified with 2.5% pea protein in the 5th instar improves the silkworm's productive traits.

Keywords: *B. mori*, cocoon traits, larval growth, silk gland, pea protein addition.

Acknowledgement: This study was supported by the Romanian Ministry of Agriculture and Rural Development, project ADER no. 24.1.2.

EFFECTS OF A PROBIOTIC ON PRODUCTIVE TRAITS IN KAHURI /T SILKWORMS *BOMBYX MORI*

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Introduction: Lactigrow (LG) is a concentrated probiotic (2 strains of *Enterococcus faecium* and rosemary extract), known by its benefits in animals. There is not information about this probiotic specific impact on silkworms or any other insects.

Aims: Assessing of the effects of mulberry leaves supplemented with LG (2% and 6%) on productive traits in Kahuri/T silkworm breed.

Materials and Methods: The trial was carried out during the 5th instar on 300 silkworms *B. mori* randomly allocated to 3 feeding groups: 1. control group (C) fed mulberry leaves, 2. mulberry leaves + 2% probiotic were given to the experimental group-1 (LG-1), 3. mulberry leaves + 6% probiotic in the experimental group-2 (LG-2). Six larvae/group were dissected on the 5th and 7th D for weighting the silk glands. Twenty cocoons/group were selected for measuring the raw cocoons, pupa and shell weight, longitudinal (L), and transverse axis (l).

Results: Although the addition of LG to the diet had a favorable effect (>4.1% LG-1 vs C and >1.5% LG-2 vs C on D7), regardless of concentration, larva weight was not significantly affected. Both experimental groups showed a slight increase in average daily gain (>4.9% in LG-1 vs. C and >2.1% in LG-2 group vs. C). In comparison to C, the silk gland increased significantly in both experimental groups. Consequently, the inclusion of probiotics improved the tissue somatic index in both experimental groups ($P < 0.05$). Data on cocoon traits indicate that the experimental groups had greater value. Fortifying mulberry leaves with probiotics had a positive effect on silk productivity (13.25% greater in LG-1 vs C and 9.18% higher in LG-2 vs C, $P < 0.0001$). A very strong positive relationship between silk gland and weight and length of the larvae, and cocoons weight and pupae.

Conclusion: We demonstrated that LG probiotic, based on 2 strains of *Enterococcus faecium* and rosemary extract, have capacity to enhance Kahuri/T silkworm economic traits.

Keywords: probiotics, silkworm, Kahuri /T breed.

Acknowledgment. This research was funded by Romanian MADR, grant ADER 24.1.3.

SOIL- AND YEAR-SPECIFIC RESPONSES OF *ECHINACEA PURPUREA* TO AMF *RHIZOPHAGUS IRREGULARIS*: CHANGES IN CAFFEIC ACID DERIVATIVE ACCUMULATION

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Introduction: *Echinacea purpurea* is a medicinal plant valued for its phenolic compounds, especially caffeic acid derivatives, which contribute to its pharmacological properties. Arbuscular mycorrhizal fungi (AMF), such as *Rhizophagus irregularis*, can influence plant secondary metabolism; however, their effects vary depending on environmental conditions and growing season.

Aims: This study aimed to evaluate the effects of *R. irregularis* inoculation on the accumulation of caffeic acid derivatives in the aerial parts of *E. purpurea* grown in different soil types and cultivation conditions over two growing seasons.

Materials and Methods: Greenhouse and open-field experiments were conducted using *E. purpurea* inoculated with *R. irregularis* and non-inoculated controls. Plants were grown in various soil types and sterile peat in the greenhouse, as well as in stagnic Luvisol under open-field conditions. Dried aerial parts were analyzed by HPLC to quantify major caffeic acid derivatives.

Results: In the first growing season, AMF inoculation significantly reduced caffeic acid derivatives on several substrates in *E. purpurea*, with control plants showing higher levels, especially on sterile peat and stagnic Luvisol under field conditions. However, in the second growing season, AMF-treated plants exhibited significant increases in chlorogenic acid, caffeic acid and echinacoside in most soils.

Conclusion: These findings demonstrate a clear time- and soil-dependent effect of *R. irregularis* on phenolic accumulation in *E. purpurea*. While initial AMF inoculation reduced phenolic levels, prolonged interaction enhanced caffeic acid derivatives, highlighting the importance of multi-season studies for understanding AMF benefits.

Keywords: AMF colonization, Caffeic acid derivatives, *Echinacea purpurea*, plant-fungus interactions, *Rhizophagus irregularis*

PRELIMINARY ANALYSIS OF SOIL AND MULBERRY LEAVES COLLECTED DURING SPRING SEASONS OF TWO-YEARS PERIOD FROM SCS BĂNEASA-BUCHAREST PLANTATION

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Introduction. In Romania, analysing soil nutrients for existing *Morus* varieties is key to ensuring optimal conditions for *Bombyx mori* silkworms.

Aims. This research involved the analysis of soil and plant samples collected during the spring over a two-years period from the SCS Băneasa-Bucharest in order to understand if the soil proprieties and plant health ensures the optimal level of nutrients requested by the insect species feed on mulberry leaves.

Materials and Methods. The leaves of 5 different mulberry species were collected from 10 different trees. The nitrogen (N) content in the leaf samples was determined (Kjeldahl method); phosphorus by colorimetry; potassium, calcium, copper, iron, manganese, and zinc by flame photometry; magnesium by spectrophotometry; chlorophyll and carotenoids pigments (Holm, 1954). The soil samples from topsoil (0-15cm) and the deeper layer (15-35cm), were evaluated in terms of pH, total soluble salt content, cation-exchange capacity-CEC, catalytic-exchange properties and mineral composition of anions and cations.

Results. Our data demonstrated small year difference in the crude protein-CP and N content of mulberry leaves. The average CP values were 24.85 and 25.19 (%in DM), while N(%) accounted from 3.86% to 4.03%. No difference ($P>0.05$) was observed between the two years in terms of macronutrients and micronutrients concentrations. Similarly, no significant year differences were found in chlorophyll a (18.12–18.00mg/100g), chlorophyll b (10.12–10.22mg/100g), or carotenoids content (7.05–7.11mg/100g) from fresh leaves. Regarding the soil whose quality determines the leaf production, our results suggest that the chemical properties differ significantly between the topsoil and the deeper layer, with the topsoil exhibiting a lower pH (6.54) and higher salt content (124 mg/100g) compared to the deeper layer (pH 7.28, 26.49 mg/100g). No significant year differences ($P>0.05$) were found in catalytic exchange properties or in the mineral composition of anions and cations in the topsoil. The deeper soil layer shows a higher CEC (22.85 me/100 g).

Conclusion. Mulberry plantation contains significant amounts of macronutrients, micronutrients, chlorophyll and carotenoids pigments, which can support the health and productive performance of the silkworms. Furthermore, soil analyses revealed good fertility and a balanced nutrient profile, promoting healthy mulberry growth.

Keywords: mulberry leaf, silkworm, soil nutrients

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IN VITRO PROPAGATION OF *OXALIS TRIANGULARIS*

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Introduction: *Oxalis triangularis* commonly known as "Purple Clover", is an edible perennial plant belonging to the Oxalidaceae family. *Oxalis triangularis* is an ornamental plant, native to South America and noted for its attractive triangular leaves ranging from bright red to dark purple, with long petioles that grow from an underground bulb. The plant is conventionally propagated by separating the bulbs, which produces a low proliferation rate (Chen et al., 2024). *O. triangularis* is valued for its high content of anthocyanins, flavonoids, oxalates, vitamin C, tannins and organic acids. They are important due to their antioxidant potential and uses in the food, pharmaceutical and cosmetic industries (Soner et al., 2023; Zhao et al., 2005).

Aims: This work aims to determine the *in vitro* culture methods applied for *Oxalis triangularis*, in order to obtain and optimize the production of bioactive compounds with various applications.

Materials and Methods: Different parts of the plant *Oxalis triangularis* 'Purpurea' were used to obtain a stable *in vitro* plant culture that would exhibit a high rate of propagation, i.e. a stable culture that would exhibit predictability. The morphogenic effect of α -naphthalene acetic acid (NAA) at a concentration of 0.5 mg/L in combination with 6-benzylaminopurine (BA) at a concentration of 1 mg/L was studied. Culture initiation was obtained using Murashige and Skoog (MS) media supplemented with (1) 0.5 mg/L NAA and 1.0 mg/L BAP or (2) 0.1 mg/L indole-3-acetic acid (IAA) and 0.5 mg/L kinetin.

Results: Among the tested variants, the high viability rate (70%) was recorded on MS medium supplemented with 0.5 mg/L NAA and 1 mg/L BA after 6 weeks of culture initiation. The protocol and experimental design were successfully used to develop a practical, simple, efficient and easy-to-use protocol for mass multiplication of *Oxalis triangularis*.

Keywords: *in vitro*, metabolites, micropropagation, Oxalis, phytohormones

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MARKETING AND RESEARCH STRATEGIES FOR IMPROVING THE ROMANIAN SERICULTURE SECTOR

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Introduction: The Romanian sericulture industry is one with tradition, loaded with cultural and historical symbols, not only in Romania but also in many areas of the world. Currently, it is developing in small but firm steps, and marketing strategies are an essential factor in this development.

Aims: Taking into account the actual status of this animal breeding domain, we identified and synthesized the main strategies to increase the development of sericulture in Romania.

Materials and Methods: For realizing this paper, we studied specialized bibliography, and partial results obtained in ADER 24.1.1. Project are reported here.

Results: In all industry, the main purpose is maximizing production and obtaining high-quality products, and sericulture is no exception to this rule. It can provide jobs, ensuring additional income for the population in rural areas, but also it represents a source of alternative secondary products, obtained from sericulture and silkworm breeding. Collaboration between silk farmers and producers, valorisation of traditional products, collaboration with processors or designers, but also the investigation and exploitation of new technologies to improve the productivity and quality of sericulture products, could be some of the opportunities for sector's development.

Conclusion: In the present research work, we demonstrated that sericulture could be an additional and important source of income for farmers, with the correct and innovative approaches of the technologies, as well as with their collaboration with research institutes and commercial actors from the different industries.

Keywords: sericulture, strategies, marketing

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ESTIMATION THE GENETIC PARAMETERS FOR PRODUCTIVE LONGEVITY IN LIMOUSINE BREED

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Introduction: The productive longevity is an important economic trait in beef production. The productive longevity was represented by the period between first parity and the time when the cow was reformed. The productive longevity in beef sector depends by the reproduction records of cows.

Aims: The aim of the present study was to estimate the genetic parameters for productive longevity in Limousine breed using the survival model, Weibull proportional hazard model (Grosu, 2013, 2019).

Materials and Methods: Productive longevity data were analyzed with survival model, Weibull proportional hazard. The pedigree consisted in 1197 cattle: 484 dams, 206 sires and 507 cows with records. The fixed effect was represented by production with three levels: high, medium, low.

Results: The productive longevity in Limousine breed was 4.176 ± 0.024 years. The breeding values of cattle for productive longevity were from -0.297 and 0.133 months in Limousine breed. The value of heritability in the Limousine breed was 0.096.

Conclusion: The productive longevity of cows from Limousine breed can be improved by selection of the cattle with highest breeding values.

Keywords: Genetic parameters, productive longevity, survival model, Weibull proportional hazard model.

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FROM CRAFT TO MASS PRODUCTION: COMPARATIVE INSIGHTS INTO THE QUALITY OF TRADITIONALLY AND INDUSTRIALLY PROCESSED MEAT PRODUCTS

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Introduction: Meat is a vital source of high-quality protein, fats, and minerals essential for physiological functions. Ensuring the quality of meat products requires adherence to food safety standards and consumer demands for nutritional value and health. This necessitates processing methods that minimize harmful chemical additives, favouring natural alternatives. Meat processing is key to preserving and enhancing the nutritional, sensory, and hygienic qualities of products. Two main approaches dominate: traditional, artisanal methods relying on local resources, and industrial methods focused on standardization, automation, and efficiency.

Aims: This study compares salami, sausages, bacon, and smoked loin made via traditional and industrial methods, aiming to identify key physicochemical differences influencing nutritional quality.

Materials and Methods: Four pork products, each processed traditionally and industrially, were analysed for moisture, dry matter, fat, protein, mineral salts, and nitrites. The study evaluated how processing type influences composition and additive content, particularly salt and nitrites.

Results: Traditional products had lower moisture, higher dry matter, and better nutritional profiles (more fat/protein, minimal nitrites). Industrial products had higher moisture, elevated salt—especially in smoked loin (7.60%)—and sometimes reduced nutritional density. Nitrite content was similar across both types (~1 mg/kg).

Conclusion: The study reveals that traditional meat processing produces products with better nutritional quality, lower additives, and greater authenticity, while industrial methods result in higher moisture and salt levels, which may affect shelf life and health. Balancing safety, nutrition, and sustainability is essential for improving meat processing practices.

Keywords: Food safety, Meat by-products, Meat preservation, Artisanal food

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ADVANCING BIO-BASED MATERIALS FOR GREEN TRANSITION TO FOOD PACKAGING

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Introduction: Single-use plastic still dominates food packaging globally, but the massive environmental impact and low recycling rate (<2%) require a rapid transition to bio-based and biodegradable materials. Currently, research and industry are converging on innovative solutions, but large-scale implementation remains limited due to technological, economic and regulatory challenges.

Materials and Methods: This article is an overview of the technologies reported in the literature on bio-based materials for sustainable food packaging.

Results: There are currently three primary classes of material being investigated: natural polymers derived from biomass (cellulose or chitin), biopolymer derived from microorganisms (PHA) and synthetic polymer which is biodegradable (PLA). All have clear environmental advantages, along with downsides related to cost, scalability or industrial performance.

Also included are additional technologies such as functional barrier layers, advanced treated paper and enzymatically- or chemically-recycled bio-based materials. Meanwhile, opportunities for refill and reused packaging options, especially urban retail, have recently emerged as a viable consideration. However, acceptance is limited by standardization issues, diverse goals between research and industry, and insufficient infrastructure for biodegradation and recycling.

