

University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, Romania
19th – 21st of June 2024



THE 14th CASEE CONFERENCE 2024

The Role of the Life Sciences Universities in the Green Transition
of Central and Eastern Europe

BOOK OF ABSTRACTS



IMPRESSUM

University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca

Organize

The 14th CASEE Conference ”*The Role of the Life Sciences Universities in the Green Transition of Central and Eastern Europe*”

19th – 21st of June 2024
Cluj-Napoca, Romania

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WELCOME MESSAGE

We are pleased to welcome you to the 14th CASEE Conference *"The Role of the Life Sciences Universities in the Green Transition of Central and Eastern Europe"*, Romania to share the scientific novelties within Green Transition of Central and Eastern Europe.

The 14th CASEE Conference *"The Role of the Life Sciences Universities in the Green Transition of Central and Eastern Europe"* 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 14th CASEE Conference *"The Role of the Life Sciences Universities in the Green Transition of Central and Eastern Europe"* 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, related to Life Sciences.

The conference programme will consist of **six scientific sessions**:

1. Agronomy and Ecological Conservation
2. Animal Science and Biotechnology
3. Food Science and Technology
4. Geodesy, Forestry, and Applied Exact Sciences
5. Horticulture, Bioeconomy, and Landscape Architecture
6. Veterinary Medicine – Preclinical and Clinical Sciences

The participants registered for our conference have the opportunity not only to present their results, published as a summary in the "Book of Abstracts" but also to publish in extenso their contributions.

Participation in the conference and the presentation of the papers/posters will provide feedback for the authors to improve the papers to be submitted to various journals. Therefore, the conference aims to discuss its topic and subtopics and assist the participants in improving their papers for submission to many journals. The submission will depend on the journals' guidelines and the specific topic: Bulletin of the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. (I) Agriculture, (II) Horticulture, (III) Animal Science and Biotechnology, (IV) Veterinary Medicine, (V) Forestry and Cadaster and (VI) Food Science and Technology. <https://journals.usamvcluj.ro/index.php>

I hope all participants will enjoy this conference and gain new ideas on developing their work utilising the experience of CASEE universities.

With best wishes,

Prof. Cornel CĂTOI, PhD
Rector

Prof. Dan C. VODNAR, PhD
Senate President

CONFERENCE PROGRAMME

Wednesday, 19 th June 2024			
09:00 -10:00	Registration of participants	Hall The Blue Amphitheater – Life Sciences Institute	
09:00 -10:00	Poster Display <i>(For more details, please see the program)</i>		
10:00-10:10	Opening ceremony Rector, Cornel CĂTOI Vice President of CASEE, Florin STĂNICĂ Senate President, Dan C. VODNAR	The Blue Amphitheater– Life Sciences Institute	
10:10-11:40	Plenary Session Chairpersons: Florin STĂNICĂ, Dan C. VODNAR KEYNOTE SPEAKER	The Blue Amphitheater– Life Sciences Institute	
	PAOLA PITTIA <i>The future of food technologies as a keystone for sustainability, innovation, and wellbeing</i>		
	TIBOR HARTEL <i>From silos to synergy: 'Whatever you do for me but without me, you do against me' - Universities as catalysts for sustainability transitions</i>		
	MARIO ROCCARO <i>GEEK4Food: A skill-based model integrating AI and adaptive learning methods in higher education and vocational training for the green and digital transitions</i>		
12:00 – 13:00	Lunch – Biodiversity Research Center		
13:00-18:00	Oral and Poster Sessions - Parallel oral session		
	13:00-15:00	WG 1 - oral presentation (Agronomy and ecological conservation + Animal science and biotechnology) Chairpersons: Cristian COROIAN, Mignon SANDOR	The Blue Amphitheater - Life Sciences Institute
	15:00 –15:10	Coffee Break	
	15:10 –15:15	Poster presentation WG 1	Ground floor hall - Life Sciences Institute
	15:20-17:00	WG 1 - oral presentation (Agronomy and ecological conservation + Animal science and biotechnology) Chairpersons: Cristian COROIAN, Mignon SANDOR	The Blue Amphitheater - Life Sciences Institute
	13:00-15:00	WG 2 - oral presentation (Food science and technology) Chairperson: Oana POP	The Green Amphitheater - Life Sciences Institute
	15:00 –15:10	Coffee Break	
	15:10 –15:40	Poster presentation WG 2	Ground floor hall - Life Sciences Institute
	15:40-17:40	WG 2 - oral presentation (Food science and technology) Chairperson: Oana POP	The Green Amphitheater - Life Sciences Institute
	13:00-15:00	WG 2 - oral presentation (Food science and technology) Chairperson: Vlad MUREȘAN	Hall 4 th Floor, Library Building
15:00 –15:10	Coffee Break		

	13:00-15:00	WG 3 - oral presentation (Geodesy, Forestry, and Applied Exact Sciences; Horticulture, Bioeconomy and Landscape architecture and Veterinary Medicine – Preclinical and Clinical Sciences) Chairpersons: Sanda ANDREI, Mirela CORDEA, Horia VLASIN	Red Amphitheater, Library Building
	15:00 –15:10	Coffee Break	
	15:10 –16:00	<i>Poster presentation WG 3</i>	Ground floor hall – Life Sciences Institute
18:00-24:00	Gala Dinner (<i>DaVinci Ristorante</i>)		
Thursday, 20th June 2024			
09:00-11:00	The CASEE General Assembly - (<i>upon invitation only</i>)		The Green Amphitheater – Life Sciences Institute
12:00 – 12:10	Closing ceremony		The Blue Amphitheater– Life Sciences Institute
12:10-13:30	Lunch – Biodiversity Research Center		
13:30	Cluj City Tour		
Friday, 21st June 2024			
08:00-19:00	Post-conference Tour – optional – Cluj-Napoca – Sighisoara – Crit – Viscri – Cluj-Napoca <i>Transylvania’s UNESCO World Heritage: Sighisoara & Viscri</i>		

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ORAL PRESENTATIONS

A1. Agronomy and ecological conservation

A 1.1 Adaptative mechanism simulation from semi-natural grassland plants under drought and changes in soil composition for mitigation and restoration actions

Faisal Anggi PRADITA, Maria JANICKA

Warsaw University of Life Sciences (SGGW-WULS), Warsaw, Poland

Semi-natural grasslands support critical ecosystem services such as feeding sources, retaining soil nutrients, maintaining biodiversity, and mitigating climate change. However, drought coincides with extensive management as excessive fertilizer uses altering species composition and disturbing such ecosystem services. Understanding the adaptation mechanism for species coexistence as the main research objective is assumed to help restoration and climate change mitigation based on phytosociological function approaches. Therefore, the current study simulated the effect of drought and different soil types on germination, growth, and development for four grassland plants that represent certain roles from similar Arrhenatherion phytosociological unit. Seeds of *Arrhenatherum elatius*, *Plantagolanceolata* (both are as feeding plants), *Vicia cracca* (legume and melliferous plant), and *Dianthus deltooides* (melliferous plant) were collected from meadows in central Poland. Then, all were sown into pots filled with universal soil (pH 6.5 – 7), sandy soil, and acidic soil (pH 4.5 – 5) and placed on two different blocks, i.e, control (full water capacity), and drought (low water capacity). Final germination capacity was suppressed significantly in *D. deltooides* and *V. cracca* by drought factor than interaction between drought and type of soil. Meanwhile, sandy soil supported *D. deltooides* and *A. elatius* height relative to other substrates in both blocks. Contradictive results were showed by *V. cracca* which were not affected by both factors and *P. lanceolata* were affected separately by both factors in height. Interaction of factors occurred in width parameter of *P. lanceolata*. On contrary, both factors affected significantly without interaction on width of *D. deltooides* plants, and for the others, plant width was not inhibited by any single factor. Total of leaf numbers varied differently for all and interacted factors reduced number of leaves merely in *D. deltooides*. Ramet as vegetative reproduction strategy were developed only for perennial forb grown under universal and sandy soil except *V. cracca*. Similarly, tiller in *A. elatius*, as a distinguishable feature than forbs which was more numerous in sandy soil than universal soil. Shoot number was counted separately on *V. cracca* with significant result due to two factors without interaction and favoured plants on sandy soil in control and drought block. Exception for *P. lanceolata* which entered generative stage by inflorescence formation in all substrate types. It was counted that on universal soil (30 inflorescences) relative to sandy soil and acid soil had 26 and 5 in two blocks, respectively. These morphological and phenological results unraveled each species responded severe impacts of drought and unsuitable soil types variedly thus expressing discrepancy on degree of tolerance. Furthermore, such species-specific characteristics may help to seed mixture preparation by balancing seed proportion for each species linked to conservation and restoration direction under drought and different soil types.

A 1.2 Organic farm management impact on soils and crop yields in Mediterranean salt-affected soil in Croatia

Igor BOGUNOVIC, Ivan DUGAN, Manuel MATISIC, Ivica KISIC
University of Zagreb, Zagreb, Croatia

Organic farming is widely recognized as a sustainable and eco-friendly approach to managing soil. It aligns perfectly with the objectives of the European Green Deal and its associated pillars. However, it requires significant expertise, as agrochemicals are not allowed. Implementing appropriate agro-technical measures is crucial, particularly since climate changes and limited soil quality pose a challenge. Managing organic farms on degraded saline-sodic soils in the Mediterranean is especially challenging. This paper studies the impact of two tillage managements (disc-harrow – DH and disc-harrow with ripping – DH+RIP) and three selected treatments on soil physical properties in saline-sodic soils of River Raša Valley, Croatia. Treatments were: control, G6+OM (6 t ha⁻¹ gypsum + 40 t ha⁻¹ farmyard manure) and G6S2 (6 t ha⁻¹ gypsum + 2 t ha⁻¹ sulphur). After four years of management, results show that DH+RIP treatment significantly increased soil water content (SWC) and significantly reduced soil compaction (bulk density - BD and penetration resistance - PR) compared to DH treatment. Water stable aggregates (WSA) are higher on DH+RIP, but the differences are insignificant. Soil amendments also show implications on soil physical properties. Significantly higher soil water content was measured at G6S2 than at control plots. The compaction level was significantly lower, while WSA is higher at G6+OM and G6S2 than at control plots. Yields of oats at the beginning of the experiment are insignificant between tillage managements. At the end of the experiment, DH+RIP recorded a significantly higher yield of oats than DH. Amendments also recorded different responses on oat yield—initially, the G6+OM treatment recorded significantly higher oats yields than the control and G6S2 treatments. In the end, G6S2 recorded a significantly higher oat yield than control. According to the present research, the most appropriate and sustainable soil management on saline-sodic soils under organic farming in the Mediterranean is the use of loosening tillage management and gypsum-manure application, which ensure the optimal soil physical environment and stable yields. **Keywords:** soil reclamation; organic farming; environmental restoration; gypsum; manure **Acknowledgment:** This work is supported by the COST action CA22144 - SUSTAIN (Sustainable use of salt-affected lands). The authors thank the Family Farm Chiavalon for their organizational support.

A 1.3 Research on methods to reduce water pollution due to phytosanitary treatments

Adrian MOLNAR-IRIMIE, Ovidiu RANTA, Sorin STĂNILĂ, Ovidiu MARIAN, Alexandru GHEȚE
USAMV - University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Cluj-Napoca, Romania

The main purpose of this paper is to analyze the methods of reducing water pollution due to phytosanitary treatments. Thus, the sources of surface water pollution with plant protection products are divided into point sources, which mainly refer to the handling of these products within the agricultural farm, as well as diffuse sources, which mainly refer to the processes related to rainwater runoff from the land surface and soil erosion and due to drift at the time of application of the plant protection products. Methods of reducing surface water pollution are also analyzed, addressing both technological and legislative aspects.