Conclusions: Sustainable food packaging is a reality of our time and a clear direction in the ecological transition. However, the success of its production and widespread use depends on open collaboration between research, industry, policymakers and consumers. The packaging sector offers a unique opportunity for the accelerated implementation of the circular bioeconomy, an economy in which we not only produce less waste, but also rebuild ecosystems through responsible design.

Keywords: sustainable packaging, food chain, bioeconomy

ESTIMATION THE GENETIC PARAMETERS FOR MILK PRODUCTION AND REPRODUCTION TRAITS IN CARPATINA GOAT BREED

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Introduction: In the world increases the interest for preservation and improvement of the local goat breeds. The reproduction can be considered as the physiological basis of animal growth, because it contributes to the numerical increase of the herd [Pascal, 2015]. Carpatina is a local goat breed and has largest percentage from total number of goats from Romania [Pascal, 2015]. In Romania the goats are raised for milk production, the milk has a high quality. Litter size is an economic reproduction trait in Carpatina goat breed.

Aims: The objective of the present study was the estimation the genetic parameters for milk production and reproduction traits using random regression test-day animal model for daily milk yield and an animal model for reproduction traits in a population from Carpatina goat breed.

Materials and Methods: The data records from 1517 goats were used in this study. The pedigree covered 3055 goats: 1517 goats, 99 sire and 1439 dams from Carpatina breed. In our study were two categories of kidding: simple and twin. The model used is animal model [Grosu et al., 2013]

Results: The mean was for age at first kidding 498.538 ± 4.067 days, for kidding litter size at first parity 1.445 ± 0.012 and for kidding interval 366.394 ± 1.101 days. The heritability for litter size had low value 0.054 in Carpatina goat breed, for age at first kidding 0.09 and for kidding interval 0.08. The data for daily milk yield consisted in 4551 test-day records. The mean for daily milk yield at 78 days was 1.189 ± 0.012 kg, at 108 days 1.196 ± 0.012 and 1.208 ± 0.012 at 140 days. The heritability for test-day milk yield was higher at the end of lactation.

Conclusion: The animal model was adequate for calculate the genetic parameters for reproduction traits and random regression test-day model for daily milk yield in Carpatina goat breed.

Keywords: Genetic parameters, individual animal model, reproduction traits, random regression test-day model

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MULTIDIMENSIONAL ANALYSIS OF SOCIAL DEVELOPMENT AND INEQUALITY IN THE EUROPEAN UNION: A PCA APPROACH

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Introduction: This paper aims primarily to follow aspects related to development and social inequalities in the countries of the European Union. The aim is to have a competitive and strong economy, a high standard of living, access to education and healthcare. Regional development policy is one of the most important and complex policies of the European Union (Pike et al., 2016).

Aims: The aim of the paper is to compare socio-economic indicators in the countries of the European Union, using principal component analysis (PCA) to identify groups of statistical indicators that explain the level of development and social inequalities.

Materials and Methods: The nine statistical indicators from the European Union countries were taken into account: Gross Domestic Product (GDP) per capita, Consumer Price Index (CPI) - %, Employment rate - %, Poverty and social exclusion rate - %, Gini coefficient score - %, Life expectancy at birth – year, The deficit and the public debt - % of the Gross Domestic Product, Infant mortality rate - %, CO2 emissions per capita and the working method was PCA.

Results: In the context of regional development, PCA can be applied to extract relevant information about the economic, social or demographic variability of the 27 countries analyzed in the paper. Following the PCA analysis, it was observed that social development and inequalities cannot be assessed through variables belonging to a single sector. This method allowed the identification of variables (of countries) that have the highest weight describing economic, social, educational, and infrastructure aspects. Principal Component Analysis (PCA) was successfully applied to the set of socio-economic indicators. The first two principal components explain the variation in the data as follows, PC1 ~ 58% of the total variation and PC2 ~ 25% of the variation. Together, these two components cover approximately 83% of the total information, which is excellent for two-dimensional interpretation.

Conclusion: Principal component analysis (PCA) is a technique used in data analysis to reduce dimensionality and highlight important patterns in complex data sets.

Keywords: Correlation matrix, development and social inequality, PCA.

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GREEN SYNTHESIS AND ANTIBACTERIAL EVALUATION OF SILVER NANOPARTICLES

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Introduction: Silver nanoparticles (AgNPs) are widely studied for their antimicrobial properties and potential to replace traditional antibiotics. Green synthesis using biological agents like bacteria and plant extracts provides a cost-effective and eco-friendly alternative (Singh et al., 2015). Their formation is often confirmed by UV-Vis spectroscopy, through detection of surface plasmon resonance (SPR) peaks (Patil & Chougale, 2021).

Aims: This study aimed to synthesize AgNPs using bacterial culture supernatants and plant extracts, then compare their antimicrobial efficacy against Gram-positive and Gram-negative bacteria, as well as *Candida albicans*.

Materials and Methods: AgNPs were synthesized using supernatants or biomass from *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, *Pseudomonas aeruginosa*, and *B. subtilis*. Additionally, turmeric, ginger, rosemary, and basil extracts were used for plant-mediated synthesis. The nanoparticles were characterized using UV-Vis spectroscopy, and their antimicrobial activity was assessed through the agar well diffusion method.

Results: The most effective antimicrobial activity was observed for AgNPs synthesized from *E. coli* and *S. aureus*, with inhibition zones up to 21 mm against *C. albicans* and 19 mm against *S. aureus*. Biomass-based synthesis showed minimal efficacy. Plant-based AgNPs, especially from turmeric and ginger, were also effective. UV-Vis analysis confirmed SPR peaks around 420–450 nm, supporting nanoparticle formation.

Conclusion: Green synthesis of AgNPs offers a promising route for developing antimicrobial agents. Efficacy depends on the biological source, synthesis method, and final nanoparticle characteristics

Keywords: Bacteria, Green synthesis, Nanoparticles

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USING DIFFERENT TYPES OF ADDITIVES TO MAKE CHEESE

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Introduction: Milk and dairy products provide essential nutrients in human nutrition and health. They are rich in beneficial components for the human body such as water, protein, fat, minerals and vitamins. The consumption of these food categories has a number of advantages: they increase the proper functioning of the body's condition, improve antioxidant and anti-inflammatory processes, enhance immunity, prevent the occurrence of various conditions such as diabetes or heart disease. One of the most important categories of foods with a therapeutic role are fermented dairy products that contain probiotic bacteria vital for health.

Aims: The purpose of this poster was to present different types of additives used for cheeses in order to improve their nutritional capabilities and extend their shelf life.

Materials and Methods: To present a database for this study, we conducted a systematic search of scientific publications in the Google Scholar, ScienceDirect, Scopus and PubMed databases. The main keywords used were: antioxidant capacity, microbial capacity, storage period, cranberry, grapes

Keywords: antioxidant capacity, cranberry, grapes, microbial capacity, storage period.

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FUNCTIONAL CHARACTERIZATION OF LACTIC ACID BACTERIA STRAINS WITH PROBIOTIC POTENTIAL

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Introduction: Lactic acid bacteria (LAB) are widely recognized for their probiotic potential, displaying antimicrobial, antioxidant, and stress-resistance properties. Multi-strain formulations may provide enhanced probiotic effects compared to single strains.

Materials and Methods: Three LAB strains—*Lactiplantibacillus plantarum*, *Lactobacillus acidophilus*, and *Apilactobacillus kunkeei*—were assessed individually and in combination (LAB mix). In vitro assays included co-culture compatibility, biofilm formation, auto-aggregation, antioxidant capacity (DPPH, ABTS, FRAP), antimicrobial activity (disk diffusion and microplate assays), antibiotic susceptibility, and survival under osmotic and simulated gastrointestinal conditions.

Results: No antagonistic interactions were observed among the strains, supporting their compatibility. The LAB mix exhibited superior biofilm formation, auto-aggregation, and antioxidant activity compared to individual strains. Strong antimicrobial effects were observed against Gram-positive and Gram-negative pathogens, with the LAB mix showing the highest inhibition. All strains tolerated high osmotic stress and maintained viability under simulated gastric and intestinal conditions, with cell counts exceeding the probiotic threshold.

Conclusions: The tested LAB strains demonstrated robust functional properties, with enhanced effects when combined in a multi-strain formulation. These findings highlight their potential for use in probiotic applications, including but not limited to apiculture, and support further investigations into their in vivo efficacy.

Keywords: lactic acid bacteria; probiotics; biofilm formation; antimicrobial activity; antioxidant capacity; multi-strain formulations

NATURAL ANTIOXIDANTS IN MEAT PRODUCTS: A SUSTAINABLE ALTERNATIVE TO SYNTHETIC ADDITIVES

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Introduction: Meat products, while rich in essential nutrients, are prone to oxidative degradation and microbial spoilage during processing and storage. Lipid, pigment, and protein oxidation negatively impact quality, nutritional value, and shelf life. Synthetic antioxidants like butylated hydroxyanisole (BHA) have been extensively used to mitigate these effects. Plant-based natural antioxidants, including rosemary, oregano, sage, black cumin, and turmeric, have significant antioxidant qualities that aid in maintaining meat quality.

Aims: In the context of growing concerns regarding food safety and transparent labeling, this study seeks to explore the potential of plant-derived antioxidants as viable and health-promoting alternatives to synthetic additives commonly used in meat products. This investigation aligns with the current shift in the food industry toward meeting consumer demands for cleaner-label products that feature natural ingredients and minimal processing.

Materials and Methods: This study's database was compiled following a systematic investigation of scientific sources in the: Google Scholar, ScienceDirect, Scopus and PubMed databases. The main keywords used were: active packaging, antioxidants, meat preservation, natural extracts. This poster emphasizes the efficacy of natural antioxidants in preserving meat product quality and diminishing dependence on synthetic chemicals.

Keywords: active packaging, antioxidants, meat preservation, natural extracts

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SESSION 6: VETERINARY MEDICINE - FUNDAMENTAL AND PRECLINICAL SCIENCES

ENVIRONMENTAL POLLUTION EFFECT ON HONEYBEES AND THEIR DERIVED PRODUCTS: A COMPREHENSIVE ANALYSIS

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Introduction: Several factors, including environmental degradation, air pollution, intense urbanization, excessive agriculture, and climate change, endanger the well-being of animals and plants. One of the significant issues with an increasingly negative impact is represented by agricultural contamination with pesticides and antibiotics (Negri *et al.*, 2015).

Aims: The objectives of the present study are based on the necessity of identifying the risks associated with honey bees and bee products.

Materials and Methods: The available data from the literature have been critically evaluated and reviewed.

Results: Bee products are exposed to various contaminants from environmental sources and beekeeping practices. Minimizing pesticide use during flowering and avoiding it during bee foraging are essential. Beekeepers should place hives at least 3 km from treated fields. Biological pest control is necessary, and stricter regulation of bee pollen as a dietary supplement is needed, including setting safe limits for mycotoxins and pollutants. Further research is essential to address hidden risks and develop practical solutions.

Conclusion: The impact of environmental pollution factors has been evaluated, and the results suggest that residual pollutants pose a threat to honey bees and indirectly to human beings.

Keywords: Bee products; honey bees; pollution; risk factors.

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NANOHEMOCEO₂ BIOMATERIALS AS HEMOSTATIC AGENTS: AN *IN VITRO* ASSESSMENT

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Introduction: Hemostatic agents have become indispensable tools in contemporary bleeding management, finding applications in both surgical and emergency settings. This paper delves into the *in vitro* evaluation of NanoHemoCeO₂ as hemostatic agents.

Aims: The aim of this paper is to test the biocompatible nature of the NanoHemoCeO₂ biomaterials, as well as their hemostatic properties *in vitro* assays.

Materials and methods: All NanoHemoCeO₂ biomaterials have been synthesized by the Interdisciplinary Research Institute on Bio-Nano-Sciences. All tests were performed in conformity with ISO 15189 and ISO 10993-4, respectively [1][2], regarding hemocompatibility, thrombogenic properties and coagulation effectiveness.

Results: All tested materials have shown cellular biocompatibility (more than 95% viability), hemocompatibility (three out of four tested materials showed less than 5% hemolysis index), none of the materials were thrombogenic and all coagulation factors were depleted, showing elevated coagulation times (PT and aPTT) *in vitro* [3].

Conclusions: Standard literature insists on the importance of biocompatibility and hemocompatibility of biomaterials which come in direct contact with blood and living tissues, thus avoiding severe systemic complications such as thrombus formation, infarcts, pyrogenic and anaphylactic reactions when such biomaterials are utilized.

Key words: hemostasis, hemocompatibility, biocompatibility, biomaterials

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IN VITRO EVALUATION OF RESVERATROL ENCAPSULATED IN LIPOSOMAL STRUCTURES PREPARED BY TWO METHODS

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Introduction: Resveratrol, a therapeutically active polyphenol, has applicability limitations because of its poor water solubility and low bioavailability. Encapsulation in liposomes could be a viable solution for these problems (Salla et al., 2024).

Aims: This study was designed to develop resveratrol-loaded liposomes through thin-film and heating methods, with or without sonication, characterise their physicochemical properties, and evaluate their bioaccessibility, cellular uptake, and cytotoxicity.

Materials and Methods: Liposomes were produced by the thin-film hydration method and the heating method, with or without sonication, and characterized by static light scattering for particle size and by HPLC-UV for encapsulation efficiency. Bioaccessibility was assessed through an INFOGEST *in vitro* digestion model. Cellular uptake and cytotoxicity (WST-1 assay) were conducted on Caco-2 cell cultures.

Results: Liposomes had a larger size ($>5\ \mu\text{m}$) and a more uniform size distribution ($\text{PDI}<0.3$) with an encapsulation efficiency of $>87\%$ when not sonicated. Resveratrol showed better bioaccessibility from liposomes than when delivered in free form, with the highest value of 64.9% . Resveratrol liposomes' cellular uptake at 6.5% was superior to that of free resveratrol, while no cytotoxic effects were observed (viability $>80\%$).

Conclusion: Liposomal encapsulation significantly increases resveratrol's bioaccessibility and cellular uptake, with minimal cytotoxicity. Future research should aim to optimize formulations for targeted delivery, furthering nanomedicine application.