A 1.4 Ecological resilience in transition: Investigating seasonal variations in soil properties across diverse land use types in a periurban setting

Ivan DUGAN, Marija GALIC, Aleksandra PERCIN, Igor BOGUNOVIC
University of Zagreb, Zagreb, Croatia

Amidst the evolving landscapes of periurban areas, this study delves into the intricate interplay between land use changes and fundamental soil properties. Seasonal dynamics of key soil attributes were systematically investigated across diverse array of land use types. By exploring the nuanced responses of these properties to varying land management practices throughout the seasons, this research aims to provide insights crucial for the development of sustainable periurban land management strategies. This research investigates the ramifications of land use changes on soil properties in a periurban context, focusing on orchard (ORCH), grassland (GRASS), secondary forest (SFOR), cropland (CROP), and forest (FOR). Soil samples and infiltration measurements were conducted at an experimental site of Faculty of Agriculture in Zagreb, through out four different seasons (Spring, Summer, Fall, and Winter) in 2023. eight soil samples and infiltration measurements were conducted per treatment in four seasons (40 in total) per each land use. Bulk density (BD) and infiltration rate (IR) were significantly affected by land use and season. BD was significantly higher on ORCH and CROP, compared to GRASS, SFOR and FOR throughout all seasons. While in Summer period BD values were higher than in other seasons on all land uses. Similar pattern occurred for IR with significantly lower values in Summer. As for the land uses, significantly higher IR occurred on SFOR and GRASS, compared to others. These findings furnish nuanced insight into the intricate interplay between land use, seasonal dynamics, and soil physicochemical attributes, providing a scientific foundation for informed periurban land management strategies geared towards sustaining soil health and ecological resilience.

Acknowledgments: This work was supported by the European Commission Horizon 2020 project “InBestSoil - Monetary valuation of soil ecosystem services and creation of initiatives to invest in soil health: setting a framework for the inclusion of soil health in business and in the policy making process” (grant agreement 101091099).

A 1.5 Effect of different tillage management systems on soil physical characteristics and yield in the peri-urban region of City of Zagreb

Luka BREZINŠČAK, Igor BOGUNOVIC
University of Zagreb, Zagreb, Croatia

In urban environments, land use practices often contribute to soil degradation. Nevertheless, certain areas are designated for agriculture and woodlands, which are vital in supplying essential services like food provision, water retention, and climate regulation. Therefore, searching for optimal tillage management is crucial for the maintenance and improvement of soil functions. The purpose of this study was to analyze the impact of conventional tillage (CT), minimum tillage (MT), and reduced tillage (RT) on Fluvisols in a peri-urban area of the City of Zagreb. Under each treatment, subplots with (at a rate of 2.75 t/ha) and without straw were applied. This study has provided valuable insights into the effects of soil management on physical properties, hydrological responses, and degradation processes in arable land. Practices that encourage surface cover, such as mulching, generally exhibit positive impacts on soil properties. Specifically, a three-year investigation of analyzing three different soil tillage methods and wheat straw mulching to assess improvements in various parameters (soil bulk density, soil penetration resistance, soil moisture, water holding capacity, stability of structural aggregates, and organic matter content) of Fluvisol. A total of 648 soil samples were collected and analyzed in an authorized laboratory over the three years, accompanied by 216 field penetrometer measurements. Results indicate that mulch and reduced tillage (MT and RT) decrease soil bulk density, with RT being more influenced by seasonal conditions, while MT shows more lasting effects. Penetration resistances were found to be below limiting values for root development, emphasizing the importance of continuous application of loosening tillage with mulch to reduce soil compaction. Minimum tillage (MT) with mulch increased the soil's water retention capacity and soil moisture over the multi-year research. After three years, MT achieved an increase in the stability of structural aggregates, and the organic matter content noted the most significant increase. Yields varied throughout the study period, with soybeans showing no significant differences, maize performing best yields with deep soil subsoiling in the second year, and significantly higher yields for spring wheat with straw application in the third year. These findings underscore the importance of ongoing and systematic monitoring of various soil management approaches to ensure ecosystem stability, preserve soil longevity, sustain high agricultural productivity, and mitigate losses caused by degradation processes. Continuous evaluation is crucial for maintaining the health and sustainability of agricultural systems while minimizing adverse environmental impacts.

A 1.6 Scaling up Agroecology - a Potential of Agriculture Transformation in Southeastern Europe

Srdan ŠEREMEŠIĆ¹, Branko ĆUPINA¹, Apolka UJJ², Željka ZGORELEC³, Svetlana VUJIĆ¹, Bojan VOJNOV¹

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There is a clear perception that the agroecological approach can be essential to the development of agriculture in the 21st century. However, in Southeast Europe, agroecology is more recognised at the theoretical level as a scientific discipline underpinning other systems of sustainable agriculture (practical platform). Therefore, the slower application of agroecological principles has raised concerns regarding its potential for food security and nutrition. Nevertheless, agroecology has the capacity to transform agriculture by linking the current food system and the production, based on a balanced coexistence between man and nature, rather than adapting its methods to industrial, technological-intensive agriculture. The aim of this study is to analyse transformation pathways by using agroecology that can enable the transition of agriculture in Southeast Europe towards sustainable food production and environmental protection. To enable agroecological development, 5 Gliessman's levels of transition, 10 FAO elements and 13 HLPE principles need to be combined in such a way to provide key elements for redesigning food production systems and achieving true environmental, economic and social sustainability. Under the conditions of discrepancy between food demands and production, it is necessary to identify the possible vulnerabilities that can weaken the transition pathways and impede successful expansion, i.e. scaling and recognition of agroecology. The following entry points can be identified for the transformation of the current food system with agroecology: ecological intensification of agriculture, local cultures and food traditions (diets), and innovative integrated territorial approach (biodistrict). This must be followed by a coherent policy framework, defining the indicators of agroecology and its monitoring at different levels. Consequently, agroecological methods for restoring resilience and diversity with local food systems need to be integrated into different curricula and supported with funding for agroecological research.

A 1.7 Acknowledging the Effects of Climate Change on Kosovo's Rural Development

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In the future, Kosovo is expected to experience more frequent climate-related hazards, including heat waves, floods, droughts, and wildfires, which will threaten the country's infrastructure, vulnerable population, public health, and human settlements. Climate change poses a significant threat to Kosovo's economy, particularly agriculture, which is the backbone of the country's economy, as well as rural households who depend on climate-sensitive resources for their livelihoods. Rural areas are considered the main barrier to Kosovo's development, and climate change poses a significant threat to rural communities that rely on resources such as water supplies, arable land, and livelihoods, including farming and livestock rearing. Climate change may result in shortages of fuelwood, reeds for making baskets, and fertile soil, which could exacerbate the situation for rural households. The fact that human activity contributes significantly to the occurrence of catastrophic disasters is generally known, but little is known about it. This is mostly because greenhouse gases like carbon dioxide are produced, which warm the planet's temperature. The most evident consequence of the phenomena is rising sea levels, which threaten several countries and inundate low-lying coastal communities. This study seeks to comprehend, develop knowledge, integrate current data, and provide fresh data, concerning the aforementioned issues. The methodology for investigating the impacts of climate change on rural development in Kosovo encompasses a multi-faceted approach integrating both quantitative and qualitative methods. While key informant interviews will offer insights into policy viewpoints and institutional reactions, household surveys will provide quantitative data on socioeconomic variables. The purpose of this study is to thoroughly examine the complex effects of climate change on rural development, with a particular emphasis on the socioeconomic aspects in the regions of Kosovo.

A 1.8 Intercropping approach for soil improvement

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The soil-improving cropping systems, based on intercropping and cover cropping are resource-efficient farming approach based on diversification and ecological intensification. Intercropping is gaining more attention as a cultivation practice of two or more crops at the same field, without necessarily sowing and harvesting them together, enabling utilization of natural resources more efficiently than sole crops. This work emphasizes the intercropping strategies of crop selection, temporal and spatial diversification on soil properties improvement in different intercropping systems. The analysis is based on the results from intercropping for forage production and the newly incorporated intercrop mixture for grain production at the University of Novi Sad, Faculty of Agriculture, Serbia. In temperate regions, carefully designed legume-based intercropping systems with peas or vetches are advantageous because of the biological nitrogen fixation that boosts soil fertility and the dense crop stand that decreases soil erosion by increasing soil cover. Regardless the aim of growing, above and belowground interactions in intercrops with different utilization of environmental resources could benefit in complementary use and increased availability of nutrients, increased yield and quality, higher root biomass, improved weed control etc. In the West Balkans, the legume-based mixtures for forage and green manure have been analyzed for their effect on soil nitrogen and water availability, soil structure, etc. However, the intercropping for grain production raise more questions into the research: nitrogen utilization of the following crop, selection of tillage method for obtaining improved soil structure, sowing method for soil organic matter preservation, acceptance of intercropping strategy by farmers, etc. Consequently this can lead to the conclusion that even so it is proved that intercropping delivers numerous ecosystem services, it requires further research and understanding of its potentials and strategies for soil improvement in agroecosystems.

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A 1.9 Advancements in Encapsulation Techniques for Probiotic Bacteria: Microparticle Delivery Systems and Beyond

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The encapsulation of probiotics stands out as a crucial practice within the dairy industry. The growing consumer inclination towards natural bioactive elements has led to the integration of probiotics in dairy products. Employing encapsulation proves to be a compelling approach to bolster the stability of probiotics while ensuring controlled release. The primary challenges in probiotic bacteria encapsulation involve selecting optimal microparticle materials capable of incorporating probiotic bacteria and ensuring that the presence of probiotic bacteria within the microparticles does not diminish their activity. Considering the advantages of probiotic bacteria in aiding fiber digestion, preventing infections, and generating essential compounds like B vitamins and healthy fatty acids, Encapsulation of probiotic bacteria through ionic gelation has gained traction as a promising method to enhance their stability and efficacy in various applications, including functional foods and pharmaceutical formulations. To form a stable gel matrix around the probiotic bacteria it is necessary to choose several important key elements: components involved in the ionic gelation process, such as gelling agents (e.g., alginate, chitosan) and crosslinking agents (e.g., calcium ions). Furthermore, the parameters such pH, temperature, and gelation time, have got an impact on the encapsulation efficiency and viability of probiotics. With new highlights recent advancements and innovations in ionic gelation techniques, such as the incorporation of bioactive compounds and the development of hybrid gel systems, aimed at improving probiotic survival and functionality. With this it is possible to provide valuable insights into the potential of ionic gelation as a versatile and effective strategy for probiotic encapsulation, with significant implications for the development of functional foods and therapeutic formulations targeting gastrointestinal health and beyond.

A2. ANIMAL SCIENCE AND BIOTECHNOLOGY

A 2.1 Basil leaves as a source of carotenoids for yolk pigmentation: Effect of cultivar on carotenoid profile, colour and oxidative stability

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Basil (*Ocimum basilicum*) is rich in bioactive compounds with beneficial health effect on human and animal health. Among them, carotenoids have a pigmenting effect and could be used as a source of yolk pigment in laying hen diet. Basil cultivars vary in their content of bioactive compounds, and the aim of the study was to investigate the effects of three cultivars [*O. basilicum* 'Genovese' (MAP00576; B1), *O. basilicum* var. *purpurescens* (MAP00335; B2) and *O. basilicum* 'Dark Opal' (MAP00593; B3)] supplemented in laying hen diet on the carotenoid profile, colour and oxidative stability of the yolks. The technology for plant production followed standard procedures, and after harvesting, the leaves were separated, dried and ground to pass 1 mm sieve. Obtained meals were added in a proportion of 3 or 5% to the basal maize-soybean laying hen diet without added pigments, resulting in 6 experimental diets. The standard laying hen diet with added canthaxanthin (CTX; 8 mg/kg) was used as a control. By three in each cage, 105 Lohmann Brown hens were allocated to 7 dietary treatments in a completely randomised design (7 treatments×5 cages). The experiment lasted 6 weeks, and eggs for analysis were collected once a week for 3 weeks after stabilisation of total carotenoid content. Carotenoid profile [lutein (L), zeaxanthin (Z), CTX, α - and β -cryptoxanthin, α - and β -carotene (β C) and total carotenoids (TC)] of diets and egg yolks was determined by HPLC, egg yolk colour was determined by CIE Lab, and oxidative stability was determined by malondialdehyde (MDA) production during Fe-induced lipid oxidation. Treatment diets varied in carotenoid profile, with higher contents of L, Z, β C and TC in the 5%-supplemented diets (on average 27.67 vs. 22.18 μ g/g DM for TC) and in the diets containing the B3 cultivar (on average 27.48 vs. 23.65 μ g/g DM for TC). The 5% supplementation resulted in 37, 14, 78 and 27% on average higher content of these carotenoids in yolk, respectively. Consistent with the higher dietary carotenoid content, yolks from hens fed B3 diets had the highest content of L, Z, β C and TC, regardless of the supplementation level. Consequently, these yolks also had the highest redness (CIE a), although these values were lower than those obtained with CTX supplementation (11.57 vs. 26.18). The basil supplementation decreased MDA production compared to the control, and the lowest MDA contents were found in the yolks supplemented with the B3 cultivar. Results of the study show that supplementation of hen diet with different basil cultivars could result in different yolk properties. Although colour intensity was lower compared to standard hen diet, basil supplementation increased the carotenoid content and oxidative stability and thus the nutritional value of the yolk. Funding: This work has been fully supported by Croatian Science Foundation under the project ColourMaize ("Bioavailability of maize carotenoids in laying hens: effect of grain microstructure and diet composition"; IP-2019-04-9063). The work of doctoral student Dora Zurak has been fully supported by the "Young researchers' career development project – training of doctoral students" of the Croatian Science Foundation. Seeds were obtained from the Collection of Medicinal and Aromatic Plants held at the Department of Plant Biodiversity, University of Zagreb Faculty of Agriculture.

A3. FOOD SCIENCE AND TECHNOLOGY

A 3.1 Sustainable solutions for the capitalizing of forest products in the gluten-free brewing production

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The essential importance of gluten-free foods is highlighted by the dietary requirement of those with celiac disease, an autoimmune disorder that impacts the small intestine. Furthermore, the increasing tendency of health-conscious individuals towards gluten-free diets exponentially increases the need for a wide variety of gluten-free food alternatives. This research aimed to harness the sustainable potential of a forest resource (acorns from *Quercus rubra* and *Quercus robur* species) by optimizing a process for efficient starch breakdown. The objective was to produce a fermentable substrate capable of generating gluten-free beer-like beverages. In order to achieve the aim, acorns were described from a physico-chemical point of view through the measurement of pH, moisture, ash, crude protein, and total starch. The starch granules were identified and measured using polarized light microscopy (50 granules per sample), while high performance liquid chromatography was employed to record the starch breakdown in fermentable sugars. The results showed values of 33.09% moisture content, 3.12% ash, 3.59% protein, 38.05% starch and 5.70 pH for *Quercus robur*, while the dimensions of the starch granules range from 17.26 – 159.54 μm^2 for the area, 4.04 – 21.04 μm for the length and 3.57 – 11.76 μm for the width. Saccharification was successfully achieved only using an exogenous enzyme package and by optimizing a standard mashing process, which included applying heat pretreatment and extending the saccharification time at a specific temperature. These results confirmed the potential use of acorn flour mash as a fermentable substrate necessary for *Saccharomyces* yeast cells.

A 3.2 Consumer Behaviour Diversity with Regards to Food Waste: Exploring Shopping and Food Ordering Habits in Romania

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There is a limited amount of research on food loss and waste in emerging countries like Romania. This scarcity primarily stems from a lack of comprehensive understanding among all stakeholders in the agri-food chain about the phenomenon, its consequences and its complexities. Therefore, adapting to the ever-changing dynamics of consumer conduct, especially focusing on environmental and social aspects, is crucial. This research based on a qualitative approach emphasises the imperative for the Romanian food industry to show flexibility and address the diverse consumer needs through a tailored and innovative method. The findings of this exploratory study using sentiment analysis unveil three distinct consumer clusters in Romania, each reflecting varied attitudes towards managing food waste: one cluster emphasizes a positive approach; another adopts a negative stance, prioritizing waste minimization and responsible use of food resources; conversely, the third cluster appears more neutral or indifferent in their attitude. Consumers prioritize both functional and emotional aspects, expressing a desire for a pleasant and varied dining experience. Moreover, concerns about food waste and a preference for local agri-food chains indicate a growing awareness of sustainability. Consequently, marketing strategies that highlight environmental aspects can be impactful, along with the of technology integration, especially through online ordering services and mobile applications, which play a pivotal role in how consumers manage food. Recognizing the need for education, mainly in responsible shopping and food waste management, calls for learning campaigns and collaborative efforts to promote sustainable practices.

A 3.3 Innovative Green Approach: Itaconic Acid Production through Solid-State Fermentation and Enzyme-Mediated Hydrolysis of Organic Residues

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The pursuit of sustainable itaconic acid (IA) production, particularly from agricultural residues like wheat bran (WB), has gained considerable attention. This research focuses on optimizing IA production efficiency while minimizing environmental impact through the synergistic use of solid-state fermentation (SsF), hydrolysis, and submerged fermentation (SmF) processes. The study explores the metabolic adaptability of *Aspergillus* species, particularly *A. terreus*, highlighting the versatility of fungal metabolisms in sustainable biotechnological applications. Meticulous optimization of factors such as moisture content, pH levels, total reducing sugar concentration, inoculum size, and humidity is undertaken to maximize enzyme and IA yields. Optimal conditions, including 80% moisture on the third day, are identified for efficient enzyme production, emphasizing the crucial role of moisture in synthesis dynamics. Further, IA production optimization with varying initial pH (3, 4, and 5) demonstrates that pH 4 and 5 are conducive to maximizing IA production, achieving 1.238 ± 0.09 g/L and 1.462 ± 0.098 g/L, respectively, on day 7. This approach aligns with circular economy principles, showcasing the potential for sustainable IA production from agro-industrial by-products. The study successfully integrates SsF, hydrolysis, and SmF for enhanced IA production from WB residues. Addressing cost implications, especially by focusing on *A. awamori* for cost-effective alternatives, contributes to reducing overall production costs and minimizing undesirable by-products. Valuable insights into the intricate relationships between substrate moisture, enzyme activities, and IA production are provided, serving as a foundation for upscaling IA production through eco-friendly processes. Additionally, a mass balance calculation demonstrates an efficient 28% yield of IA from glucose. In conclusion, this research introduces innovative strategies for a more sustainable and eco-friendly IA production process, emphasizing the potential of SsF within the circular economy framework. By leveraging microbial metabolisms and agricultural residues, the study enhances the efficiency and sustainability of IA synthesis, promoting a more environmentally conscious and resource-efficient chemical industry. Funding: The financial support for this research was provided by two projects under the Ministry of Research and Innovation (no. PN-III-P1-1.1-PD-2021-0672 and PN-III-P1-1.1-TE-2021-1052).

A 3.4 Phenolic Compound Dynamics: Unraveling Their Impact on Intestinal Microbiota and Biotransformation

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This comprehensive study delves into the complex characteristics and potential health implications of lyophilized apple pomace derived from three distinct cultivars: Red Delicious, Granny Smith, and Jonathan. Within this investigation, Red Delicious distinguishes prominently by exhibiting the highest total phenolic content, with a rich composition dominated by procyanidins, epicatechin, caffeic acid, quercetins, and phloridzin. Sugars analysis reveals Red Delicious to possess elevated levels of glucose and fructose, which undergo a discernible decline during the simulated process of in vitro digestion. This observation underscores the dynamic nature of sugar availability and composition within the digestive tract. Moreover, the antioxidant activity exhibited by phenolic extracts proves to be markedly superior to that observed in freeze-dried intestinal phases. Specifically, Jonathan demonstrates the highest post-digestion antioxidant activity, while Red Delicious presents exceptional antioxidant potential even before the digestion process unfolds. The assessment of prebiotic index scores elucidates a moderate to high prebiotic potential inherent in apple pomace, particularly accentuated at a 1% concentration, with Red Delicious consistently demonstrating the strongest potential among the evaluated cultivars. These findings underscore the multifaceted health benefits associated with apple pomace consumption, advocating for nuanced consideration of cultivar-specific attributes. Notably, the observed variations in prebiotic effects across cultivars and bacterial strains underscore the complexity inherent in these interactions. Ultimately, this study provides invaluable insights into the bioavailability, functional attributes, and prebiotic potential effects of apple pomace, accentuating its capacity to support the proliferation of beneficial gut microflora. Furthermore, it suggests a compelling case for continued exploration into the nutritional properties of this agricultural by-product, thereby elucidating its potential as a pivotal component in promoting human health and well-being. Funding: The financial support for this research was provided by two projects under the Ministry of Research and Innovation (no. PN-III-P1-1.1-PD-2021-0672 and PN-III-P1-1.1-TE-2021-1052).

A 3.5 The effect of acid and alkaline pretreatment on phenolic and lipid components in wheat bran

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Wheat bran (WB) is a by-product of wheat milling and is recognized for its nutritional richness and functional properties. It is a valuable source of dietary fiber, minerals, vitamins, phenolic compounds, and lipids, contributing significantly to the health-promoting attributes of whole grains. This study explores the complex interactions between acidic and alkaline pretreatment methods along with the way they impact the ultrasound extraction of phenolic compounds and the impact on the lipid profile of WB. By applying an intensive analytical methodology that incorporates mass spectrometry, chromatography, and spectrophotometry, we want to clarify the variations in phenolic component profiles and lipid compositions observed after acid and alkaline treatments. Our research aims to identify the fundamental processes causing these modifications, which will further our understanding of WB processing methods. The fatty acid profile of lipids confirmed the presence of oleic acid (C18:1, n-9), linoleic acid (C18:2, n-6), and palmitic acid (16:0) as prominent components. The study of phenolic compounds indicated a wide spectrum, including cinnamic acids and benzoic acids. The investigation's findings offer significant potential for the future growth of the fields of nutrition and food science. The study provides valuable insights into the development of sustainable approaches for the utilization of cereal bran for the production of bioactive compounds with potential health benefits. Acknowledgment: This research was funded by MCI-UEFISCDI, project number PN-III-P4-PCE-2021-0750 and project number PN-III-P1-1.1-TE-2021-1052.