Keywords: antioxidant, bioaccessibility, intestinal absorption, liposomes, resveratrol

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NATURAL ANTIOXIDANTS IN THE MODULATION OF OXIDATIVE STRESS-RELATED INTESTINAL DISEASES

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Introduction: Colorectal cancer (CRC) is a highly prevalent malignancy of the digestive tract, ranking among the top three most common cancers worldwide and representing a leading cause of cancer-related mortality (Wang și colab., 2022). Inflammatory bowel diseases (IBD), including ulcerative colitis and Crohn's disease, are chronic, relapsing disorders that significantly increase the risk of developing CRC due to long-standing inflammation and disruption of intestinal epithelial homeostasis (Tomkovich și colab., 2017). Rich in compounds like polyphenols, terpenes, alkaloids, and sterols, plants offer valuable anti-inflammatory, antioxidant, and anticancer properties. This makes them effective alternatives or complementary options for traditional treatments.

Aims: This review summarizes recent research from the past decade on plant-derived compounds with therapeutic potential for inflammatory bowel disease and colorectal cancer.

Materials and Methods: A detailed search of the literature was done to find studies done *in vitro*, *in vivo*, and *ex vivo* that looked at the anti-inflammatory, antioxidant, and cancer-fighting effects of plant extracts and natural compounds.

Results: Plant-derived compounds have significant therapeutic potential by reducing inflammation and oxidative stress, and by inducing apoptosis. In particular, polyphenols and terpenes have shown powerful effects against inflammatory bowel disease (IBD) and colon cancer. These findings are consistently supported by research across various models and extraction methods. The core actions of these compounds—promoting cell death and inhibiting abnormal cell growth—make them a compelling area of research for future therapies.

Conclusion: This review highlights the traditional use of medicinal plants for treating inflammatory and cancerous conditions of the gastrointestinal tract. The bioactive compounds identified show strong pharmacological effects and deserve further research as potential complementary or alternative treatments for inflammatory bowel disease and colon cancer.

Keywords: Colorectal cancer, Inflammatory bowel disease, natural antioxidants.

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EFFICACY OF BENZIMIDAZOLES AND MACROCYCLIC LACTONES AGAINST EQUINE NEMATODES: A CASE STUDY FROM MARAMUREȘ, ROMANIA

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Introduction: Equines worldwide are constantly exposed to infections with multiple species of nematodes, especially strongyles. Currently, three classes of anthelmintics are available for treating such infections: benzimidazoles, macrocyclic lactones, and pyrimidines (Nielsen, 2022). If an active substance is used continuously, there is an increased likelihood of parasites developing resistance to it, and to related substances within the same chemical group (Sallé et al., 2017).

Aims: This study, conducted on a group of 30 equines, aimed to evaluate anthelmintic resistance in gastrointestinal nematodes.

Materials and Methods: Two types of tests were performed: *In vivo* Faecal Egg Count Reduction Test (FECRT), to assess the efficacy of fenbendazole (FBZ) and abamectin (ABA). *In vitro*, Egg Hatch Assay (EHA) and Larval Development Assay (LDA), to evaluate albendazole (ABZ), fenbendazole (FBZ), and mebendazole (MBZ) efficacy.

Results: FECRT showed ABA as more effective, yet statistical analysis indicated low efficacy for both ABA and FBZ. In EHA, all benzimidazoles showed >50% hatching at the reference concentration. LDA revealed the lowest larval development rate for MBZ (0.59%), followed by FBZ (13.3%).

Conclusion: All tested anthelmintics exhibited limited ovicidal activity. A discrepancy was observed between EHA and LDA results for benzimidazole efficacy. The correlation between *in vivo* and *in vitro* results for FBZ was 100% only in the case of LDA.

Keywords: Anthelmintic resistance, FECRT, EHA, Equine nematodes, LDA

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EFFICACY OF BENZIMIDAZOLE ANTHELMINTICS AGAINST CATTLE STRONGYLES IN ALBA COUNTY: AN IN VITRO STUDY

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Introduction: Nematode infections in ruminants have both medical and economic negative impacts. Parasitic infestations lead to major financial losses due to treatment and prevention costs, reduced weight gain, and compromised animal welfare (Enejoh and Suleiman, 2017). The majority of commonly used anthelmintics fall into one of three chemical classes: benzimidazoles, macrocyclic lactones, and imidazothiazoles. The resistance development against one compound often implies cross-resistance to other agents within the same class (Merck & Co., Inc., 2025).

Aims: The study aimed to evaluate the efficacy of four active substances from the benzimidazole class against gastrointestinal strongyles: albendazole (ABZ), mebendazole (MBZ), thiabendazole (TBZ), and fenbendazole (FBZ).

Materials and Methods: The study was conducted *in vitro* on a group of 41 cattle from various localities within Alba County. Two types of tests were performed: Egg Hatch Assay (EHA) and Larval Development Assay (LDA).

Results: In EHA, the lowest lethal concentration 50 (LC₅₀) was exhibited by FBZ (1.099 µg/ml), followed by ABZ (2.111 µg/ml) and MBZ (3.173 µg/ml). In LDA, the minimum inhibitory concentration (MIC) highlighted the highest efficacy of MBZ (0.343 µg/ml), followed by FBZ (0.415 µg/ml). ABZ tests showed no significant differences between the LC₅₀ and MIC values.

Conclusion: EHA revealed strongyle resistance to ABZ, MBZ, and FBZ. LDA highlighted strongyle resistance to ABZ and sensitivity to MBZ and FBZ. LC₅₀ and MIC values indicated that FBZ had the lowest effective concentrations. The highest resistance risk was found in ABZ.

Keywords: Anthelmintic resistance, benzimidazoles, cattle, EHA, LDA

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PRELIMINARY STUDY ON THE UTILITY OF DGGR LIPASE FOR EXOCRINE PANCREATIC INJURY

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Introduction: Sensitive, specific, and reliable biomarkers of exocrine pancreatic injury remain elusive, and no effective clinical chemistry biomarker is currently available for detecting pancreatic injury in animal models.

Aims: The aim of this study is to assess the effectiveness of pancreatic biomarker DGGR-lipase in detecting pancreatic injury.

Materials and Methods: Acute pancreatitis was induced in adult Wistar rats by one-hour intraperitoneal injection of L-arginine (37,5 – 300 mg/100 g bw). After 24, 48 and 72 h from first injection, animals were anesthetized and blood sample were drawn via retroorbital sinus. Animals were killed by cervical dislocation and pancreas, small intestine, liver and kidney were harvested for histopathology examination. Rat grimace scale (RGS) and hunching were used for pain evaluation. Complete blood count was performed on Mindray BC 60-R analyser and biochemistry on automated analyser (Element CM XT, Scil). The Kolomogolov-Smirnov test was used to determine the distribution of data and the Spearman correlation to detect a possible relationship between dose and lipase value.

Results: An increase in RGS score was observed 2 hours after pancreatitis induction, beginning at the 150 mg/100 g bw dose. At 24 hours post-induction, administration of L-arginine at doses ≥ 200 mg/100 g bw resulted in elevated DGGR lipase levels, as well as increased leukocyte and neutrophil counts, and hepatic parameters were increased. On histopathology examination, multifocal-caulescent necrosis of acinar cells were observed, while Langerhans islet were intact at dose 200 mg/100 g bw. No pathological changes of liver and kidneys were noted.

Conclusion: Elevated DGGR lipase values correlated with the presence of histological lesions, supporting its utility as an enzymatic marker in this model.

Keywords: DGGR lipase, acute pancreatitis, pancreatic toxicity

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BACTERIOLOGICAL PROFILE AND ANTIMICROBIAL RESISTANCE OF ORGANIC RAW MILK

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Introduction: Milk contamination by pathogens such as *Listeria spp.*, *Salmonella spp.*, *Escherichia coli*, and psychrotrophic bacteria poses serious health risks and contributes to spoilage during cold storage (Kim et al., 2017). Antimicrobial resistance (AMR) has emerged as a global health threat, largely driven by excessive antibiotic use in livestock. Organic farming is proposed as a solution to reduce antibiotic use and limit AMR spread. However, its effectiveness remains context-dependent and incompletely understood (Ager et al., 2023).

Aims: This study aimed to evaluate the microbial composition and antimicrobial resistance patterns in organic raw milk, considering different lactation stages and production systems, to assess potential public health risks.

Materials and Methods: Organic raw milk samples were aseptically collected and stored at 4°C. Samples were cultured on Columbia blood agar and MacConkey agar. Bacterial isolates were identified using MALDI-TOF. Antimicrobial susceptibility was tested using antibiotic discs on Mueller-Hinton agar. Incubation was performed at 37°C.

Results: MALDI-TOF analysis identified *Lactococcus garvieae* (11.7%), *Lactococcus lactis* (9.1%), *Staphylococcus chromogenes* (7.8%), and *Staphylococcus aureus* (5.2%) as the most frequent isolates. Antimicrobial resistance varied by species, indicating potential public health concerns even in organic systems.

Conclusion: Organic raw milk contains diverse microbiota, including potentially pathogenic and resistant strains. Although organic farming may limit antibiotic use, resistant bacteria can persist, highlighting the need for integrated monitoring and prevention strategies.

Keywords: Antimicrobial resistance, pathogens, raw milk.

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ANALYSIS OF INSTANTANEOUS ELECTROMAGNETIC POWER DENSITY AND ITS EFFECTS ON HONEYBEE COLONIES IN THE PROXIMITY OF GSM ANTENNAS (0–500 m)

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Introduction: Electromagnetic radiation emitted by modern technologies, such as mobile phones and 4G/5G wireless communication antennas, can negatively affect the health and behavior of exposed organisms (*Ratnieks and Carreck, 2010*), including honeybee colonies, which are particularly sensitive to environmental stressors (*Cucurachi et al., 2013*).

Aims: The study aims to assess the impact of electromagnetic pollution caused by wireless communication infrastructure on the physiological and behavioral parameters of honeybee colonies.

Materials and Methods: The electromagnetic emission of GSM antennas was monitored in the vicinity of three apiaries in Romania: two with pathological conditions (Vrancea and Ialomița – experimental group) and one clinically healthy (Argeș – control group), at distances ranging from 0 to 500 meters from the emission source. During the 2024–2025 period, power density measurements were performed using the Extech 480846 meter, and spectral analysis was conducted with the UNI-T UTS1032T spectrum analyzer (9 kHz–3.2 GHz). Biological samples (adult bees and brood) were collected, resulting in six laboratory reports and six monitoring sheets used to evaluate colony health.

Results: Measurements conducted in the counties of Vrancea, Ialomita, and Arges revealed variable distributions of electromagnetic field intensity depending on the distance from GSM antennas. In Vrancea, peak values were recorded at 10 meters (average: 20.78 mW/m²; maximum: 37.99 mW/m²), indicating a lateral emission lobe characteristic of GSM antennas. In this high-exposure area, bees exhibited disorientation, agitation, a reduction in foragers, and progressive mortality. In Ialomita, the distribution was irregular, with a peak at 400 meters (maximum: 39.05 mW/m²), likely due to signal reflections; colonies showed signs of agitation and reduced flight activity. In Argeș, the highest intensity was recorded directly under the antenna (~8 mW/m²), decreasing steadily to below 0.30 mW/m² at 500 meters; although colonies remained clinically healthy, they exhibited agitation and aggressive behavior during foraging.

Conclusion: Exposure to high or reflected electromagnetic fields (EMF) can negatively affect honeybees, causing agitation, disorientation, reduced foraging activity, and increased mortality. These findings support the need for EMF monitoring in beekeeping areas.

Keywords: honey bees, electromagnetic radiation

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MULTILOCLAR HYDATID DISEASE IN A NON-HUMAN PRIMATE: HISTOPATHOLOGICAL INSIGHTS INTO *ECHINOCOCCUS* *MULTILOCLARIS* INFECTION

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Introduction: *Echinococcus multilocularis* is a zoonotic parasite causing alveolar echinococcosis, a severe and potentially fatal disease. This report highlights the rare but significant threat to non-human primates and potential risk to humans.

Materials and methods: A zoo-housed 5-year-old mandrill (*Mandrillus sphinx*), with poor body condition, died suddenly, without previous clinical signs. Necropsy revealed multiple nodular lesions in various organs. Tuberculosis was initially suspected, and tissue samples were collected for microscopic evaluation. Histopathology was performed using standard haematoxylin and eosin staining.

Results: Microscopy showed extensive polycystic lesions in the liver, lungs, myocardium and lymph nodes, consistent with multilocular hydatid cysts. These consisted of numerous irregular parasitic cysts, separated by thick fibrous septa. Surrounding connective tissue extended into and replaced adjacent parenchyma, accompanied by marked infiltration of lymphocytes, plasma cells, macrophages and eosinophils. Intact cysts had hyaline laminated membranes enclosing granular flocculent material and numerous protoscolices. Collapsed cysts showed mineralization, eosinophilic necrotic debris, and marked mixed inflammatory infiltrates, including degenerated neutrophils, multinucleated giant cells and macrophages. The final diagnosis was multifocal granulomatous and eosinophilic hepatitis, myocarditis, pneumonia and lymphadenitis, with intralesional multilocular hydatid cysts.

Conclusion: This case underlines the pathogenic severity of *E. multilocularis* infection in non-human primates and its potential to cause fatal systemic disease even without prior clinical signs.

Keywords: alveolar echinococcosis, *E. multilocularis*, mandrill

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DYNAMIC ASSESSMENT THROUGH HISTOLOGICAL STUDY OF WALL DEVELOPMENT IN THE AORTIC ARCH AND BRACHYCEPHALIC TRUNKS IN ROSS 308 BROILER CHICKENS

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Introduction: The chickens have been used as animal models in numerous studies of vascular pathology. Moreover, regarding atherosclerosis, numerous studies suggest that the first atheromatous plaques are deposited at the level of the aortic arch as well as at the level of the brachycephalic trunk. The amount of researches about specific arterial structure in avian species is remarkably fewer than those carried out in mammals.