A 3.6 Enhancing Vitamin B12 Content in Wheat By-Products Through Sustainable Solid-State Fermentation: A Multi-Actor Approach for In Situ Biofortification

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In 2017, global wheat production exceeded 770 million tons, with a projected annual growth rate of 2.5%. Wheat grains serve as a substantial reservoir of bioactive compounds, micro-, and macro-nutrients, predominantly concentrated in bran fractions. Recent advancements in biotechnology have highlighted the significance of cereal by-products as abundant sources of bioactive compounds. *Propionibacterium freudenreichii* DSMZ 20271 emerges as the singular food-grade strain distinguished by its capability to synthesize DMBI from naturally occurring riboflavin inherent in wheat bran, particularly within solid-state fermentation contexts. This enzymatic pathway facilitates the production of bioactive vitamin B12, thereby presenting an unprecedented opportunity for naturally enriching food sources with this crucial nutrient. Moreover, this approach offers a sustainable solution for valorizing cereal industry by-products, minimizing waste generation. The originality and innovative aspects of this research involve a multi-actor approach. Firstly, it explores the concept of in situ biofortification, aiming to enhance the vitamin B12 content directly within cereal by-products. Experiments were carried out utilizing the *P. freudenreichii* subsp. *freudenreichii* DSM 20271 culture in 50 mL tubes. Fermentation was conducted over a 7-day period, 3 days under anaerobic condition and 4 days under aerobic condition. Each strain was activated using a model fermentation medium and inoculated in a 10% ratio in different formulations of WB medium and precursors. Specifically, the medium variations included: (1) With and without riboflavin (40 μ M) (2) Co-supplemented with riboflavin (40 μ M) and cobalt (0.6 mg/g dry weight) (3) Co-supplemented with riboflavin (40 μ M), cobalt, and nicotinamide (27 μ M) (4) Co-supplemented with riboflavin, cobalt (0.6 mg/g dry weight), and DMBI (100 μ M added on day 6 of fermentation). All precursor additions were added on day 0 of the fermentation process. The media formulations were meticulously tailored alongside the incorporation of precursors crucial for the vitamin B12 biosynthetic pathway, notably DMBI. Fermentation parameters, such as temperature, kinetics, fermentation duration, and inoculum size, were systematically optimized to attain maximum vitamin B12 yield. The cell count was over 9.0 log colonyforming units (CFU)/mL in the seventh day for all variants, and the pH level decreased from 6.3 on the first day of fermentation to approximately 5, depending on the variant. Fermentation was conducted under controlled conditions with a temperature set at 30°C, maintained through constant agitation at 150 rpm over the course of 7 days. The experiment yielded the highest concentration of vitamin B12 in variant 3, reaching 56.6 ng/g dw, and also in variant 5, registering a quantity of 46.67 ng/g dw. The impact of supplementation on cell growth varied depending on the type of supplement utilized. Overall, supplementation did not impede cell growth; however, co-supplementation with both riboflavin and cobalt exhibited a synergistic effect, stimulating cell growth and vitamin B12 synthesis. Acknowledgement: This work was supported by a grant of the CNCS-UEFISCDI, project number PN-III-P1-1.1-TE-2021-1052, 7TE/2022.

A 3.7 Modelling farmer's perception and intention to join cashew marketing cooperatives: an expanded version of the theory of planned behaviour

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The “Agricultural Promotion Policy (2016–2020)” represents a strategic initiative by the Nigerian government to address domestic food shortages and the challenges in exporting products at the required quality standards. Hindered by an inefficient system for setting and enforcing food quality standards, coupled with a lack of market knowledge, the Federal Ministry of Agriculture and Rural Development (FMARD) aims to enhance support for the production and activities of key crops like cashew. By collaborating with farmers, processors, investors, and stakeholders in the cashew sector, the policy seeks to define and uphold high-quality standards across the cashew value chain. Given the challenges and opportunities faced by Nigerian cashew farmers, active participation in cashew marketing groups becomes imperative. These groups serve as essential platforms for farmers to collectively navigate market intricacies, access resources, share knowledge, improve output quality, and bolster their overall bargaining power. Through engagement in these cooperative initiatives, farmers not only boost their economic prospects but can also contribute significantly to the sustainable growth of the cashew industry, fostering resilience and community development. This study explores the perceptions and intentions of farmers regarding their involvement in cashew marketing cooperatives, utilizing an expanded version of the Theory of Planned Behaviour. Drawing insights from a diverse sample of 321 cashew farmers in Southwest Nigeria, the research sheds light on the factors influencing decision-making in cooperative participation. The demographic analysis reveals a diverse landscape, with a substantial presence of middle-aged individuals contributing significantly to the agricultural sector and cashew-related activities emerging as a primary income source for a substantial proportion (23.99%). Employing Structural Equation Modelling (SEM) with Maximum Likelihood Robust (MLR) estimation in R, the research elucidates the associations among latent variables. Despite the model's complexity, the goodness-of-fit indices attest to the validity of the structural model, explaining approximately 40% of the variance in the intention to join cooperatives. Moral norms emerge as a pivotal construct, highlighting the profound influence of ethical considerations in decision-making processes, while perceived behavioural control presents potential challenges in active participation. Attitudes toward joining cooperatives reveal nuanced perspectives, with strong beliefs in enhanced connections with other farmers but varying perceptions on improved access to essential information. The SEM analysis establishes positive and significant effects of moral norms, perceived behavioural control, subjective norms, and attitudes on farmers' intention to join cooperatives. The knowledge construct positively affects key factors influencing intention, emphasizing the importance of informed decision-making. A supplementary analysis using partial least squares (PLS) SEM corroborates the robustness of our findings, aligning with covariance-based SEM results. This research unveils the determinants of cooperative participation and provides valuable insights for policymakers and practitioners aiming to empower and support this vital demographic in the cashew industry.

A 3.8 Screening of short-chain fatty acid profiles: insights from potentially psychobiotic strains

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A relatively new class of probiotics known as psychobiotics has shown great promise as a mental health treatment. They exert their effects by influencing the microbiota-gut-brain axis via many routes, such as metabolic, immunological, humoral, and neurological ones. Recent advances in microbiome research have uncovered numerous potentially beneficial psychobiotic strains. Among these, bacteria capable of producing short-chain fatty acids (SCFAs) have attracted significant attention. The compelling idea that these SCFA-producing bacteria play a role in promoting mental well-being is a focus of ongoing research efforts. Recent research has investigated specific probiotic strains, including *L. acidophilus* ATCC4356, *L. casei* ATCC 393, *B. bifidum* CCFM 1025, and *L. plantarum* 299V, for their potential as psychobiotics through the production of SCFAs. The study aimed to improve SCFA secretion by these strains using fermentation methods with inulin as a prebiotic to optimize production efficiency. High-performance liquid chromatography (HPLC) analysis revealed certain concentrations of acetate, propionate, and butyrate in the fermentation solutions. The integration of inulin as a prebiotic in the fermentation process aimed to increase the efficiency of SCFA synthesis by improving substrate metabolism. This study highlights the significance of optimizing SCFA production in specific probiotic strains for potential mental health benefits via the microbiota-gut-brain axis, providing insights for targeted interventions for mental well-being. Funding: This research was funded by the Ministry of Research, Development and Innovation, developed with the support of UEFISCDI (Project No. 14 PFE-2022-2024).

A 3.9 Stabilization and functionalization of iron oxide nanoparticles in biomedical applications

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Magnetic iron oxide nanoparticles (IONPs) have garnered considerable attention due to their unique magnetic properties and potential applications in targeted drug delivery, imaging, and therapy. However, concerns persist regarding their safety and potential toxicity, particularly upon interaction with cells in the gastrointestinal tract. To address this need, an *in vitro* study was conducted to examine the interaction between magnetic iron oxide nanoparticles and stomach and intestinal cells (HS-26, CaCo2, and DDL-1) and evaluate the nanoparticle dose-related toxicity. First, the standard MTT colorimetric assay was used to measure cell growth, and cell viability was examined after 12, 24, and 48 hours. In correlation with the cell proliferation assay, the LDH activity assay was determined to demonstrate the cytotoxicity of the compound on the tumor cell line. Also, the investigation into the type of cell death was conducted by evaluating the activity of caspases, which is a crucial indicator and mediator of programmed cell death (apoptosis). The findings of the MTT test indicated that at a concentration of 250 $\mu\text{g Fe/mL}$, tumor cell lines had their proliferation suppressed by around 10–15%. For the normal human fibroblast line, a slight proliferation of cells was observed at concentrations of 5 or 10 $\mu\text{g Fe/mL}$, respectively. On the other hand, at 150 $\mu\text{g Fe/mL}$, an increased LDH concentration was recorded, suggesting that the cell membrane was damaged and LDH was being released into the extracellular space. Consequently, caspase activation was not detected in normal human or tumor cells. These findings provide novel insight into the toxicology of iron oxide nanoparticles and highlight the need for a comprehensive evaluation of their clinical application. Therefore, iron oxide nanoparticles can be further studied for oral drug delivery in biomedical applications.

A 3.10 Investigating the Relationship Between Probiotics and Mineral Absorption in the Human Body

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The interaction between probiotics and mineral absorption is increasingly captivating due to its potential impact on human well-being. Minerals play crucial roles in various physiological functions, and deficiencies can lead to significant health issues. Probiotics, beneficial microorganisms residing in the gut, have garnered attention for their ability to influence mineral absorption and alleviate deficiencies. This review aims to explore the complex relationship between probiotics and the absorption of essential minerals such as calcium, selenium, zinc, magnesium, and potassium. However, challenges arise from the variability in probiotic strains and dosages, as well as the unique composition of individuals' gut microbiota. Establishing universal guidelines is hindered by these factors. Enhanced comprehension of these mechanisms will facilitate the development of targeted probiotic interventions to maximize mineral absorption and promote human health.

A 3.11 Innovative Food: Sourdough Enhanced by Apple Pomace and Fermented with Selective Cultures

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Around 18% of the 96 million tonnes of apples produced worldwide each year are processed, having a significant amount of apple pomace (AP), which can make up 20% to 35% of the apples' fresh weight. Promising pathways for lowering environmental pollution and incorporating these by-products into a circular economy include utilising cutting-edge AP management strategies and incorporating this knowledge into creative fermentation procedures. Adding AP flour improves the nutritional value of sourdough and provides a freshtake on creative fermented food. After blending wheat flour (WF) and AP flour in different ratios (90+10%; 95+5%) to make sourdough, the mixture was fermented for 72 hours with *Saccharomyces cerevisiae* and *Oenococcus oeni* DSMZ 20255. When by-products were used as a wheat flour substitute, the storage modulus increased, indicating changes in the dough's structural properties. During proving, these changes were clearly visible in the dough's ability to leaven. Additionally, the nutritional qualities were improved by this change. The findings show that AP is an important source of fermentable sugars and organic acids, which support cell growth and improve the nutritional value of sourdough. Beneficial outcomes were noted, especially in the co-culture fermentation process utilising 95% WF and 5% AP. Funding: This research was funded by the European Union. However, the views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them. Grant agreement No 101131479 (RIA4FOOD).