Aims: This study aims to describe the microscopic structure and the development of the aortic arch and the 2 brachycephalic trunks in Ross 308 broiler chickens aged 20 and 30 days.

Materials and Methods: During necropsy, cross-section fragments were harvested from the aortic arch and the two brachiocephalic trunks (right and left), fixed in formalin, embedding in paraffin and stained with Verhoeff trichrome method. The histological slides were examined under optical microscope and the wall thickness and the number of elastic lamellae were determined. The study was approved by the Bioethics Committee of the USAMV-CN, no. 453 from 29.05.2024.

Results: The aortic arch is structurally a transitional artery of the elastic-muscular type. The intima is formed by endothelium arranged on a thin band of subendothelial connective tissue. In the structure of the media, elastic lamellar connective tissue predominates, among which discrete bundles of smooth muscle cells with circular orientation are observed. The adventitia is very thin and is formed by relatively dense connective tissue. The brachycephalic trunks are elastic-muscular transition arteries. The tunica intima is thin and subendothelial connective tissue can be observed in places. The structure of the tunica media is dominated by elastic lamellar connective tissue and in between the elastic lamellae there are thin bundles of smooth muscle cells. The tunica adventitia is represented by a relatively dense connective tissue.

Conclusion: In Ross 308 broiler chickens aged 20 and 30 days, the aortic arch and the brachycephalic trunks are elastic-muscular transitional arteries. Between 20-30 days of life, the aortic arch wall thickens by approximately 18% and the brachiocephalic trunks by approximately 85%. The elastic lamellas present in the vascular wall structure are thicker in the brachiocephalic trunks than in the aortic arch in both 20-day-old and 30-day-old chicks.

Keywords: aortic arch, brachycephalic trunk, broiler chickens, histomorphometry, Verhoeff trichrome stain

ACUTE AND SUBACUTE ORAL TOXICITY ASSESSMENT OF KINKELIBA (*COMBRETUM MICRANTHUM* G. DON) ETHANOLIC EXTRACT IN BALB/C MICE

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Introduction: *Combretum micranthum* G. Don is a medicinal plant traditionally employed in West Africa for its diuretic and gastrointestinal therapeutic properties. Despite its extensive ethnomedicinal use, comprehensive toxicological assessments are still lack-ing.

Materials and Methods: For the acute toxicity assessment, female mice received oral doses of 50, 300, and 2000 mg/kg of extract for 14 days. In the subacute study, both sexes were administered daily doses at the same concentrations over 28 days. Throughout both protocols, clinical signs, body weight, and food and water consumption were regularly monitored. At the end of each study, hematological, biochemical, and histopathological parameters were analyzed, in accordance with OECD Guideline 420.

Results: Phenolic profiling revealed nine major compounds, with a total content of 293.54 mg/g of extract. In the acute toxicity study, no mortality or significant clinical manifestations were observed at any administered dose; however, significant variations were noted in platelet counts and amylase activity. In the subacute model, slight but non-critical alterations in hepatic and renal biomarkers were detected, without any signs of systemic toxicity. Histopathological examination revealed similar lesions in both acute and subacute phases, including multifocal mixed inflammatory infiltrates in the periportal area of the liver, minimal bacterial overgrowth in the superficial layer of the gastric mucosa, minimal medullary mineralization and focal glomerular hypertrophy in the kidneys accompanied by mononuclear inflammatory infiltrates, and minimal to moderate vacuolization in the pancreatic acini.

Conclusion: These results indicate that *C. micranthum* ethanolic extract is relatively safe at the tested doses, reinforcing its traditional use and supporting further research into its pharmacological potential.

Keywords: *Combretum micranthum*; kinkéliba; acute toxicity; subacute toxicity; ethanolic extract; BALB/c mice

ASSESSING THE EFFICIENCY OF CYTOBLOCK TECHNIQUES FOR VETERINARY DIAGNOSTIC USE

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Introduction: Cytoblocks are paraffin-embedded specimens derived from cytological material, offering enhanced cellular preservation as well as the ability to apply ancillary techniques such as immunohistochemistry to the samples. Although widely used in human pathology, their implementation in veterinary medicine remains inconsistent and underexplored.

Aims: The objective of this study was to compare and evaluate different methods of cytoblock preparation applicable to veterinary diagnostic.

Materials and methods: Two cytoblock protocols were used: one following a standard method developed at Oncology Institute Prof. Dr. I. Chiricuță, and the second adapted from a diagnostic laboratory protocol, routinely used at Synevo Laboratory.

Results: Both protocols allowed successful paraffin embedding and sectioning of cytological specimens from veterinary patients, with notable differences in cellular integrity and staining compatibility. The simple centrifugation and fixation method proved to be more efficient in terms of processing time and cost when compared to the glycerinated albumin-paraformaldehyde embedding technique. Although the latter is traditionally considered to offer better cellular preservation and diagnostic yield, in this comparative evaluation both methods achieved comparable cellularity. Surprisingly, the simple centrifugation protocol provided adequate cell concentration and structural integrity, while being significantly faster and more economical, making it a practical choice for routine use.

Conclusions: Cytoblocks represent a valuable technique for veterinary cytopathology, improving diagnostic precision and enabling extended testing. Careful selection of the preparation methods, based on the sample type and diagnostic needs, is critical for optimizing the protocols. Wider standardization and species-specific validation are needed to enhance routine use in veterinary laboratories.

Keywords: Cytoblocks protocols, veterinary diagnostic

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NANOHEMOCEO₂ BIOMATERIALS AS HEMOSTATIC AGENTS: AN *IN VITRO* ASSESSMENT

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Introduction: Hemostatic agents have become indispensable tools in contemporary bleeding management, finding applications in both surgical and emergency settings. This paper delves into the *in vitro* evaluation of NanoHemoCeO₂ as hemostatic agents.

Aims: The aim of this paper is to test the biocompatible nature of the NanoHemoCeO₂ biomaterials, as well as their hemostatic properties *in vitro* assays.

Materials and methods: All NanoHemoCeO₂ biomaterials have been synthesized by the Interdisciplinary Research Institute on Bio-Nano-Sciences. All tests were performed in conformity with ISO 15189 and ISO 10993-4, respectively [1][2], regarding hemocompatibility, thrombogenic properties and coagulation effectiveness.

Results: All tested materials have shown cellular biocompatibility (more than 95% viability), hemocompatibility (three out of four tested materials showed less than 5% hemolysis index), none of the materials were thrombogenic and all coagulation factors were depleted, showing elevated coagulation times (PT and aPTT) *in vitro* [3].

Conclusions: Standard literature insists on the importance of biocompatibility and hemocompatibility of biomaterials which come in direct contact with blood and living tissues, thus avoiding severe systemic complications such as thrombus formation, infarcts, pyrogenic and anaphylactic reactions when such biomaterials are utilized.

Key words: hemostasis, hemocompatibility, biocompatibility, biomaterials

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IN VIVO STUDY OF THE THERAPEUTIC EFFICACY OF BENZIMIDAZOLS AND TETRAHYDROPYRIMIDINS IN STRONGYLID NEMATODES INFECTION IN DOGS

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Introduction: Parasites infestations, with members of *Ancylostomidae* and *Strongyloididae* families, can affect both animals and humans. Mass treatment requires prior epidemiological investigation and a well-tolerated active ingredient. Nowadays resistance in canine digestive nematodes is increasing being stated in various regions: Australia, USA, Canada.

Aims: The study was conducted on 30 dogs from Floresti, Cluj County, and aimed to determine the efficacy of two anthelmintic products against strongylid nematodes.

Materials and Methods: *In vivo* Fecal Egg Count Reduction Test (FECRT) was performed to assess the efficacy of a pyrantel (PIR) and febantel (FEB) combination and oxybendazole (OXI) alone products. Faecal samples for ante-therapeutic (AT) analysis were collected to assess intensity and prevalence. Following this, PIR and FEB were administered as combination to 20 dogs, while the remaining 10 received OXI. Post-treatment (PT) faecal samples were collected at day 7, 14, 21 and 28. At each time point, the intensity and prevalence were assessed by quantifying the number of eggs per gram of faeces (EPG) and, following coproculture, the number of larvae per gram of faeces (LPG). All collected data were statistically analyzed.

Results: The study revealed an average AT prevalence of 50% across both groups, with mean intensities of 377.05 EPG and 1733.33 LPG, respectively. By 28 days PT, both the prevalence and intensity had dropped to zero in both groups. The efficacy of PIR and FEB combination, and the absence of anthelmintic resistance, were demonstrated by the high percentage reduction and the upper limit of the 95% confidence interval. In the group treated with OXI, statistical parameters fell below the minimum accepted values by day 21 PT for EPG and by day 14 PT for LPG.

Conclusion: Both anthelmintic products demonstrated the expected efficacy against tested canine strongylid nematodes.

Keywords: benzimidazoles, dogs, FECRT, pyrantel, strongylid nematodes

COMPLETE BLOOD COUNT DETERMINATION IN DOMESTIC CHICKENS WITH THE HELP OF AN AUTOMATIC HEMOANALYZER

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Introduction: Haematology evaluation in birds with the help of counting chambers and Natt-Henrich solution is the gold standard for both red and white blood cell lines. This method is both time consuming and prone to human error.

Aims: The aim of this study is to demonstrate a step-by-step protocol of CBC assessment in *Gallinacea spp.* with the help of an automatic analyzer, Mindray BC-60R Vet. This new analyzer is capable of analyzing red blood cell lines in species with nucleated red blood cells, with the help of new Sysmex technology, thus eliminating the need for manual counting.

Materials and methods: Blood was collected from 5 domestic egg laying chickens, smears colored with May-Grunwald Giemsa stains were effectuated and the white blood cells were manually counted and morphologically evaluated. The red blood cell parameters were effectuated with the help of the above-mentioned machine.

Results: The automatic analyzer gives results for avian species in general, thus specific parameters for *Gallinacea spp.* must be compared to existing studies and revised. All of the birds presented stress leucograms correlated to the laying season and prolonged heat felt during the summer. This automatic method is optimal for research assessment and industrial settings with numerous animals within the experimental groups.

Conclusions: Further studies regarding red blood cell parameters for this analyzer must be performed and comparisons between the classic method and novel method must be correlated. This method of blood analysis is currently the quickest and easiest method that can be used to establish blood values in *Gallinacea spp.* Due to effective costs and time saved.

Key words: *Gallinacea spp.*, Mindray BC-60R Vet, CBC, avian hematology, CBC

PREVALENCE AND ANTIBIOTIC RESISTANCE PROFILE OF *SALMONELLA* SPP. ISOLATED FROM PET REPTILES

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Introduction: Reptiles serve as reservoirs for zoonotic pathogens, including *Salmonella* spp., posing a notable risk of transmission to humans (Austin and Wilkins, 1998).

Aims: This research investigated the prevalence and characterized *Salmonella* strains in captive specimens within Cluj-Napoca.

Materials and Methods: A total of 51 samples from lizards, chelonians, and snakes were collected over a period of 6 months. Cloacal swabs were collected as samples, followed by isolation, serotyping, and antimicrobial susceptibility testing to characterize the *Salmonella* spp. strains. Isolation followed ISO 6579-1:2017 protocol.

Results: Isolation yielded 13 positive samples, representing 25.5% of the reptiles. *Salmonella* spp. were identified in 10 (35.7%) lizards, 3 (33.3%) snakes, and none in chelonians. A limitation of this study is the incomplete serotyping, as isolates were classified only at the serogroup level. Notable serotype groups such as D1 and B were identified and two of isolates exhibited cefotaxime resistance.

Conclusion: Reptiles kept as pets can be both carriers and reservoirs of *Salmonella* spp., harboring various serotypes with potential intermittent excretion of the bacteria in feces. These findings highlight the need for monitoring reptile-associated *Salmonella* infections as a potential public health concern.

Keywords: *Salmonella*, reptile, antibiotic resistance, zoonosis

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A COMPREHENSIVE REVIEW OF PHYTOTHERAPEUTIC ALTERNATIVES FOR GASTROINTESTINAL NEMATODES IN COMPANION ANIMALS AND LIVESTOCK

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Introduction: Gastrointestinal nematodes pose a significant global concern, both in companion animals due to their high zoonotic potential and in livestock, where they negatively impact productivity and, consequently, the economy. The improper use of synthetic anthelmintics, widespread metaphylactic treatments, and lack of routine parasitological monitoring have led to the emergence of anthelmintic resistance among parasites. Increasing concerns have recently been raised that this phenomenon may also extend to human parasites.

Aims: This review aims to explore the mechanisms underlying anthelmintic resistance and to evaluate potential alternatives to conventional synthetic treatments, with a particular focus on plant-derived essential oils as promising phytotherapeutic agents.

Materials and Methods: A comprehensive literature review was conducted, analysing studies on anthelmintic resistance in gastrointestinal nematodes, the mechanisms behind resistance development, the efficacy and limitations of conventional anthelmintic therapy and the potential of phytotherapeutic alternatives. Special attention was given to essential oils with reported anthelmintic activity, their active compounds and proposed mechanisms of action.

Results: Several essential oils have been identified to contain bioactive compounds with demonstrated anthelmintic effects, showing efficacy comparable to certain synthetic drugs. Their distinct mechanisms of action suggest a reduced risk of cross-resistance with conventional anthelmintics. Nevertheless, current evidence is largely based on *in vitro* studies, with limited *in vivo* validation.

Conclusion: Essential oils emerge as a promising alternative for the control of gastrointestinal nematodes in veterinary medicine. However, to support their integration into routine practice, further *in vivo* research is essential to confirm their efficacy, determine appropriate dosages, ensure safety and identify any potential adverse effects.

Keywords: parasites; anthelmintic resistance; essential oils; human parasites; zoonotic potential.

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THE ACTION OF COMMON DISINFECTANTS ON INFECTIVE FORMS OF TOXOCARA CANIS

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Introduction: It is well known that many disinfectant products are commonly used by veterinarians in their clinics or farms for their antibacterial, antifungal and antiviral properties.