A 3.12 Improvement of Chemical and Physical Characteristics in Macroalgae-Based Coating Materials through the Application of Aqueous Extracts Derived from Olive Leaves

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This study aimed to integrate bioactive compounds extracted from olive leaves into biodegradable films tailored for preserving perishable food items, specifically fruits and vegetables. Olive leaves (*Olea europaea* L.) sourced from Lesbos island in Greece underwent aqueous extraction, yielding three distinct extracts: olive leaves 1 (OL1), olive leaves 2 (OL2), and olive leaves 3 (OL3). The antioxidant potential and phenolic compound profile of these extracts were meticulously analyzed. Subsequently, these extracts were incorporated into 1% sodium alginate solutions, and the resulting blends were cast into 90 mm Petri dishes to form solid biofilms. The light absorption of alginate solutions (at 600 nm) and their antioxidant activity (assessed using DPPH) were examined. The solid biofilms underwent measurement of various physical attributes, including weight, diameter, density, and thickness. Additionally, evaluations were conducted on humidity, solubility in water, and water vapor permeability. Glycerol served as a plasticizer and was added to all three extracts in conjunction with alginate solutions. Significant differences were observed in the investigated parameters between the biofilms containing glycerol and those without the plasticizer for all three extract variants used. Olive leaf extracts contribute to the enhancement of both the chemical and physical properties of alginate-based coating materials. 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, and by UEFISCDI, project no. PD 7/2022, PN-III-P1-1.1- PD-2021-0444 (Acronym: MIGRATION).

A 3.13 Beer aroma compounds: key odorants, off-flavor compounds and improvement proposals

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The aroma of beer is one of the most powerful and important aspects of the product besides the appearance, taste, and mouthfeel. For beer drinkers, the beer they will usually choose is the one that will have the most pleasant smell to them. The sense of smell is closely intertwined with our emotions, and certain aromas are capable of evoking memories and creating pleasant sensations or in other cases off-flavours can signal a potential issue with the food being consumed by the individual. Every beer consumer has a preference on how the beer should smell or taste, “hoppy”, “malty”, “fruity”, or “floral”, they all have a favourite beer, and the aroma of that beer is a big part of the reason why they buy and drink it together with the taste and appearance in the glass. As molecules enter our body via the nose and mouth, they activate our sense of smell and when we detect certain odorants in the beer, our brain can recognize them. For example, in the case of a Stout, or a Porter we can identify “chocolate” or “coffee” notes, or when smelling an American Pale Ale, it can have notes of “grapefruit”, “lime”, or “tropical fruits”. The question of why the beer smells like it does and where those scents come from led to the development of this study. In this paper, the most common beer styles were identified and described. For these beer assortments, the key aroma compounds were described. Using the key aroma compounds, a troubleshooting guide was developed that can be used by a brewer in a microbrewery to identify the most common off-flavours that appear and to find out the cause and possible solutions that will help microbreweries solve the issues.

A 3.14 Polyphenols-Enrichment of Vienna Sausages using Microcapsules containing Acidic Aqueous Extract of *Boletus edulis* Mushrooms

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Polyphenols are ubiquitous by-products in many plant foods. Their intake has been linked to health benefits like the reduced incidence of cardiovascular disease, diabetes, and cancer. These bioactive compounds can be successfully extracted from *Boletusedulis* mushrooms with acidic water; still, this extract may influence the organoleptic or textural properties of the product to which it is added for enrichment. This inconvenience can be avoided by microencapsulating the extract using spray drying. In this study, Vienna sausages were reformulated by replacing 2% of the cured meat with microcapsules containing acidic aqueous extract of *Boletus edulis* and by replacing ice flakes, an ingredient of 22.9% of these sausages' recipe, with ice cubes from acidic aqueous extract of *Boletus edulis* to obtain a product enriched with polyphenols. The results showed a higher content of polyphenols in sausages with microcapsules (523.03 µg/g) and extract (568.92 µg/g) than in control ones (455.41 µg/g), with significant differences for 2,4-dihydroxybenzoic acid, protocatechuic acid, and 1-*O*-galloyl-β-D-glucose. However, using the extract is not feasible as it affects the appearance and taste of Vienna sausages. As for the microcapsules, they do not influence the sensory properties and hardness of Vienna sausages and prevent moisture loss and colour changes during storage. For an enhanced effect of polyphenol enrichment, it is recommended to be used in a higher concentration in the manufacturing recipe.

A 3.15 Fats extracted from oil press cakes, fish meat, and chicken hearts as potential CoQ10 supplements

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Coenzyme Q10 (CoQ10) is a liposoluble compound naturally occurring in plant and animal cells, with some benefits for health, mainly due to its antioxidant properties. The food industry gives large quantities of by-products and waste; these could be used to recover the natural form of CoQ10, which has a higher bioavailability than synthetic. The Folch method modified by Boselli was used in this study to extract and characterise the fats from some food by-products (oil press cakes of rapeseed, sunflower, pumpkin, linseed, walnut, and hempseed) and waste (fish meat and chicken hearts), previously identified as sources of CoQ10, for potential uses as dietary supplements. The highest CoQ10 content was found in fats extracted from chicken hearts-CH (2041.74 µg/g) and pumpkin press cakes-PPC (661.40 µg/g). Both vegetable and animal fats are triglycerides but have a low CVD risk (AI values below the recommended limit). CH fat is dominated by oleic acid (n-9) and PPC fat by linoleic acid (n-6). PUFAs/MUFAs ratio is above the recommended minimum in both fats; however, the n-6/n-3 PUFAs ratio in CH fat exceeds the maximum value. These fats also contain tocopherols (PPC-138.09 µg/g and CH-54.22 µg/g) that, along with CoQ10, give them antioxidant properties; therefore, they meet the criteria of a food supplement.

A 3.16 From grain to gain: solid-state fermentation for vitamin B12 enrichment in oat bran

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Producing vitamin B12-fortified plant-based food products is becoming increasingly important and fermentation is, by far, the most attractive field of exploration. The present paper aims to investigate and optimize the solid-state fermentation by *P. freudenreichii* for in situ production of vitamin B12 (de novo biosynthesis of DMBI and production of active form of vitamin B12) in oat bran (OB). Experiments were carried out utilizing the *P. freudenreichii* subsp. *freudenreichii* DSM 20271 culture in 50 mL tubes. Fermentation was conducted over a 7-day, 3 days under anaerobic condition and 4 days under aerobic condition. The fermentation volume was 30 grams where the ratio of oat bran to water was 30:70. Sterilized substrates with a slightly acidic neutral pH were used and all solutions/distilled water used in setting up the fermentation experiments were adjusted to a pH of 6.3. The strain was inoculated in a 10% ratio on oat bran (variant 1: substrate+inoculum), but supplementation with cobalt and DMBI was also performed, along with the addition of precursors, as follows: with riboflavin (40 μM) (variant 2); with riboflavin (40 μM) and cobalt (variant 3), co-supplementation of riboflavin (40 μM) and nicotinamide (27 mM) plus cobalt (variant 4), (these were added on day 0 of fermentation) and riboflavin (40 μM) and cobalt with the addition of DMBI (100 μM added on day 6 of fermentation – variant 5). To monitor the metabolism of *P. freudenreichii* during fermentation, acidification properties, microbial growth, and levels of glucose and riboflavin, a precursor of DMBI, were measured in situ (on oat bran substrates) along with vitamin B12 production. The initial concentration of riboflavin in oat bran was 0.22 ± 0.08 mg/100g. This concentration decreased significantly by day 7 of fermentation, as it was utilized by bacteria in the synthesis of B12. The cell count was over 9.0 log colony forming units (CFU)/mL in the seventh day for all variants and the pH increased from 6.3 on the first day of fermentation to 6.7 by the end of fermentation, depending on the variant. Variant 3 yielded the highest concentration of vitamin B12 reaching 87.5 ng/g dw, followed by variant 5 registering a quantity of 60.0 ng/g dw. The impact of supplementation on cell growth varied depending on the type of supplement utilized. Overall, supplementation did not impede cell growth; however, co-supplementation with both riboflavin and cobalt exhibited a synergistic effect, stimulating cell growth and vitamin B12 synthesis. Acknowledgement: This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-III-P1-1.1-TE-2021-1052, 7TE/2022, within PNCDI III.

A 3.17 Structured edible oil systems for bioactive compounds delivery

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The effectiveness of bioactive compounds in promoting health relies on both the intake level and their bioavailability and bioaccessibility. Several systems have been created to enhance the delivery and bioavailability of bioactive compounds. This presentation delves into the effects of various encapsulated systems on the digestibility and bioavailability of hydrophilic and lipophilic bioactives. These systems include gelled (oleogels, bigels, emulgels, hydrogels and hydrogel beads), micro-(gels, particles, spheres, capsules, emulsions and solid lipid microparticles), and nano-encapsulated (nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, nanoemulsions, liposomes and nanoliposomes). The presentation provides a comprehensive analysis of delivery systems that contain structural molecules, various types of oil, antioxidants, emulsifiers, and coatings that show promise for use in the food sector. Factors such as hydrophobicity, the system's network, the type of antioxidant, the gelator-to-oil ratio, and the concentration and type of gelators all impact the release and bio-accessibility in gelled systems. Structured emulsions enhanced the bioaccessibility, controlled release, and stability of bioactives. There are a number of factors that can influence the bioactive release in microencapsulated systems. These include the wall material, oil/water ratios, encapsulation technique, and pH conditions. Coating type and core-to-wall ratio are two factors that affect core component stability and release. How bioavailable nanoencapsulated systems depend on a number of factors, including the encapsulating material, the encapsulation process, and the nanoparticles' properties. The stability and absorption of nanoliposomes are improved. When it comes to increasing the availability and dispersion of bioactive compounds, all encapsulated methods have demonstrated immense potential.

A 3.18 Carotenoid recovery from tomato processing by-products through green chemistry

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The extraction of bioactive compounds from agro-industry-derived by-products aligns with circular economy principles, emphasizing resource efficiency through enhanced recycling and waste minimization. Tomato processing by-products, rich in carotenoids renowned for their health-promoting attributes, offer a promising avenue for scientific exploration and functional food development. This study aimed to investigate the extraction of carotenoids from tomato processing by-products by implementing green chemistry principles, utilizing generally recognized as safe (GRAS) solvents, freeze-drying as a pretreatment method, and ultrasound assistance during extraction. Spectrophotometric analysis and High-Performance Liquid Chromatography (HPLC) were employed to identify and quantify total and individual carotenoids in the extracts. Specifically, the study seeks to assess the total and individual carotenoid content in tomato waste extracts using ethyl acetate and ethyl lactate as green solvents.

A4. Geodesy, Forestry, and Applied Exact Sciences

A 4.1 Woody species of agroforestry systems as one of the possibilities of obtaining wood raw materials

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The production potential of trees suitable for growing in agroforestry systems for maximizing production and the highest possible economic profit is primarily oriented towards non-native-introduced trees. These, in the climatically more favorable conditions of agroforestry systems, represent the possibility of increasing volume production with a shorter fallow period, but also the possibility of creating valuable assortments, which in their physical properties are close to tropical woods.

A5. Horticulture, Bioeconomy and Landscape architecture

A 5.1 Analysis of the Drivers of Agricultural Land Abandonment Among Small-scale Farmers in Nigeria

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The global agricultural landscape has always been dynamic, with varying contexts in land use change and transition, especially in developing countries like Nigeria, which is characterized by a majority of rural small-scale subsistence farming bearing the brunt of the nation's food production. Given that the world population is increasing at an exponential rate putting more demand on food production, land as a valuable resource coupled with global climate change has furthermore put more pressure on the farmers, thereby causing a strain on the available resources of land, labour, and capital as the agricultural sector in Nigeria cannot effectively compete with other sectors of the economy leading to potential shifts in land use demands and patterns as well as socio-economic outcomes that collectively influence the farmers' decision to either continue their farming practices at a relatively higher cost or not; thereby leading to land abandonment. This study provides an in-depth overview and comprehensive analysis of the possible drivers of land abandonment among smallholder farmers in Nigeria by examining the demographic, environmental, socio-economic, and institutional factors that influence their decision to abandon their land. The research was carried out in Nigeria using a multistage sampling technique, with three states selected from three of the six geopolitical zones. A total of 450 semi-structured questionnaires were administered. A logistic regression model was used to assist in the quantitative assessment of the determinants of land abandonment in the study area. The result showed that age and distance from the farm to the market have adverse but significant effects on the decision to abandon the land, which help to signal that young farmers and farmers with more remote farms are more likely to abandon their land; this could also be related to succession issues and the willingness of the younger generation to take an interest in farming. On the other hand, farmers who reared livestock, who owned their own land, who had experienced flooding, and who had difficulties in hiring labor were found to have significant positive effects on the decision to abandon the land. These variables suggest that the economic and labor-related pressures of managing livestock, recovering from environmental stressors such as flooding, and coping with labor shortages may lead farmers to abandon their agricultural land. Thus, this study underscores the need for policy interventions that address the multiple challenges faced by smallholder farmers, promote resilience to environmental adversities, and support the sustainable development of rural communities in the face of accelerating land-use change, especially in Nigeria.

A 5.2 Rediscovering the landscape in the Czech borderland

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The traditional cultural landscape is esteemed as a critical asset and an essential part of global heritage at both institutional and political levels, receiving substantial focus in scholarly research. As defined by the UNESCO International Convention (1992), a landscape cultivated by humans is a critical component of our shared identity, reflecting land-use patterns established by earlier generations with tangible and intangible aspects. The European Landscape Convention (2000) further underscores the importance of landscape in shaping societal identity within the European context. This study investigates various strategies for revitalising forsaken cultural areas in Central Europe, particularly in the border regions and inner enclaves of the Czech Republic, areas with historical German settlements. Following World War II, the enforced displacement of the German-speaking population shift substantially contributed to a profound socio-cultural transformation in these regions. This research explores the different motivations of stakeholders involved in reinvigorating these landscapes. It addresses the challenges encountered in managing and studying these areas, especially in the context of their vanishing traditional cultural landscapes. The study also examines the complex and sometimes conflicting views of these landscapes across different communities, considering their environmental consequences and significance for cultural heritage preservation. Employing qualitative research methods, including case studies and interviews, the study presents novel approaches to re-energise these spaces and landscapes that honour and reinforce historical and cultural values while also considering the preferences and requirements of the local populations.

A 5.3 Interaction impact of drought stress, nutrient deficient water and seed borne pathogen (*Alternaria alternata*) on germination and vigor of two tomato varieties

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Drought is one of the most important factors negatively influencing tomato yield. Under drought pressures, plants expand the roots to uptake more water, thus minimizing stomatal loss of water when there is a water inadequacy. *Alternaria* spp. can be classified as a seed-borne pathogen, causing tomato diseases. Seed germination can be negatively influenced by *Alternaria* sp. because of the presence of the fungus on the seed's surface. Salicylic acid occurs naturally in plants and has a key role in plant development, stress tolerance, and defense against pests and pathogens. Salicylic acid is considered to be a part of natural host plant defense mechanisms to pathogen harm in a variety of interactions between hosts and pathogens. This study evaluated not only the seedling performance of two tomato varieties (Marmande and Kecskeméti Jubelium) under irrigation with nutrient-deficient water and drought stress but also salicylic acid application on alleviating seed-borne disease of tomato caused by *Alternaria alternata*. Results indicated that the Kecskeméti Jubelium variety exhibited a superior development compared to Marmande related to the seedling's dryweight, and the tissue water content of Kecskeméti Jubelium was lower under nutrient-deficient water. Nevertheless, when applying levels of drought, the Marmande variety had a higher viability rate of 62.5% in comparison with another variety among all drought stress-simulated solutions, and the germination rate of the two tomato varieties is at 85.5% in 5% but decreased progressively when exposed to a higher drought concentration of 10%. When using 3 ml of Salicylic acid during germination stages, the seedling vigor index of Marmande shows greater resistance at 165% in comparison to Kecskeméti Jubelium just 108% under the infection of *Alternaria alternata*.

A 5.4 The process of producing bioethanol from Sago Palm (*Metroxylon* spp.) from Sorong under various conditions of hydrolysis and fermentation

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Sago palm (*Metroxylon* spp.) is a potential starch-producing crop that can produce 20 – 40 tonnes of starch per hectare every year. For many years, a lot of sago starch has been wasted because it is not exploited well. The people utilize sago starch for daily consumption only. Sago starch can be used as raw material for renewable energy such as bioethanol. The main object of this study was to analyze the optimization of enzyme application to hydrolyze sago starch from Sorong and the ratio of water and starch in bioethanol fermentation. The second aim was to ensure the kind of sago starch that can be used to produce bioethanol, so that sago palm farmers can be empowered to produce sago palm intensively in Sorong District, Indonesia. The enzyme was used to hydrolyze sago starch into liquid sugar. Fermentation of liquid sugar used yeast (*Saccharomyces cerevisiae*) to produce bioethanol. Iwarwo sago starch was used in this study. The experimental setup for this investigation was a split plot treatment using a completely randomized design. Subplots for the enzymes of α -amylase and glucoamylase are treated, where as the main plot compares the effects of starch and water. Each treatment was repeated twice, for a total of 54 experimental units. The treatment of sago starch and water (1:5), 1 mL of α -amylase enzyme per kg of sago starch, and 1.2 mL glucoamylase enzyme per kg of sago starch produced the highest ethanol (10.93%) after 72 hours of fermentation. Further investigation into the composition of α -amylase and glucoamylase enzymes used in various forms of sago starch can be conducted since it can be a valuable initial step. To determine the amount that sago starch can be made into bioethanol, further studies need to be done.

A6. Veterinary Medicine – Preclinical and Clinical Sciences

A 6.1 Chytridiomycoses (*Batrachochytrium dendrobatidis* and *Batrachochytrium salamandrivorans*) in Eastern Europe and the importance of baseline surveillance of wildlife emerging infectious diseases

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Batrachochytrium dendrobatidis (Bd) is an emerging fungal pathogen discovered in the 1990s, causing acute and severe declines in populations of anurans, urodeles and caecilians on all continents, with over 1000 susceptible species, in 96 countries. Due to its rapid spread, devastating effects, and the susceptibility of a wide range of species, chytridiomycosis is considered one of the most concerning wildlife diseases of our time. *Batrachochytrium salamandrivorans* (Bsal) is a related emerging fungal pathogen, described in 2013. It is responsible for the decimation of Belgian, Dutch and German populations of fire salamanders (*Salamandra salamandra*) and other species of urodeles (newts). Both chytrid fungi have emerged as significant threats to amphibians in recent decades, being the main cause of amphibian extinctions in contemporary times. The chytrid-driven collapses of amphibian populations have been also associated with documented knock-on impacts on ecosystem functioning and human health. Developing effective mitigation measures requires disease surveillance in already affected areas as well as in naïve populations. However, efforts and programs that monitor and study the epidemiology and impacts of chytrid fungi have been targeted at a limited number of known hot spots of high Bd/Bsal impact such as Central and South America, Australia, and Western Europe. In contrast, Eastern Europe has lagged behind, partly due to factors such as insufficient awareness, lack of infrastructure and funding, but also due to the perceived (but unconfirmed) absence of significant declines in wild amphibian populations. Limited studies in Eastern Europe have revealed correlations between Bd distribution and landscape context, emphasizing the need for comprehensive surveillance and research. Despite screenings in various countries, including Hungary and Serbia, gaps remain in understanding Bd and Bsal distribution and impact in the region. Its impact in Eastern Europe, including Romania, remains poorly understood. Reports of Bd presence in Southern Transylvania indicate a need for further investigation, given the lack of apparent disease signs or population decline. Additionally, the emergence of Bsal in Western Europe highlights the urgency of surveillance efforts in Eastern Europe. A higher level of priority needs to be ascribed to baseline surveillance of emerging wildlife diseases in Eastern Europe and to allocate appropriate resources and attention to this essential aspect of disease prevention and control.

POSTER PRESENTATIONS

B 2. Animal science and biotechnology

B 2.1 Plant Breeding for Organic Farming: A General Approach

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Organic farming is a growing niche within the entire agricultural production. However, it is not aimed to replace conventional, i.e. industrial system of production, but is developing within the limited frame of holistic approach, and is based on specific values and principles, such as the principle of ecology, the principle of health, and the principles of overall sustainability, care and fairness. These principles dictate the need on specific approach in plant breeding, including breeding goals for particular variety, but also for general concepts of varieties which should be put into the wider and holistic consideration, primarily within the natural ecosystem, but also within sustainable economic, market, and social frames. As a consequence of these propositions, organic farming has specific requirements on plant breeding programmes different from conventional breeding regarding their strategies, goals, techniques, resources, and legislative procedures. In this light, the breeding goals for organic agriculture are focused on the traits and characteristics different from the usual breeding goals in conventional agriculture which is mainly focused on the yield as a final outcome of the crop, neglecting important traits that indirectly affect the plant potential for organic farming. Conventional agriculture replaces the lack of the "traits responsible for sustainability" by external inputs, such as chemicals, plant protection products, fertilizers, intensive use of machinery and external energy, mainly in the form of fossil fuels. Therefore, the breeding goals for organic agriculture include primarily all these traits that strengthen the genetic, physiological, and morphological potential of the plant for survival without external inputs, but bearing satisfactory yields in the same time, satisfying the economic issues and market demands. In such an environment, plant breeding for organic agriculture has several strengths and weaknesses as an internal driving forces or constraints, but is also exposed to external threats and opportunities. Here we present overview of the most important factors and forces that determine strategies of plant breeding activities and programmes for organic agriculture, and their comparison with the mainstream breeding procedures in conventional breeding programmes. The stress in this approach is put on the differences that seems to put the organic breeding putatively "a step back" in regards to mainstream breeding, such as differences in genetic resources used, techniques applied, traits favoured, and goals to be achieved in cultivar design for organic agriculture as the factors that should be considered in order to achieve ecological, technological, and social sustainability of this specific agricultural niche.

B 3 Food Science and Technology

B 3.1 Effects of hot air- and freeze-drying on the colour and carotenoid content of powders obtained from different rosehip waste

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Rosehip fruits come in various shapes and hues, ranging from yellow-orange to dark red and occasionally even black, depending on the distribution of pigments like carotenoids, flavonoids, or anthocyanins (Bhave et al., 2017). Carotenoids are the principal pigments responsible for the colour of rosehips (Alp et al., 2016). This study aimed to determine the effects of hot air- and freeze-drying on the colour and carotenoid content of powders obtained from waste from rosehip puree preparation by boiling (traditional processing) and cold pressing, respectively. The current study was designed to determine the colour attributes of rosehip fruits (the raw material used to make rosehip puree), paste, juice, waste (resulting from fruits processing by boiling and cold pressing), and powders (obtained by hot air- and freeze-drying of waste). L^* , a^* , and b^* values were measured using an NH300 portable colorimeter (3NH, Shenzhen, China), while those of h^* , C^* , and ΔE^* attributes were calculated. To determine the polar and nonpolar carotenoid content, ethanolic and ethereal (with petroleum ether) extracts were prepared for all rosehip samples, which were subsequently read to a UV-VIS spectrophotometer at 450nm. The total colour difference (ΔE^*) between waste from fruits processing by boiling and cold pressing also between resulting juice and paste was large. Hot air drying determined a large ΔE^* between powders obtained from the boiled and raw waste. Freeze-drying caused an intensification of colour in the powder obtained from boiled waste but a reduction of colour intensity (C^*) in the powder from raw waste. These results corroborate those regarding the content of polar carotenoids. Fruits processing by boiling affected the carotenoid content of the resulting waste to a greater extent than cold pressing, as did hot air drying the waste compared to lyophilization in terms of carotenoids in the corresponding powders.