Aims: The purpose of the research is to identify the disinfectant product that is commonly used by veterinarians in their clinics or on farms in particular for its ability to inhibit or stall the development of *Toxocara canis* infestations, beyond its antibacterial, antifungal and antiviral properties.

Materials and Methods: The study was conducted in the Department of Pharmacology and Pharmacy at the Faculty of Veterinary Medicine Cluj-Napoca. Serial dilutions from 7 disinfectants were used for the purposes of this study. The relevant disinfectants are commonly used in spaces where animals live, are consulted or are treated. Egg hatching and larvae development tests were conducted in order to determine the relevant percentage of morulation, egg hatching and development of L1 and L2.

Results: The results of the study were statistically analysed and CL50 was determined. Looking at the capacity of the 7 disinfectants tested on *Toxocara canis* eggs, it has overall been observed that these generally have the ability to inhibit the development of larvae L2 and a relatively low capacity to inhibit the development of morulation or the hatching of L1 eggs. The maximum capacity to inhibit the morulation of *Toxocara canis* eggs was shown by Germicidan FF Plus (CL50 of 54,47%), followed by Domestos (CL50 of 79,41%). The maximum efficacy in inhibiting the L1 hatching was observed in the use of Clorom (8,43%), followed by Germicidan FF Plus (10,13%). The maximum efficacy in prohibiting the development of L2 was observed in the products Tegee Sol and Biosan Steridet (CL50 of 0,11%), followed by Germicidan FF Plus (CL50 of 0,56%).

Conclusion: In general, the 7 disinfectants tested have the capacity to inhibit the development of L2 larvae and relatively low capacity to inhibit morulation or L1 hatching. The maximum capacity to inhibit the morulation of *Toxocara canis* eggs was demonstrated by Germicidan FF Plus (CL50 = 54.47%), followed by Domestos (CL50 = 79.41%). The maximum efficacy in inhibiting L1 hatching was observed through the use of Clorom (CL50 = 8.43%), respectively Germicidan FF Plus (CL50 = 10.13%). The maximum efficacy of disinfectants based on their capacity to block L2 development was demonstrated by Tegee Sol and Biosan Steridet products (CL50 = 0.11%) followed by Germicidan FF Plus (CL50 = 0.56%).

Keywords : disinfectants, EHA, LDA, *Toxocara canis*.

COULD OXIDATIVE STRESS BE A KEY FACTOR IN MYXOMATOUS MITRAL VALVE DISEASE PROGRESSION IN ASYMPTOMATIC DOGS? AN OVERVIEW

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Introduction: Myxomatous mitral valve disease (MMVD) is the predominant cardiac pathology in dogs. Stage B1 denotes asymptomatic valvular degeneration without atrial or ventricular enlargement. Although the EPIC trial reported a median of 15 months before congestive onset, the molecular mechanisms driving progression from B1 to B2 remain unclear (Tomsic et al., 2023). Oxidative stress and subsequent ROS accumulation may trigger early remodeling via dysregulated TGF- β and mTOR signaling (Grzeczka et al., 2025). Proteomic data further support redox and inflammatory shifts preceding clinical symptoms (Saril et al., 2022).

Aims: This short communication aims to review current evidence suggesting that oxidative stress may already be active in asymptomatic MMVD dogs (Stages B1–B2), highlighting its potential as an early biomarker and therapeutic target.

Materials and Methods: A narrative review was conducted following SANRA guidelines to ensure quality and transparency in the process. ISI-indexed articles from the past five years were selected via Web of Science using keywords such as “MMVD,” “oxidative stress,” “TGF- β ,” and “Stage B1.”

Results: Dogs in Stage B1 MMVD show early oxidative imbalance, with reduced antioxidant enzyme activity and elevated lipid peroxidation (Tomsic et al., 2023). Dysregulated TGF- β /mTOR signaling and inflammatory mediators appear involved in valvular remodeling (Grzeczka et al., 2025). Proteomic data reveal stage-specific alterations in redox- and immune-related proteins, suggesting subclinical molecular progression (Saril et al., 2022).

Conclusion: Beyond a passive consequence, oxidative stress may act as an active driver of early molecular remodeling in Stage B1 MMVD, priming valvular and myocardial tissue for degeneration. Integrating redox biomarkers with pathways like TGF- β and mTOR could enhance early detection and enable preventative, precision-based interventions.

Keywords: Asymptomatic MMVD, Molecular signaling, Oxidative stress, Proteomics, TGF- β /mTOR pathways

PROTECTIVE EFFECTS OF DONKEY MILK AND WHEY PROTEINS ON DEXTRAN SULFATE SODIUM-INDUCED INTESTINAL INFLAMMATION IN RATS

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Introduction: Inflammatory bowel diseases (IBD) are chronic intestinal disorders driven by epithelial barrier dysfunction and excessive cytokine production, including IL-6, IL-1 α , and TNF- α (Mitropoulou et al., 2022). Natural bioactive agents such as donkey milk (DM) and its whey fraction (DW), rich in lactoferrin, lysozyme, and immunoglobulins, show promising immunomodulatory and anti-inflammatory effects (Xu et al., 2025; Li et al., 2025).

Aims: This study aimed to assess the anti-inflammatory effects of donkey milk (DM) and its whey protein fraction (DW) in a rat model of DSS-induced colitis, focusing on systemic inflammatory markers including IL-6, IL-1 α , TNF- α , CRP, and oxidative stress marker 8-OHdG.

Materials and Methods: Six groups of Wistar rats (n = 6) were included: Control, Donkey Milk, Donkey Whey, DSS, DM+DSS, and DW+DSS. Colitis was induced by 5% DSS in drinking water for 7 days, while DM and DW were given daily by oral gavage for 14 days. Body weight and Disease Activity Index (DAI) were recorded, and cytokines (IL-6, IL-1 α , TNF- α , CRP) along with the oxidative stress marker 8-OHdG were measured using ELISA kits (Elabscience).

Results: Administration of donkey milk (DM) and its whey protein fraction (DW) significantly reduced the DAI score and preserved body weight in rats with DSS-induced colitis. Levels of IL-6, IL-1 α , TNF- α , and CRP were significantly lower in the DM+DSS and DW+DSS groups (p<0.05), suggesting systemic anti-inflammatory effects. The oxidative stress marker 8-OHdG was also reduced, particularly in the DW+DSS group.

Conclusion: Donkey milk and its whey proteins exert protective and modulatory effects against DSS-induced intestinal inflammation in rats, mainly through attenuation of cytokine-mediated responses.

Keywords: Cytokines; Donkey milk; Colitis; Rats; Whey proteins

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MARKED METARUBRICYTOSIS IN AN AFRICAN HEDGEHOG (*ATELERIX ALBIVENTRIS*): A CASE REPORT AND PROGNOSTIC CONSIDERATIONS

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Introduction: In domestic mammals, metarubricytosis may result from hypoxia, inflammation, bone marrow neoplasia, extramedullary haematopoiesis, or splenectomy¹. In African hedgehogs (*Atelerix albiventris*), the presence and significance of nucleated red blood cells (nRBCs) in peripheral blood are poorly documented. The highest previously reported value was 42 nRBCs/100 WBCs.²

Aims: This case report aims to describe the prognostic significance of nRBCs in an African hedgehog with multiple systemic conditions and to document the highest known nRBC count in this species.

Materials and Methods: A 5-years-old intact male african hedgehog was presented with neurological signs. Diagnostic exams included radiography, computed tomography (CT), biochemistry, haematology, coproparasitological and bacteriological ear examination, and cytology from oral and ear masses. Complete blood count (CBC) was performed on Mindrey BC 60-R analyser and blood smear were stained with May-Grunwald Giemsa for microscopic evaluation.

Results: Clinical findings included oral lesions suggestive of squamous cell carcinoma (OSCC), lung crackles, bradycardia, arrhythmia, and two abdominal masses. Imaging exams showed cardiomegaly, malformed left ear canal, and two symmetric prostatic masses. Biochemistry result suggested hepatic stasis due to heart failure. CBC revealed a mild hyperregenerative anaemia, thrombocytopenia and severe leucocytosis with marked lymphocytosis, monocytosis and neutrophilia. However, polychromasia and 147 nRBC/100 WBC, predominantly metarubricytes, were observed on blood smear examination. The hedgehog died of cardiac arrest within 24 hours post-anaesthesia. Necropsic examination showed myocardial necrosis, chronic pulmonary oedema, and a pulmonary thrombus.

Conclusion: This is, to our knowledge, the highest number of nRBCs reported in an African hedgehog. The case highlights the importance of manual smear examination in confirming automated CBC results and suggests a possible prognostic value of nRBCs in exotic species, warranting further investigation.

Keywords: hedgehog, nRBC, severe leucocytosis

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SESSION 7: VETERINARY MEDICINE - CLINICAL SCIENCES

ROMANIAN BROWN BEARS (*URSUS ARCTOS*) AS HOSTS FOR *DIROFILARIA IMMITIS* AND *CRENOSOMA* SPP.

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Introduction: Cardiopulmonary nematodes are increasingly studied among domestic and wild carnivores due to their impact on host health and potential zoonotic relevance. Currently, Romania hosts 60% of the total European population of brown bears (*Ursus arctos*), with many individuals roaming close to or within human settlements. However, data on respiratory and vascular parasites of brown bears is scarce, with no nationwide studies available.

Aims: This study aimed to investigate the occurrence and species diversity of cardiopulmonary nematodes in brown bears from various regions of Romania, using both morphological and molecular diagnostic tools.

Materials and methods: A total of 102 brown bears, legally hunted or found dead between 2020 and 2025, were subjected to necropsy. Lungs, heart, and pulmonary arteries were examined for the presence of parasites. The recovered nematodes were morphologically identified using standard taxonomic keys, and randomly selected specimens were molecularly characterized.

Results: Lungworms were detected in 8 out of 102 bears. *Crenosoma vulpis* was found in 7 individuals. Additionally, *Dirofilaria immitis* was found in the pulmonary arteries of 2 bears—one from Sibiu County and one from Buzău County. Molecular analysis confirmed the species identity and helped distinguish between closely related nematodes.

Conclusion: These results highlight the presence of cardiopulmonary nematode infections in Romanian brown bears, with *Crenosoma vulpis* as the most frequent agent and *D. immitis*. These results contribute to the understanding of parasite ecology in wild carnivores and suggest a need for continued surveillance of wildlife health and parasitic risks.

Keywords: brown bears, *Crenosoma* spp., *Dirofilaria immitis*, Romania

ANTIMICROBIAL RESISTANCE AND CLINICAL DYNAMICS OF *ESCHERICHIA COLI* IN NEONATAL CALF DIARRHEA

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Introduction: Neonatal diarrhea is a major cause of morbidity and mortality in calves, leading to significant economic and welfare concerns in cattle farming. The condition often arises from a multifactorial etiology involving infectious agents, environmental factors, and management practices. Although *Escherichia coli* is a natural resident of the bovine gastrointestinal tract, certain pathogenic and antimicrobial-resistant strains can aggravate clinical manifestations and complicate treatment strategies.

Aims: This study aimed to assess the prevalence and antimicrobial resistance profiles of *E. coli* isolates during a neonatal diarrhea outbreak on a mixed beef-dairy farm in Bistrița-Năsăud County, Romania. Recognizing *E. coli*'s dual role as a commensal and potential pathogen, we evaluated its presence before and after treatment, with a focus on identifying resistance patterns relevant to therapeutic decision-making.

Materials and methods: Fecal samples were collected from 30 calves at two time points: upon farm entry (pre-treatment) and 30 days' post-treatment, following clinical resolution. Bacterial isolation was performed using Brilliance *E. coli* and TBX agar media. Gram-negative co-isolates were also documented. Antimicrobial susceptibility testing of *E. coli* strains was conducted via disk diffusion against ten commonly used antibiotics in veterinary practice.

Results: *E. coli* was isolated from 100% of samples at both time points, indicating either persistent colonization or rapid recolonization after treatment. *Enterobacter* spp. and *Pseudomonas* spp. were also isolated initially but decreased in prevalence post-treatment. Susceptibility testing revealed universal resistance to ampicillin and amoxicillin, and a low susceptibility to trimethoprim/sulfadiazine (8.33%). Resistance to amoxicillin-clavulanate was observed in 75% of isolates. The highest susceptibility was seen with colistin (62%), followed by neomycin (52%) and tetracycline (48%). Doxycycline showed variable results (38% susceptible, 29% resistant), while erythromycin displayed predominantly intermediate responses (70%) and enrofloxacin showed limited efficacy (33%).

Conclusion: All calves recovered clinically following combined treatment with colistin and oxytetracycline plus supportive care, where needed. The consistent post-treatment recovery despite continued *E. coli* detection—alongside rotavirus and *Clostridium* spp.—supports a multifactorial etiology. These results emphasize the importance of interpreting microbiological data within clinical context. Antimicrobial strategies should focus on suppressing pathogenic strains and promoting host resilience, rather than achieving complete bacterial clearance. This approach may enhance treatment success and reduce the development of resistance in calf-rearing systems.

Keywords: Antimicrobial resistance, calves, diarrhea, *Escherichia coli*, mixed infection

ENTEROTOXEMIA CAUSED BY *CLOSTRIDIUM PERFRINGENS* IN OLDER CALVES OF DAIRY COWS

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Introduction: Enterotoxemia caused by *Cl. perfringens* is a peracute disease with frequent fatal outcomes. This paper presents data on the prevalence of enterotoxemia in calves caused by *Cl. perfringens* on a dairy farm over one year.

Aims: The goal of our study was diagnostics, therapy, and the implementation of prophylactic measures in specific cases.

Materials and Methods: For one calendar year, we monitored the occurrence of enterotoxemia in fed calves up to three months of age on a farm of high-milk-producing cows with a tied housing system. Enterotoxemia has become a major health problem in the fed calf category and for calves in the feeding category on that farm. An autopsy was performed on all dead calves in the field.

Results: A Total of 49 calves were weaned. The calves were between 63 and 81 days old when they were weaned. The age of dead calves ranges from 51 to 103 days. The number of dead calves per month ranges from one to six. A total of 24 calves died. The percentage of dead calves of the number of sick calves ranged from 14.28% to 50%. There were no sick or dead calves in February, June, July, and August.