B 3.2 Bigels as fat substitutes in confectionery products

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The aim of the present study was to develop and evaluate bigels for their potential application as substitutes for fats in confectionery products. The research was projected using Design-Expert statistical software, including three variables: emulsification time (minutes), the rotations used for emulsification (rotations per minute), and the emulsifier type (Polysorbate20/Tween 80/Lecithin). Bigels represents biphasic formulations in which oleogel (carnaubawax and sunflower oil) and hydrogel (xanthan gum and distilled water) were obtained independently. According to the design (23 samples), the oleogel was added to the hydrogel and homogenized at high shear rate (appear as a single gel visually). The main advantage of them is that both the internal and external phases are structured, allowing them to incorporate the benefits of both phases. The samples were stored for 24 hours at 4°C and then analyzed: texture profile, rheological measurements, polarized light microscopy, FTIR, liquid binding capacity. At the selected concentration of 2%, the emulsifiers used were effective structuring agents, as evidenced by the stability and the absence of phase separation in all bigel formulations. P8 sample formulated with lecithin presented both the highest value of hardness- 16.28 N and adhesiveness- 78.47 mJ. The emulsifier type, the time and rotations used for homogenization and the interaction between factors influence the rheological characteristics of the samples. The rheological profile, showed that the elastic modulus G' was higher than the loss modulus G'' and both moduli increased slightly in the frequency range used (from 0.1 to 10 Hz). The minimum value recorded for the elastic modulus G' was 7736.80 N for sample P13- bigel formulated with Tween 80, while the maximum value was recorded for sample P20- bigel formulated with Polysorbate 20 of 27141N. The liquid phase losses were below 11.24% for all samples. To assess the possible applications, the samples were subjected to mechanical grinding to replicate the mixing process with the ingredients necessary to obtain a confectionery product and then evaluated in terms of stability. The lowest losses were recorded for sample P22 (with Tween 80)-0.42%, respectively sample P3 (with Polysorbate 20)- 0.43%, these being chosen to obtain a spreadable cream (80% bigel, 10% powder sugar, 10% cocoa) due to their high stability. The substitution of conventional fats with the novel bigels food systems represents a promising option in food technology, with the potential to provide nutritionally enhanced products.

B 3.3 Iron oxide nanoparticles carried by probiotics in iron absorption

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Recently, newly generated iron oxide nanoparticles (IONPs) carried by probiotics have been recommended as innovative iron supplements due to their low reactivity and high bioavailability compared to conventional anemia treatments. The present study aimed to investigate the beneficial effect of IONPs with probiotics (average size 10 nm) as new iron supplements for iron deficiency in anemic rats compared with the conventional treatment (FeSO₄). The research included a comprehensive set of tests, including in vitro MRI and electronic microscopy investigations on the human cell line after treatment. Also, the restoration of healthy levels of blood parameters and iron-related protein expressions were investigated to confirm the efficiency of this material as a new drug for anemia. The efficiency of IONPs for treating anemia was sensibly higher when nanoparticles were incorporated into the probiotic bacterium *Lactobacillus fermentum* than in conventional treatment (FeSO₄). Plasma iron, hemoglobin, and hepatic expression of the hormone hepcidin were fully restored to healthy levels after administering IONPs with probiotics. The collective analysis of results points out that *L. fermentum* is a good carrier to overcome the stomach medium and drive IONPs to the intestine, where iron absorption occurs.

B 3.4 Characterization of the chemical composition of the postbiotics obtained from environmental strains of *Levilactobacillus brevis* to serve as promising food biopreservatives

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Due to the detrimental effects of chemical preservatives, there has been an increasing demand for safer, healthier, and natural biopreservatives. Biopreservation refers to the extended shelf life and enhanced safety of food products using natural antimicrobials. The majority of research on biopreservation has focused on the antagonistic interaction between lactic acid bacteria and/or their metabolic by-products and spoilage and pathogenic bacteria. In this context, the study aimed to assess the antimicrobial activity, total phenolic content, organic acid content, and antioxidant properties of the tested postbiotics, as well as preliminary characterization of the proteinaceous nature of some of the components of bacterial extracts. The research material consisted of postbiotics obtained from environmental strains of *Levilactobacillus brevis* B1 and O24 isolated from Polish regional cheese “Bundz” made from sheep’s milk. The antibacterial activity was determined using the agar-based well-diffusion method. The antioxidant potential was evaluated by measuring the total phenolic content and DPPH and ABTS+ radical scavenging activities. Organic acids and sugars were analyzed using an HPLC system. The proteinaceous nature of the part of the substances present in the cell-free supernatants was confirmed by treating them with proteolytic enzymes, pH variation, and exposing them to heat. Partial purification of the produced antimicrobial peptides was done using 80% ammonium sulfate precipitation and ÄKTA pure chromatography system. Their molecular weight was determined by SDS-PAGE. All the prepared *L. brevis* postbiotics contained phenols and exhibited antioxidant activities in the DPPH and ABTS+ radical scavenging assays. Lactic acid and acetic acid were the most dominant exuded intracellular components in the tested samples. All the tested bacterial preparations were able to inhibit the indicator strains constituted of foodborne pathogens and spoilage microorganisms belonging to either Gram-positive or Gram-negative bacterial groups. pH neutralization of the supernatants narrowed but did not inhibit their antimicrobial activity. Additionally, based on the influence of different proteases’ treatments on the antimicrobial activity and stability under a broad range of pH (2–10), and temperature (80C), possibly some of the antibacterial substances synthesized by the tested strains could be of proteins, such as bacteriocins. Regarding the SDS-PAGE profile, the secreted bacteriocins have a molecular weight of approximately 14 kDa. Our results indicate that postbiotics obtained from *L. brevis* B1 and O24 strains have promising antibacterial features based on the inhibitory effect of organic acids and protein substances and could be potentially used for developing bio-control formulations to minimize pathogens’ contamination and improve food safety measures.

B 3.5 Preparation and physicochemical characterization of composite alginate/casein biopolymer microparticles containing Bifidobacterium BB-12

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Ionic gelation, as an encapsulation technique, exhibits significant promise in protecting probiotics when introduced into dairy products with challenging conditions for their viability. The primary aim of this investigation was to generate composite microparticles of probiotic alginate/casein using the ionic gelation method, employing an optimal concentration of calcium ions. The study also aimed to assess the viability of the probiotics, specifically Bifidobacterium BB-12, and their release at specific time intervals. The results showed that Bifidobacteria BB-12 survived the encapsulation process and that their viability and activity were preserved. Zeta sizer measurements have determined that Bifidobacterium BB-12 cells remain negatively charged even at the highest concentration of calcium ions but they start to form aggregates as their charge decreases. FTIR analysis of composite microparticles composed of alginate, casein, and Bifidobacterium BB-12 revealed that the primary interaction among biopolymers, calcium ions, and Bifidobacteria BB-12 is predominantly electrostatic, with a notable influence of hydrogen bonds. Microscopic examination revealed the formation of spherical-shaped composite biopolymer microparticles. Subsequent drying and water loss induced a significant alteration, not only in shape but also in size. The surface exhibited wrinkling and numerous cracks, attributable to the dehydration process. These prepared composite microparticles offer an advantageous environment for the viability and proliferation of probiotic bacteria, facilitating their gradual release over an extended duration. This attribute is particularly crucial in the production of functional dairy products. Therefore, the research illustrated that the ionic gelation encapsulation method could be regarded as a viable technology for safeguarding, applying, and regulating the release of probiotics in dairy products.

B 3.6 Unveiling the Potential of Novel Foods through Proteomics and Molecular Modeling: evidence synthesis

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The rapid expansion of the global population necessitates the exploration of novel food sources to ensure sustainable food security. This study pioneers the integration of proteomics, molecular modeling, and dynamics simulations to investigate the nutritional and functional potential of underexploited and novel food sources. Our research aims to uncover the molecular basis of the nutritional value, allergenicity, and bioactive properties of these novel foods, thereby facilitating their incorporation into the global food supply. Methods: We employed evidence synthesis based on cutting-edge in silico proteomic techniques to profile the protein compositions of selected novel foods, followed by molecular modeling and dynamics simulations to predict their interactions with human digestive enzymes and gut microbiota. Additionally, in silico analyses were conducted to assess the allergenic potential and bioavailability of the identified proteins and peptides. Results: Preliminary findings indicate that certain novel foods contain unique proteins and peptides with potential health benefits, including anti-inflammatory and antioxidant properties. Molecular dynamics simulations revealed a high compatibility of these molecules with human digestive enzymes, suggesting good bioavailability. Moreover, our allergenicity assessments propose a low allergenic potential for the majority of the analyzed novel foods. Conclusion: This study demonstrates the power of combining proteomics with molecular modeling and dynamics to explore the nutritional landscape of novel foods. Our findings pave the way for the development of sustainable and nutritious food alternatives, crucial for addressing the growing demands of the global population. Future work will focus on validating these in silico predictions with in vitro and in vivo studies to further assess the safety, functionality, and nutritional benefits of these foods.

B5. Horticulture, Bioeconomy, and Landscape architecture

B 5.1 Vineyard Vulnerability: Grapevine Fruitset Under Advers Climatic Conditions

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At SCDVV Blaj - Târnavă vineyard, the 2023 vintages, showed a considerable percentage of abnormal developed berries. This phenomenon known as millerandage, is a potential viticultural hazard problem because it can cause yield drops and also may have a negative impact on the wine quality. The present manuscript aims to document this phenomenon in the climate change context, the root cause of millerandage being the adverse climatic conditions during the flowering phenophase which leads to poor fertilization of grape flowers. A total of 26 grapevine cultivars were monitored, assessing the frequency and intensity of themillerandage by field observations carried out in two experimental plots from Crăciunelu deJos, in July and September. The first experimental plot (S1) is situated on a plane field at a 244m altitude (46°17'35.85"N 23°84'99.04"E) while the second experimental plot (S2) is situated at 300m altitude on a 5-6% slope (46°18'17.16"N 23°85'67.41"E). The BBCH scale was used for the phenological monitorization emphasizing on the BBCH 65-68 representing the full flowering, BBCH 77-79 representing the end of fruit development and BBCH 81-85 representing the beginning of berries ripening. The adverse climatic conditions observed during the flowering phenophase consisted in low temperatures, high relative humidity levels and heavy rains. Between 6 and 20st of June, the flowering phenophase period, an average temperature of 18.67°C was recorded, the average relative humidity reached 81.33% and the precipitations amount summed up to 76,4 mm/m², 4 of the days registering heavy rains (>10mm/m²). Some of the studied cultivars have been more susceptible to millerandage than others. Cultivars like Ezerfurtu, Fetească regală, Napoca, Riesling de Rhin, Fetească neagră, Someșan registered a millerandage grade of 33,1% (Someșan) up to 43,3% (Ezerfurtu) meanwhile cultivars like Brumăriu, Radames, Pinot noir, Pinot gris, Muscat Ottonel and Neuburger were slightly affected (around 1% millerandage grade). Due to a great variability of the data (even within the same cultivar) non-parametric statistical methods were used. The results showed significant differences between the two experimental plots – higher millerandage percent was recorded in S2. Also, significantly higher millerandage percent was recorded in July, which means that the development of the normal berries covers and hides the abnormal ones within the cluster.