Conclusion: Implementation of zoohygiene measures. The basic prophylactic measure proposed is vaccination of the herd.

Keywords: *Cl. perfringens*, calves, enterotoxemia, farm

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PROMISING RESULTS REGARDING HYDROCHLOROTHIAZIDE USE IN CATS WITH RECURRENT CONGESTIVE HEART FAILURE

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Introduction: Congestive heart failure (CHF) is frequently refractory in cats suffering from advanced heart disease and the key to long-term management is combined diuretic therapy. While hydrochlorothiazide is recommended in canine CHF treatment and shows favorable outcomes, its use in feline medicine remains limited. A single retrospective study analyzing azotemia in cats with CHF briefly noted the use of hydrochlorothiazide in a single feline patient but provided no additional information.

Aims: This study aims to present the promising results of hydrochlorothiazide use in long-term management of CHF in feline patients evaluated at the Cardiology Clinic of FMV Cluj-Napoca.

Materials and Methods: A retrospective analysis of veterinary records was performed, and data were collected regarding breed, age, clinical condition, echocardiographic findings, treatment approaches and time intervals between CHF episodes in the two patients with decompensated cardiomyopathy, who received hydrochlorothiazide.

Results: Both patients were Sphynx cats diagnosed with cardiomyopathy, one with a nonspecific form and the other with end-stage disease. They experienced 7 and 8 episodes of CHF, respectively. The chronic treatment protocol was adjusted after each episode of decompensation and contained combinations of oral or intramuscular furosemide, torasemide, and hydrochlorothiazide. The median interval between CHF episodes was 44.5 days in the first cat and 35.5 days in the second. The longest remission periods occurred when torasemide was combined with intramuscular furosemide (98 days) and when injectable furosemide was replaced with hydrochlorothiazide (91 days). In contrast, attempts to discontinue injectable furosemide and rely solely on oral loop diuretics were poorly tolerated, leading to the shortest time to a new episode of decompensation (3 days). These two cases of refractory CHF suggest that including a thiazide diuretic in the treatment protocol may help prolong compensated periods when using oral medications alone.

Conclusion: Although the number of patients included is very limited and does not allow a statistical analysis, this study suggests that hydrochlorothiazide may be a promising alternative for long-term management of refractory CHF in cats due to advanced heart disease, especially when injectable therapy at home is not an option.

Keywords: cardiomyopathy, cat, congestive heart failure, hydrochlorothiazide

TRENDS IN CLIMATIC SUITABILITY FOR *DIROFILARIA IMMITIS* TRANSMISSION IN ROMANIA (2015–2025)

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Introduction: *D. immitis* is a mosquito-borne filarial nematode whose larval development in vectors (extrinsic incubation period, EIP) is temperature-bounded: below 14 °C it stops and above it larvae (L1) accumulate development units (DU) until infective L3. It was used daily DU and assumed the EIP complete when the preceding 30-day DU sum reached ≥ 130 °C days (~mosquito lifespan) (Atkinson et al., 2024; Genchi et al., 2011).

Aim: To quantify 2015–2025 climatic suitability for *D. immitis* in Romania using daily-mean temperature and DU-based EIP indicators.

Materials and Methods: ERA5-Land daily means on a $\sim 0.1^\circ$ ($\sim 10 \times 10$ km) grid were analysed. For each pixel was computed DU-day and flagged EIP-positive days when the preceding 30-day DU sum ≥ 130 . Annual EIP-positive-day counts per pixel were mapped, summarized the yearly share of upper-quartile pixels and tested trends with Mann–Kendall and Sen’s slope.

Results: EIP-positive days occurred every year with a clear spatial gradient. South-western lowlands consistently showed the highest counts and persistent hotspots, whereas northern and mountainous regions were rarely suitable. Despite year-to-year variability, south-western pixels more often had positive Sen slopes, yielding a small overall upward tendency and suggesting gradual seasonal widening around warm-lowland foci.

Conclusion: Daily-mean DU analysis indicates gradual spatial expansion and seasonal extension of climatic suitability for *D. immitis* EIP completion in Romania. Because temperature-based suitability is necessary but not sufficient, DU outputs should be integrated with mosquito surveillance and canine infection data and, in future, complemented by precipitation and land-use covariates in multi-parameter risk models.

Keywords: climate change, *D. immitis*, DU, EIP, Romania.

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MESENTERIC VOLVULUS IN A DOG: A CASE REPORT

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Introduction: Mesenteric volvulus is a rare but severe condition in small animals, caused by twisting of the intestines around the mesenteric root. Predisposing factors include recent gastrointestinal surgery, enteritis, foreign bodies, and gastric dilatation-volvulus.

Aims: This article presents a rare canine mesenteric volvulus where intestinal gas from corn fermentation was a major predisposing factor. It underlines the role of fermentable substrates in increasing intra-abdominal pressure and triggering acute, life-threatening events, particularly in dogs with abdominal adhesions.

Case presentation: A 1.5-year-old dog showed abdominal pain, vomiting, and nausea. Six months earlier, it underwent abdominal surgery for an intestinal foreign body, leading to peritoneal adhesions. Ultrasound showed moderate free abdominal fluid. Blood tests revealed elevated lactate, suggesting intestinal ischemia. Radiographs indicated marked gaseous distension and multiple opaque structures. Laparocentesis was performed for cytology. Given the findings, an emergency laparotomy was done, revealing torsioned jejunal loops with ischemia. About 50 cm of jejunum was resected, preserving the ileoceccocolic valve, followed by end-to-end anastomosis.

Clinical outcome: Postoperative care lasted 4 days in intensive care. The patient recovered without complications and was discharged in good condition.

Conclusion: Mesenteric volvulus is a critical emergency due to rapid intestinal ischemia and necrosis, potentially fatal if untreated. Corn fermentation can generate gas that predisposes to volvulus, especially in dogs with adhesions. Early diagnosis and surgery are essential for a favourable prognosis.

Keywords: corn fermentation, mesenteric volvulus, surgery

PERIPHERAL VENOUS CATHETER PLACEMENT VIA THE EXTERNAL SAPHENOUS VEIN IN RABBITS: A REFINEMENT METHOD FOR REPEATED BLOOD COLLECTION

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Introduction: Rabbits are commonly used in experimental pharmacokinetic studies where repeated blood sampling may be required within a short period. Repeated venipuncture can cause significant stress, vascular damage, and compromise sample quality. Various catheterization techniques have been described in laboratory animal practice to reduce handling stress and improve sample consistency. Among these, the use of a peripheral venous catheter secured for a defined period offers a refinement that aligns with the 3Rs principle by minimizing animal discomfort and improving data reliability.

Aims: Considering that repeated sampling is necessary for methods such as high-performance liquid chromatography (HPLC) analysis, our aim was to evaluate whether a central venous catheter placed peripherally in the external saphenous vein could serve as a practical method for repeated blood collection. The objective was to document the technique, assess its feasibility, and highlight its advantages and limitations compared to repeated venipuncture.

Materials and methods: Seven female rabbits (*Oryctolagus cuniculus*) were included. A central venous catheter (CVC), pediatric type (Altius, 4 Fr, single lumen), was inserted through the external saphenous vein and secured for short-term use. Although designed as a CVC, it was used peripherally and not advanced to the vena cava, remaining in the external saphenous vein to allow repeated sampling. Catheters were placed under aseptic conditions with appropriate sedation, secured with sutures and a protective dressing, and maintained patent by intermittent flushing with heparinized saline. Placement was performed 24 hours before sampling. After intramuscular administration of metamizole, blood samples were collected at 0.5 h, 1 h, 3 h, 7 h, 10 h, and 24 h. Rabbits were monitored for catheter displacement and local complications during the 36-hour period and for one week afterward.

Results: Out of seven rabbits, two removed the catheter overnight before sampling began, and one removed it during sampling. Sampling was successfully completed in four rabbits. In these four, the catheter remained functional for the entire sampling period, enabling all six scheduled collections without repeated venipuncture. No significant local complications were observed.

Conclusion: Using this catheter significantly reduced the need for repeated venipuncture, simplifying animal handling and decreasing stress. The flexibility and lumen diameter of the Altius catheter offered clear advantages over a standard short peripheral catheter, which would likely have clogged sooner or displaced. Although one catheter eventually became blocked, requiring venipuncture for the final sample, the approach still improved procedural efficiency and animal welfare.

Keywords: rabbits, blood collection, catheterization, pharmacokinetics

ACUTE ORAL TOXICITY ASSESSMENT IN MICE VIA FIXED DOSE PROCEDURE: CLINICAL SIGNS, BODY WEIGHT CHANGES, AND HISTOPATHOLOGY OF TARGET ORGANS

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Introduction: Nanotechnology has the potential to enhance diagnostics, therapy, and prevention in veterinary medicine (El-Sayed *et al.*, 2018). Various nanomaterials are used in this field, including pharmaceuticals and pesticides (Danchuk *et al.*, 2023).

Aims: This study aimed to determine the maximum non-lethal dose and assess the acute oral toxicity of hybrid nanoparticles made of keratin, sulfur, and potassium oxide in mice using the OECD Fixed Dose Procedure (Test Guideline 420).

Materials and Methods: Eighteen BALB/c mice (14 females, 4 males, 20–25 g) from the "Cantacuzino Institute", Bucharest, were used. Approved by the Bioethics Commission, three mice were selected per dose from levels of 50, 300, 650, 1000, and 2000 mg/kg, with control groups included. Nanoparticles were administered orally for 8 days, and assessments were made on body weight, clinical signs, and histopathology of major organs post-study.

Results: Neurological signs were observed primarily at 2000 mg/kg, with all animals exhibiting convulsions within 2 minutes. No signs appeared in females at 50 mg/kg or males at 650 mg/kg, indicating sex-specific sensitivity. Histopathological evaluations showed no deviations in organs at 50 mg/kg.

Conclusion: The fixed-dose method effectively assessed acute oral toxicity, revealing sex-based variability in responses and neurotoxic effects at higher doses.

Keywords: fixed dose procedure, keratin, mice, nanotoxicity, potassium oxide, sulfur

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PERIOPERATIVE MONITORING AND ANAESTHETIC MANAGEMENT IN ORTHOPEDIC SURGERY IN SMALL ANIMAL PRACTICE

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Introduction: Orthopedic surgery in small animals demands patient-specific, multimodal anesthesia and continuous monitoring to control pain, maintain stability, and limit complications.

Aims: This study aimed to assess anesthetic protocols and intraoperative monitoring strategies in six canine orthopedic cases, focusing on drug combinations, real-time parameter trends, and complications.

Materials and Methods: Six canine patients undergoing orthopedic surgery (fractures, arthrodesis) were included. Anesthesia protocols involved alpha-2 agonists, opioids, ketamine, propofol, midazolam and isoflurane. Locoregional techniques (brachial plexus block, epidural) were used to enhance analgesia. Perioperative monitoring included HR, NIBP, EtCO₂, SpO₂, respiratory rate and temperature.

Results: All six patients completed surgery without major complications. Locoregional anesthesia was used in 5/6 cases. CRI protocols were applied in 4/6 cases to enhance analgesia. Transient hypotension was noted in 3/6 cases; dopamine infusion was necessary in one case. Hypocapnia occurred in 2/6, attributed to superficial anesthesia or equipment error. Bolus supplementation (ketamine/propofol) was required in 4/6 patients. All had stable SpO₂ values, and recovery was smooth in all cases.

Conclusion: Individualized anesthetic protocols combined with real-time monitoring and intraoperative adjustments provide safe and effective management for orthopedic surgeries. The use of multimodal analgesia and supportive techniques such as CRIs and regional blocks improves outcomes.

Keywords: analgesia, canine, orthopedic surgery

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MATERIAL-TISSUE INTERACTION: EVALUATION, INTEGRATION AND BIOCOMPATIBILITY

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Introduction: The development of biocompatible materials capable of interacting efficiently with biological tissues is essential in regenerative medicine. Composite cements with organic and inorganic bioactive components have shown promise in bone and soft tissue applications. Incorporating bio glasses, silica, and hydroxyapatite fillers into a polymeric matrix (Bis-GMA, TEGDMA, UDMA, HEMA) supports tissue regeneration and stimulates osteogenic activity without systemic toxicity.

Aims: This study aimed to evaluate in vivo and in vitro material–tissue interactions, focusing on biological integration, local tissue response, and systemic biocompatibility. The research targeted composite materials for subcutaneous, intramuscular, and bone environments to validate their biomedical potential.

Materials and Methods: Two experimental composites were synthesized using a polymeric matrix combined with inorganic fillers (BaO glass, hydroxyapatite, bioglass). In vivo tests involved implanting the materials in Wistar rats, with evaluations adapted to the tissue type. Bone implants underwent CT and histopathology at 14, 28, 56, and 90 days' post-implantation. Subcutaneous and intramuscular implants were evaluated by CT at days 0, 10, 30, and 90, with tissue samples for histopathology collected at days 30 and 90. Parameters included macroscopic integration, CT scans, histology, and histopathology of implant sites, liver, and kidneys. In vitro studies used palatal mesenchymal stem cells (MSCs) to assess cytocompatibility (MTT assay), alkaline phosphatase activity, and morphological changes via SEM and EDS.

Results: The materials showed excellent tissue compatibility, minimal local inflammation, and no systemic toxicity. SEM and EDS confirmed uniform filler distribution and microcapsule disintegration during polymerization. MSCs cultured on the composites had high viability (>90%), maintained pluripotency early on, and exhibited osteogenic differentiation after 5–7 days, indicated by increased ALP levels and morphological changes.

Conclusion: This study highlights the biological safety, integration potential, and osteogenic compatibility of the tested composites. The findings support their use in tissue engineering and regenerative medicine, providing a solid basis for future translational research.

Keywords: biocompatibility, composite cements, mesenchymal stem cells, regenerative medicine, tissue interaction

APPROACHES IN TESTING COMPOSITE BIOMATERIALS: SUBCUTANEOUS, INTRAMUSCULAR AND INTRAOSSEOUS

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Introduction: Evaluating composite biomaterials in diverse tissue environments is a crucial step in developing advanced and effective solutions in regenerative medicine. These biomaterials must demonstrate not only biocompatibility but also the ability to integrate with surrounding tissues and promote healing. Implantation in subcutaneous, intramuscular, and intraosseous sites allows for a comprehensive assessment of the materials' behavior in soft and hard tissues, providing valuable insights into their regenerative capacity and biological performance *in vivo*.

Aims: The primary objective of this study was to systematically assess the biocompatibility, local tissue response, and regenerative potential of novel composite biomaterials in an animal model. Implantations were performed in subcutaneous, intramuscular, and intraosseous locations to simulate different physiological environments and better understand the materials' interaction with various tissue types.

Materials and Methods: Two experimental composite materials, combining a polymeric matrix with inorganic bioactive fillers, were implanted in Wistar rats at carefully selected subcutaneous, intramuscular, and bone sites. Tissue responses were evaluated at multiple time points post-implantation, focusing on inflammatory reactions, integration of the materials, and the progression of tissue healing. Advanced imaging techniques, including computed tomography (CT), were employed alongside histopathological analyses to provide a detailed evaluation of the implant sites. Additionally, systemic effects were monitored through histological examination of vital organs such as liver and kidneys to rule out toxicity.

Results: The biomaterials exhibited excellent biocompatibility characterized by minimal local inflammation and no adverse systemic effects. CT scans and histopathological studies confirmed favorable integration of the composites with surrounding tissues, as well as stimulation of the healing process without signs of rejection or chronic inflammation. The combination of imaging and microscopic analyses allowed for thorough monitoring of both the material behavior and tissue response over time.

Conclusion: Subcutaneous, intramuscular, and intraosseous implantation proved effective for preclinical evaluation of composite biomaterials. Findings support their safe use and regenerative potential in various tissue environments.

Keywords: rats, biomaterials, biocompatibility, regeneration, composite.

URINE SEDIMENT CHARACTERISATION IN ADULT JENNIES (*EQUUS ASINUS*) UNDER DIFFERENT HYDRATION STATUS

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Introduction: Urinalysis is an aid for evaluating the renal system (van Galen et al., 2024). Its use in donkeys remains limited despite their unique metabolism and water conservation mechanisms (Kasirer-Izraely et al. 2001). Species-specific data on donkeys' renal parameters, particularly urine sediment, is scarce in current literature.

Aims: To characterize urine sediment in physically healthy adult jennies and ones with mild dehydration

Materials and Methods: 54 clinically healthy adult jennies were selected from 4 farms in Transylvania, Romania. Urine was collected via bladder catheterization during autumn 2024. Full urinalysis was performed within 4 hours. Sediment was assessed blindly by two experienced clinicians. Samples were classified based on USG into group A – hydrated (USG <1.050; n=33) and group B – dehydrated (USG >1.050; n=21).

Results: Both groups had a normal pH (7.6 ± 0.5 for A; 7.7 ± 0.4 for B), no leucocytes, erythrocytes or glucose on dipstick. Group A had a USG of 1.039 ± 8 and B of 1.056 ± 2 . Calcium carbonate was present in all samples, with a higher density (+++) in group B (38.1%, n=8). Calcium oxalate monohydrate was higher in group B (76.2%) with a higher density (+++; 18.7%, n=3). Mucus filaments were greater (80.9%) and denser (++; 5.9%, n=1) in group B. Group A had 24.2% squamous cells and higher density on smear (+/-; 25%, n=2). Transitional cells were more present in group B (14.3%) with a +/- density (100%, n=3). Epithelial cells were higher in group A (60.6%) with + density in 25% (n=15.1%).

Conclusion: Donkey urine appears to have a higher number of calcium oxalate compared to reports in horses. Both calcium carbonate and calcium oxalate were greater in group B. A species-specific urinalysis will aid in the diagnosis of renal diseases in donkeys.

Keywords: Donkey, Sediment, Urinalysis, Urine

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PHYSIOLOGICAL ASSESSMENT OF LACRIMAL GLAND ACTIVITY IN *TRACHEMYS SCRIPTA ELEGANS* IN RELATION TO BODY TEMPERATURE PARAMETERS DURING THE WINTER SEASON

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Introduction: In reptiles, physiological regulation is deeply influenced by both ambient and body temperatures (Spotila *et al.* 1990), directly affecting exocrine gland functions (Chiquet *et al.* 2013). *Trachemys scripta elegans*, a semi-aquatic species commonly kept in captivity, offers an ideal model for investigating lacrimal function in connection to thermal factors.

Aims: The study aims to establish reference values for tear production and to examine correlations between tear output and body temperatures measured at different anatomical sites (cloaca, carapace, plastron, neck), as well as the impact of individual morphological characteristics.

Materials and Methods: Tear production was measured in a total of 52 *T. scripta elegans* individuals, using the endodontic absorbent paper point tear test (EAPTT). Body temperatures were recorded with both an infrared and a rectal thermometer. Pearson correlation coefficients and linear regression analyses were applied to assess relationships between parameters.

Results: Average tear production was 7.79 mm (SD $\pm 1,96$ mm) for the left eye and 8.12 mm (SD $\pm 1,89$ mm) for the right eye, with no statistically significant difference between eyes ($p > 0.05$). A weak positive correlation was observed between tear production and cloacal temperature $r = 0,28$ (Right), $r = 0,29$ (Left), with carapace temperature $r = 0,33$ (R), $r = 0,25$ (L) as well as with plastron temperature $r = 0,31$ (R), $r = 0,32$ (L).

Conclusion: These results confirm the influence of internal temperature and body size on lacrimal gland activity. The established reference values can serve as a diagnostic baseline in veterinary ophthalmology and support optimal captive management of this species through thermal regulation.

Keywords: lacrimal gland, PPTT, *Trachemys scripta elegans*, body temperature, aquatic turtles

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COMPARATIVE HISTOPATHOLOGICAL ASSESSMENT OF REPRODUCTIVE TISSUES FOLLOWING DIFFERENT HEMOSTATIC TECHNIQUES IN BILATERAL OVARIOHYSTERECTOMY IN BITCHES

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Introduction: Ovariohysterectomy (OVH) is routinely used for sterilization in bitches. However, the tissue-level impact of surgical hemostatic techniques remains poorly characterized. This study provides a comparative histopathological evaluation of reproductive tissues (ovaries and uterine horns) excised during OVH using two different bilateral hemostasis methods.

Aims: The study aimed to evaluate tissue damage patterns induced by two distinct surgical techniques applied symmetrically: Method 1 on the left side, and Method 2 on the right, focusing on vascular lesions, endometrial structure, and stromal integrity.

Materials and Methods: Twelve bitches (aged 6 months–3 years) underwent OVH, with tissue samples fixed and examined histologically. Parameters included follicular activity, vascular dilation, hemorrhage, thrombosis, and endometrial integrity.

Results: All examined ovaries were hormonally active, showing follicles and corpora lutea in various stages. A reproducible pattern was observed:

- Left side (Method 1): mild ectasia, focal thrombosis, discrete periovarian edema, and rare hemorrhages.
- Right side (Method 2): acute extensive hemorrhages in ovarian and uterine stroma, multiple thrombi, marked periuterine edema, and mucosal architectural distortion. Notably, case 65245 showed massive bilateral hemorrhage, possibly due to an individual bleeding predisposition unrelated to technique.

Conclusion: Method 1 induced significantly fewer vascular and stromal alterations than Method 2, suggesting lower tissue invasiveness. Consistent histological differences support the need for further studies on larger cohorts and clinical correlation.

Keywords: bitch, endometrium, hemostasis, ovary, pathology

THE IMPACT OF PESTE DES PETITS RUMINANTS ON CERVID POPULATIONS IN ROMANIA

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Introduction: Peste des petits ruminants (PPR) is a highly contagious viral disease caused by a *Morbillivirus* from the *Paramyxoviridae* family. Though traditionally associated with small ruminants such as sheep and goats, recent evidence indicates a broader host range, including camelids and potentially wild cervids (S. Parida *et al.*, 2015). The spread of PPR beyond its endemic regions, including into Romania, poses serious economic, ecological and epidemiological challenges.

Aims: This study aims to explore the indirect impacts of PPR on wild cervid populations in Romania. It focuses on interspecies transmission risks, the ecological consequences of disease spillover and the socio-economic repercussions for rural communities.

Materials and Methods: The research combines field surveillance, serological testing of wild and domestic populations and ecological modelling of disease spread. Materials that will be used are biological sampling materials such as sterile blood collection tubes, needles, syringes, vacutainers, swabs, cold storage containers, personal protective equipment, diagnostic tools and reagents: ELISA kits, RNA extraction kits, biosafety cabinet, centrifuge, standard lab equipment.

Results: We expect to find seropositive cases among wild cervids in PPR-affected zones, suggesting possible spillover events. Patterns of shared water and grazing resources might be identified as potential transmission points.

Conclusion: In the present research work, we believe PPR represents not only a threat to livestock but also to wildlife biodiversity and rural livelihoods. Enhanced surveillance, cross-species monitoring and public awareness will become critical for controlling the disease's impact. These findings will emphasize the need for an integrated One Health approach in managing PPR in Romania.

Keywords: *Cervids*, *Morbillivirus*, Romania, PPR, wildlife-livestock

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FELINE HYPERTROPHIC CARDIOMYOPATHY: FROM DIAGNOSIS TO THERAPEUTIC MANAGEMENT

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Introduction: Hypertrophic cardiomyopathy (HCM) is the most common cardiac disease in cats and closely resembles the human form of the condition. While certain breeds are genetically predisposed, HCM is also frequently diagnosed in domestic shorthair cats. In some cases, congestive heart failure has been identified as a consequence of previously undiagnosed HCM. Early detection is critical for effective management and to prevent clinical decompensation. Clinical presentation can range from overt cardiac symptoms to completely asymptomatic cases. Pre-anesthetic screening is often neglected, despite its importance in detecting hidden cardiac disease.

Aims: This study aims to review clinical cases of feline HCM, analyze diagnostic approaches, and outline therapeutic strategies adapted to disease stage, emphasizing the importance of individualized treatment.

Materials and Methods: Cats included in this study were referred for routine check-ups, pre-anesthetic evaluations, murmur assessments, or second opinions. All cats underwent a standardized cardiological evaluation, which included a medical history review, clinical examination, echocardiography (2D and Doppler), blood pressure measurement and ECG.

Results: In this study, out of 83 cats that underwent specialized cardiology examinations, 20 were diagnosed with hypertrophic cardiomyopathy (HCM), resulting in an overall prevalence of 24.09%. HCM was diagnosed in both young and older cats. Most of the affected cats were male (75%) and primarily belonged to the European Shorthair (55%) and British Shorthair (35%) breeds. Echocardiographic examinations revealed a heterogeneous pattern of cardiac hypertrophy, with the following distribution: the interventricular septum was affected in 45% of cases, the free wall in 43%, the anteromedial segment in 10%, and the anterolateral segment in 3% of cases. Systolic anterior motion (SAM) of the mitral valve was identified in 55% of the HCM cases and was often associated with a left parasternal systolic murmur.

Conclusion: Following this study, a prevalence of 24.09% for HCM was identified among the evaluated feline population. Affected cats spanned a wide age range, highlighting the importance of cardiological assessment regardless of age. Clinical presentations varied from asymptomatic cases to advanced congestive heart failure, and heart murmurs were not consistently detectable during auscultation. Echocardiography proved essential for accurate diagnosis, allowing for early intervention and improved quality of life in affected cats.

Keywords: cardiomyopathy, echocardiography, diagnosis, treatment

SEASONALITY, CONTROL AND RISK FACTORS FOR *GASTEROPHILUS INTESTINALIS* EGG INTENSITY IN HORSES FROM ROMANIA UNDER FIELD CONDITIONS

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Aims: This study aimed to assess the efficacy of pyrethroid based insecticides against *Gasterophilus* spp. egg-laying activity and to establish the seasonality patterns in the specific climatic area of Transylvania, Romania.

Materials and Methods: To fulfil the aims of the study, a total of 40 horses were treated every 4 weeks and inspected every 2 weeks between 11 May to 6 November 2024. Through this period, eggs were found between 24 June and 2 November.

Results: The eggs were found on 34 out of 40 horses (prevalence: 85%, CI 95%: 73.43 – 96.56%). Overall, a total of 50,029 *Gasterophilus* spp. eggs were counted during this study, and all were morphologically identified as *G. intestinalis*. Statistical analysis revealed no significant difference in prevalence and intensity between treated and control horses ($p > 0.05$). The number of laid eggs varied significantly across body regions ($p < 0.05$). The risk factors associated with increased egg-laying activity were significantly ($p < 0.05$) associated with dark-colour coats, outside husbandry regime, and the month of exposure. No significant differences in egg numbers and prevalence were found across gender or age groups ($p > 0.05$). The applied statistical tests were as follows: the non-parametric Mann-Whitney U test; the Friedman test; Wilcoxon test corrected by the Bonferroni method; the Kruskal-Wallis test and The Bonferroni correction for multiple comparisons.

Conclusion: These results are highlight gasterophilosis as an important parasite in horses. In conclusion, we recommend that, in order maintain a low prevalence of *Gasterophilus* spp., treatment should include the use of larvicidal drugs and the mechanical removal of the eggs.

Keywords: *Gasterophilus intestinalis*, eggs, repellent, seasonality, colour

THE IMPACT OF MILKING SYSTEMS ON MICROORGANISMS INVOLVED IN THE DEVELOPMENT OF MASTITIS IN CATTLE AND THEIR ANTIBIOTIC RESISTANCE PROFILE

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Introduction: Mastitis represents one of the most prevalent and costly conditions in dairy cattle farms, significantly impacting both the quantity and quality of milk.

Aims: In this context, the present study aims to provide essential information for optimizing milking practices and improving mastitis management strategies.

Materials and methods: The research was conducted on biological material collected from 40 cattle of various breeds, raised in different farming systems. Samples were taken in the morning or evening, before milking, in sterile containers. Some were processed using classical microbiological methods (cultivation on standard media, Kirby-Bauer antibiotic susceptibility testing of 12 commonly used antibiotics, identification through API biochemical tests), while others were processed with the VITEK 2 Compact System.