B 5.2 Effect of *Trichoderma* spp. on flowering and quality of *Tropaeolum majus* L. ‘Spitfire’

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The aim of the study was to compare the influence of three fungal species of the *Trichoderma* genus (*T. aureoviride* Rifai – Ta8, *T. hamatum*/Bonord/Bainier – Th15, and *T. harzianum* Rifai– Thr2) on the quality, flowering, and nutritional status of the *Tropaeolum majus* L. ‘Spitfire’. Fungi of the *Trichoderma* genus are widely distributed in the environment. They are present in all climatic zones and inhabit a variety of ecological niches. The most common habitats for *Trichoderma* spp. include decaying wood, soil, and, above all, the rhizosphere. Seeds of the ‘Spitfire’ cultivar were sown in multi-pot trays (2×2 cm). Due to their photosensitive nature the seeds were covered only with a thin layer of sifted sand. One month after sowing the seeds, the young plants were planted in pots with a diameter of 9 cm. Each species of the fungi was used on two dates: after sowing the seeds (5 ml per pot in a tray) and/or after planting the plants in the pots (20 ml per plant). The plants which after sowing the seeds were grown without *Trichoderma* spp. were used as the control sample. The three species of *Trichoderma* spp. fungi influenced the flowering, quality, and nutritional status of the *Tropaeolum majus* ‘Spitfire’ plants. Early flowering was influenced only by *T. hamatum*, which delayed it by 6 days. *T. aureoviride*, *T. hamatum*, and *T. harzianum* stimulated the flowering of the ‘Spitfire’ cultivar, but did not affect the size of their flowers. The plants treated with *T. harzianum* after being planted in the pots flowered most abundantly. *Trichoderma* spp. caused the plants to grow more intensively, produce longer and more leafy shoots with a greater number of lateral shoots. The plants treated with *T. hamatum* and *T. harzianum* after planting in the pots grew most intensively. Those treated with *T. harzianum* had the most lateral shoots. The fungi of the *Trichoderma* genus stimulated the uptake of macronutrients, except for phosphorus (P), with calcium (Ca) and sodium (Na), a phenomenon only observed in plants treated with *T. aureoviride* and *T. hamatum*, and magnesium (Mg) when *T. hamatum* was applied only to sown seeds. As far as the micronutrients are concerned, *Trichoderma* spp. stimulated the uptake of zinc (Zn) and manganese (Mn). Apart from that, there was higher iron (Fe) content in the plants treated with *T. harzianum* on both dates and *T. aureoviride* – after planting the plants in the pots.

B 5.3 Influence of apical leaf removal on phenolic composition of 'Svrdlovina' grapes

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'Svrdlovina' is Croatian autochthonous red wine grape variety from Zadar wine-growing region, unjustly neglected lately. Beside that, climate changes affect non-simultaneous synthesis of soluble solids and polyphenols in grapes. High air temperatures also lead to the appearance of overripe aromas in the wines of black grape varieties. That is why traditional canopy management techniques are increasingly investigated. Apical leaf removal is one of those techniques performed in aim to delay grape berry ripening by limiting grapevine photosynthesis, but also with aim to avoid negative impact on desirable berry composition. In this trial, apical leaf removal carried above the cluster zone at veraison was carried out to investigate its effect on yield components and basic chemical composition of grapes (total soluble solids, titratable acidity and pH), as well as the polyphenolic composition of 'Svrdlovina' grapes grown in the Zadar wine-growing region. Five photosynthetically active leaves were removed manually starting from 7th node and above. Apical leaf removal did not affect yield components, total soluble solids and titratable acidity content. On the other hand, it affected decrease of total polyphenols, total anthocyanins and almost all individual anthocyanins. The results obtained indicate the need for further research of apical leaf removal technique.

B 5.4 Quantifying Green: Analysis and sustainable development of green spaces in Bucharest, Romania

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In the ever-evolving urban fabric of Bucharest, Romania, a city marked by continual metamorphosis, there is a growing recognition of the importance of environmental considerations. This research delves into the interconnectivity of green spaces within the city, with the goal of providing valuable insights and actionable recommendations to optimize their integration. The primary objective of this study is to evaluate the current status of green spaces in Bucharest and understand their role in fostering overall landscape connectivity. Green spaces are pivotal in enhancing urban life quality, offering recreational areas, fostering biodiversity, and mitigating the negative impacts of urbanization. The mapping of these spaces' connectivity will illuminate their distribution, accessibility, and potential linkages. To achieve these goals, advanced mapping techniques, satellite imagery, and Geographic Information System (GIS) technology are employed for a comprehensive analysis of the spatial distribution of green spaces throughout Bucharest. The research considers factors such as size, proximity, and accessibility to identify key nodes and corridors that facilitate landscape connectivity. Additionally, the study evaluates the ecological and social benefits associated with these green spaces. Ultimately, this research seeks to be a valuable resource for urban planners and decision-makers, advocating for a holistic approach to urban development that prioritizes environmental sustainability and the well-being of the city's residents. By providing a nuanced understanding of existing green spaces and proposing potential enhancements, this study aims to contribute to a more ecologically conscious and socially inclusive urban environment in Bucharest.

B 5.5 Controlling the vase life of cut peony flowers

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Peony flowers, belonging to the genus *Paeonia*, are renowned for their exquisite beauty, diverse forms, and cultural significance. With a rich history spanning centuries and a wide-ranging geographical distribution, these perennial flowering plants have captured the admiration of horticulturists, artists, and enthusiasts alike. The history of peony cultivation dates back thousands of years, with origins in Asia, Europe, and North America. Revered in Chinese culture for centuries, peonies have been associated with prosperity, honor, and romance. Peony flowers play a crucial role in the horticultural industry. Their popularity in gardens and landscapes is evident, with enthusiasts and growers cultivating a wide array of cultivars. The economic importance of peonies extends to the cut flower market, where their ornamental value contributes to the floral industry's vibrancy. The good cultivation practices of peony flowers can be related to soil requirements, climate considerations, and growth management strategies that might impact the quality of cut flowers intended for market distribution. In addition, the influence of cutting methods on the vase life of peony flowers and different cultivars exhibits varying responses to post-harvest conditions, emphasizing the need for tailored approaches. A range of post-harvest treatments, including solutions, preservatives, and innovative approaches, provide a comprehensive overview of their effectiveness in extending the vase life of cut peony flowers. This review synthesizes current knowledge on the production, economic importance, cutting, cultivar dependency, storage, and post-harvest treatments of cut peony flowers. By integrating insights from various studies, the article aims to guide practitioners in the floral industry towards informed decisions and sustainable practices for maximizing the quality and longevity of cut peony flowers in the market.

B6. Veterinary Medicine – Preclinical and Clinical Sciences

B 6.1 Prevalence and antimicrobial susceptibility test results of the isolated bacterial strains from dogs with diagnosed ear infections

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Ear infections in dogs are commonly presented diseases in the small animal practice. The etiology is multifactorial, while causative agents, such as bacteria and yeast, often worsen the course of these diseases, isolated independently or in mixed infections. Due to the frequent bacterial occurrence, the use of antibiotics is high, while often can be misused. Moreover, it is considered that unreasonable use of conventional drugs represents one of the reasons for increased growth of antimicrobial resistance and the emerging of drug- and multidrug-resistant strains. Hence, the objective of this study was to determine the prevalence of isolated causative agents from dogs with diagnosed ear infections (otitis externa and otitis media) and to determine the antimicrobial susceptibilities of the isolated strains. As part of this research, sampling was done at the Veterinary Clinics for Small animals at the Department of Veterinary Medicine, University of Novi Sad, Serbia in the period of one year (from January 2023 to January 2024). From 45 dogs that were previously clinically and otoscopically examined, samples were taken and then sent to be microbiologically tested. Isolation of the pathogens was carried out using conventional methods under aerobic conditions, while yeast and bacterial identification was done by microscopic method and commercial biochemical tests, retrospectively. The disc diffusion method was used for evaluation of the bacterial sensitivity to antimicrobials. Out of 40 positive samples (88.88%), 59 pathogens were isolated. Mixed infections by yeast and bacteria were present in 19 cases (42.22%), while solo infections by these pathogens were recorded in 9 (20%) and 12(26.67%) cases, respectively. Furthermore, from total number of positive samples, *Malassezia pachydermatis* was present in 28 (70.00%) cases, while the most common isolated bacterial strains were *Staphylococcus pseudintermedius* (50%) and *Pseudomonas aeruginosa* (20%). The antibiotic with the highest effectiveness against gram-positive bacteria was amoxicillin with clavulanic acid with only one isolate resistant (94.74%), while for gram-negative bacteria, it was gentamicin (83.33%). On contrary, staphylococci showed the greatest resistance against clindamycin and sulfamethoxazole-trimethoprim (52.63%), while for gram-negative penicillin and tetracycline proved to be the least effective (91.67% resistance). In addition, 58.62% of bacterial isolates have shown resistance to more than three antibiotics. The study results emphasize the need for regular susceptibility testing. Furthermore, implementation of antimicrobial guidelines through the One Health concept maybe one of the possible solutions to mitigate antimicrobial resistance. However, due to the existing variations in the antimicrobial sensitivity patterns of isolated bacterial stains at local level, differences in drug accessibility and registered drugs for veterinary use, each country should establish its own guidelines, following, of course, world recommendations of experts in this field.

B 6.2 Insights into the critically important antimicrobials for human use in the antimicrobials used in the bovine mastitis treatment in Serbian dairy farming

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Mastitis is recognized worldwide as a leading indication for antimicrobial treatment in dairy cows. Yet, concerns rise over widespread antimicrobial use in dairy farming, while non-prudent antimicrobial use in food producing animals is considered to contribute to the emergence of antimicrobial resistance (AMR), with a potential impact on both animal and human health. In addition, some classes of the antimicrobials that are widely used in the humane medicine, are used in the veterinary medicine also, representing an additional global concern related to the protection of the public health. Thus, controlling AMR involves judicious use of antimicrobials in the veterinary medicine, particularly those that are critically important for productive animals. Given the global importance of AMR and the prevalence of bovine mastitis, this study aimed to summarize critically important antimicrobials for human use in the bovine mastitis treatment. The data on treatment protocols were obtained from the veterinarian's computerized database for 100 lactating cows diagnosed with the clinical form of mastitis, on selected Serbian dairy farm. The data on the conducted therapeutic protocol were collected for a period of 1 year (May 2021 to June 2022). The most prevalent treatment approach, administered to 93% of cows, involved a combination of procaine benzylpenicillin and dihydrostreptomycin. However, the use of critically important antimicrobials in our study involved administering single-antimicrobial pharmaceutical formulation containing the following active ingredients: cefquinome (Cefimam LC® and Cobactan LC®; 84% and 1%), ceftiofur (Ceftionel 50®, 2%), tylosin (Tilozin 200® and Medilozin®, 37% and 3%), marbofloxacin (Kelbomar®, 32%) and enrofloxacin (Enrocin-S 10%®, 2%). Our study examined intramammary formulations for mastitis combining two or more antimicrobial agents. The combinations included dihydrostreptomycin and neomycin (Tetra delta® and Gamaret LC®, 39% and 1%), both recognized as critically important for human use. In conclusion, the findings underscore the need for judicious antimicrobial use in the veterinary medicine, emphasizing the importance to protect public health and mitigate the challenges posed by AMR in the dairy industry. To ensure that this important therapeutic class is used judiciously in both human and veterinary medicine, veterinary practitioners must be encouraged to limit their veterinary use and improve current practices to prolong their effectiveness.

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