Results: The application of this methodology revealed considerable variation in the microbial flora structure depending on the complexity of the milking system. Manual milking exhibited greater microbial diversity, predominantly comprising environmental agents, compared to mechanical and robotic milking, where the prevalence of unique contagious agents was higher. Furthermore, the study highlighted significant antibiotic resistance, with 46 out of 63 identified strains having a MAR index > 0.2 . Additionally, it was observed that in small farms, multiple antibiotic resistance was below 50%, whereas in large operations, it exceeded this threshold.

Conclusions: The conclusions of this work underscore the importance of implementing appropriate milking practices and mastitis management measures, considering the significant variations in microbial flora and antibiotic resistance identified in different milking systems.

Keywords: antibiotic resistance, cattle, mastitis, milking systems

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SEVERE THORACOABDOMINAL INJURIES FOLLOWING DOG BITE WOUNDS IN A DOG: A CASE REPORT

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Introduction: Bite wounds are one of the top three causes of trauma in dogs, with an overrepresentation of intact males. Depending on the severity and the location of the wounds, they can be minor or can lead to serious and life-threatening complications.

Aims: This report aims to highlight the importance of thorough assessment and monitoring in bite wound cases, where minor external lesions may conceal severe internal damage.

Materials and Methods: A 1.5-year-old intact male Beagle was presented to the Emergency Clinic of FMV Cluj-Napoca after being attacked by six shepherd dogs. It presented multiple small skin wounds on the right thoracoabdominal area, right thigh and right stifle. Thoracic radiographs showed right-sided pneumothorax and a 13th rib fracture. Under general anesthesia, surgical exploration of the wounds revealed a right-sided circumferential diaphragmatic hernia, extensive tearing of the sublumbar and costoabdominal muscles and massive intercostal tearing between the 10th and 11th intercostal spaces. Surgical repair of the diaphragm, abdominal and thoracic walls was performed and skin wounds were sutured. The patient went into cardiorespiratory arrest three times during surgery, with successful resuscitation each time. Postoperatively, the dog was unstable and unconscious, requiring intensive care support. Due to recurrent right-sided pneumothorax, a passive thoracic drain was placed. The patient gradually improved, becoming responsive by the following morning and showing signs of recovery. Follow-up blood tests revealed mild anemia and signs of hepatic impairment.

Results: Seven days after presentation, the patient showed significant improvement and was discharged. The patient remained stable, and all wounds healed.

Conclusion: In conclusion, this report underlines the potential of seemingly minor bite wounds to mask severe underlying injuries, emphasizing the critical need for thorough initial assessment and prompt intervention when necessary.

Keywords: bite wound, diaphragmatic hernia, pneumothorax

THE USE OF AUTOLOGOUS FASCIA LATA GRAFT IN HIATOPLASTY FOR LARGE HIATAL HERNIAS IN DOG – A NOVEL SURGICAL TECHNIQUE

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Introduction: Large hiatal hernias with thin diafragmatic crura are prone to recurrency regardless of the suture variant or the technique used. A crural reinforcement can be performed using various types of material, either synthetic or biologic. To avoid foreign material complications and increased costs we propose the use of autologous fascia lata, successfully used in humans for over a decade (Puia et al. 2014, Bjelovic et al. 2015).

Aims: Taking into account the technique used in humans we developed a variant adapted to hiatal hernias in dogs and applied it in a cadaveric model.

Materials and Methods: In a large dog we performed a midline sterno-pubic incision, identified the esogastric junction and circumferentially dissected the inferior thoracic oesophagus. The autologous fascia lata graft measuring 6/4 cm was harvested from the thigh and tailored in a horseshoe shape. The two flaps were stitched with two barbed self-locking running sutures from the anterior surface of the oesophagus and descending on the sides. The graft was sutured to the diaphragm with absorbable tacks.

Results: The duration of the operation was 60 minutes. No incidents were recorded. The reinforced area looked resistant but no quantitative check was performed.

Conclusion: In the present research work, we demonstrated that the use of autologous fascia lata for hiatoplasty reinforcement in dogs is a feasible technique applicable in large hiatal defects.

Keywords: fascia lata, hiatal hernia, hiatoplasty

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ALTERNATIVE WOUND HEALING PROTOCOLS FOR WOUND HEALING IN ANIMALS

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Introduction: Wound healing is an intensively researched area in veterinary medicine and the way to approach and treat wounds is continuously evolving. Due to the increase in antibiotic resistance, new therapy protocols need to be developed. (Sangiovanni et al., 2022). *Cannabis sativa L.* extracts were used since ancient times for open wounds because of the CBD molecule, which is proved to promote faster cell growth and to exhibit antimicrobial effects. Another area of application in veterinary medicine is photobiomodulation, also called laser therapy. This breakthrough is a non-invasive technique that harnesses the power of focused light to promote wound healing in animals. This cutting-edge treatment modality is gaining ground among veterinarians because it offers a number of benefits, including reducing pain, speeding recovery time and improving tissue repair.

Aims: Through this study we aim to highlight the positive influence that cannabidiol-based extracts can have on wound healing and to develop therapeutic protocols based on the use of cannabidiols in combination with photobiomodulation.

Materials and Methods: A combination between CBD based extracts will be placed in open wounds after photobiomodulation therapy will be done. The developed protocols will be clinically tested on feline and canine patients that suffer from superficial or deep skin alterations and compared to those who benefit from standard therapeutical approaches.

Keywords: alternative protocols, *Cannabis sativa L.*, healing, Photobiomodulation, wounds,

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INCIDENCE OF INTRAOPERATIVE COMPLICATIONS IN BRACHYCEPHALIC DOGS: A RETROSPECTIVE ANALYSIS

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Introduction: Brachycephalic dogs, due to their distinct anatomical conformation and associated pathophysiological changes, present significant challenges in anesthetic management and postoperative recovery. These patients are at increased risk of airway obstruction and inadequate ventilation.

Aims: The aim of this study is to identify and characterize perianesthetic complications in brachycephalic dog breeds, as well as to determine the associated risk factors and potential prevention strategies.

Results: The analysis included 50 patients from breeds such as French Bulldogs, English Bulldogs, and Pugs, undergoing elective or emergency surgical procedures. The recorded complications included bradycardia, hypoventilation, difficult intubation, regurgitation, and apnea. Preliminary findings reveal a significantly higher incidence of these events compared to non-brachycephalic breeds, emphasizing the need for breed-specific anesthetic protocols.

Conclusion: This poster provides a graphical overview of the collected data and proposes recommendations for improving anesthetic safety and perioperative outcomes in brachycephalic dogs.

Keywords: brachycephalic dogs, intraoperative complications, veterinary anesthesia, anesthetic risk, monitoring

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A COMPARATIVE STUDY OF CADES, DISHA, AND CAWEC IN THE ASSESSMENT OF CANINE COGNITIVE DYSFUNCTION

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Introduction: Canine Cognitive Dysfunction Syndrome (CCDS) is an age-related neurodegenerative condition resembling human Alzheimer's disease. Early detection is crucial for intervention and improved quality of life.

Aims: This study assessed the clinical utility and accuracy of three behavioural questionnaires—CADES, DISHA, and CAWEC—for identifying and staging CCDS in geriatric dogs.

Materials and Methods: 24 dogs, aged 8 to 15 years, of various breeds and sexes, were evaluated using all three tools.

Results: CADES and DISHA showed strong agreement, with 95.83% concordance. When comparing all three, concordance dropped to 75%, mainly due to CAWEC classifying some early-stage cases as normal ageing. Common behavioural signs included disturbed sleep–wake cycles, reduced responsiveness to commands, impaired learning, increased irritability or aggression, purposeless wandering, loss of interest in play, inappropriate elimination, and poor focus. These symptoms were most common in dogs with mild to moderate dysfunction.

Conclusions: Findings suggest CADES and DISHA are more sensitive and precise tools for staging CCDS, while CAWEC, though simpler, may miss subtle signs. Using all three tools together provides a more comprehensive cognitive profile and helps identify dogs at greater risk of disease progression. As most dogs in the study showed early signs of CCDS, these tools may support timely diagnosis and long-term monitoring.

Keywords: canine cognitive dysfunction, geriatric dogs, questionnaire validation

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SESSION 8: GEODESY, FORESTRY AND APPLIED EXACT SCIENCES

THE SLOPE OF SILT SEDIMENT IN STREIULUI UPPER WATERSHED

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Introduction: Hydrotechnical constructions, both transversal and longitudinal, play an important role in regulating the hydrological regime of floods and in supporting vegetation establishment. The presence of these structures in the hydrographic network directly influences the entire river basin, from the confluence with tributaries to the lower sections of the riverbed, through channel stabilization and flow regulation.

Aims: The study aims to analyze the hydrological regime of the upper Strei River and its tributaries in relation to torrent control works, bank protection measures, and existing forest infrastructure, in order to assess their effectiveness in reducing the risk of flash floods and stabilizing slopes.

Materials and Methods: The research was carried out on the upper sector of the Strei River (km 4–28) and its main tributaries, in an area characterized by a dense hydrographic network and fragmented relief, where torrent control works, bank protection measures, and forest infrastructure are present. The main tributaries include the Rea, Grușoara, Jigoreasa, Strâmba, and Jigoroșita valleys, as well as the Leucuș, Prăvaț, Copăciosu, and Rovina Leului streams. Precipitation, the main factor driving flash floods, reaches its highest values in July - August and its lowest in February - December, showing an upward trend from January until early summer. The runoff regime is influenced by slope, degree of erosion, basin afforestation, and the water retention capacity of vegetation (Dirja, 2000; Bădescu, 1972). The deposition slope of sediments is lower than the natural riverbed slope, which reduces flow velocity and sediment transport; standards recommend slopes of 0.5% for fine sediments, 1% for sand, 2% for gravel under 1 cm, 3% for coarse gravel, and 4% for boulders (Munteanu et al., 1993).

Results: The study showed that maximum precipitation occurs in the summer months, leading to a high frequency of flash floods and significant sediment transport. The natural riverbed slope favors erosion, while the existing hydrotechnical works help mitigate this phenomenon and stabilize the terrain. Adhering to recommended slope standards has enabled better flow control and reduced the impact of torrential events.

Conclusion: The hydrotechnical works in the upper Strei River basin play a crucial role in preventing erosion and reducing the risk of flash floods. The analysis of the hydrological regime confirms the need to maintain and expand these measures to protect forest infrastructure and ecosystems.

Keywords: hydrological regime, slope, torrent correction

BONITATE FOR DEER

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Introduction: Wildlife management goals are shaped by local conditions, societal needs, and the interests of communities living in and around the management area. The primary objective is to maintain healthy wildlife populations while minimizing damage to forests and crops, and ensuring sustainable hunting opportunities. This study focuses on assessing the carrying capacity of the red deer (*Cervus elaphus*) population in the Someșul Cald management area.

Aims: The purpose of this study is to determine the optimal number of red deer that can live in natural balance with their habitat in the Someșul Cald hunting and forest management area. The carrying capacity assessment will serve as a basis for sustainable management and future hunting quotas.

Materials and Methods: The carrying capacity (known as “bonitate” in Romanian forestry) was assessed using diagnostic keys organized into three main factor groups: abiotic, biotic, and anthropogenic. The most critical factor was forest structure, including tree species composition, age classes, undergrowth, and available winter biomass. Data were collected through field surveys at multiple sites, documenting vegetation layers and habitat conditions. A calculation sheet was developed using tables adapted for Romanian ecological conditions. The total score from all factors was compared to a classification table, which determined the bonitate category and the corresponding optimal number of deer per 1000 ha.

Results: The analysis determined a bonitate category corresponding to 6–10 deer per 1000 ha. The total suitable habitat in the Someșul Cald area is approximately 7000 ha, resulting in an optimal population size of 42–70 deer. An average of 56 individuals is considered appropriate. Population monitoring indicates a yearly growth rate of approximately 10%, suggesting a stable and healthy increase in red deer numbers.

Conclusion: The red deer population in the Someșul Cald area is approaching its ecological carrying capacity. Although numbers are improving, it is premature to establish precise hunting quotas. Maintaining a slightly larger population is recommended, as this could enhance sustainable hunting opportunities in the future.

Keywords: red deer, carrying capacity, bonitate, wildlife management, population assessment

ERICOID MYCORRHIZA IN VACCINIUM VITIS-IDAEA: MICROSCOPIC INSIGHTS INTO NATURAL ROOT COLONIZATION IN ROMANIAN WILD FLORA

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Introduction: One of the oldest and most common symbioses on Earth is the mutualistic relationship between fungus and plants, known as mycorrhizal symbiosis (Redecker et al. 2000).

Aims: This study aimed to investigate the natural colonization of *Vaccinium vitis-idaea* roots by ericoid mycorrhizal fungi in Romanian wild flora, focusing on the identification of fungal structures through microscopic analysis.

Materials and Methods: Small plants of *V. vitis-idaea* were collected from 4 locations in the spontaneous flora of Romania. The root and especially the hair roots, was preserved in 70% ethanol. To assess the presence of mycorrhizae, the acidified staining protocol with Sheaffer blue ink was used (Kowal et al., 2020) and the intensity of mycorrhizal colonization (%) was quantified on a scale from 0 to 5. The plant community of each location was described by identifying each species, as well as its degree of coverage.

Results: The general level of root colonization exhibited variation across the different study sites, suggesting an influence of local environmental conditions on symbiotic development. The identification of specific fungal structures such as hyphas inside, hyphas outside, and punctiform fungal structures was carried out ensuring the accuracy of the morphological assessments bibliographic sources. In the investigated populations, further differences were observed also in relation to the composition and density of the associated vegetation.

Conclusion: The study confirms the presence of mycorrhizal colonization in *V. vitis-idaea* roots and reveals that colonization intensity and fungal structure vary across natural habitats, reflecting complexity of plant–fungus–environment relationships.

Keywords: ericoid mycorrhiza, lingonberry, plant community

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