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Section 1.
Biotechnologies in Food Industry

CORNUS MAS L. BY-PRODUCTS

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Abstract: The increasing interest in sustainable resource management has driven the search for innovative strategies to valorize agri-food by-products, including those derived from *Cornus mas L.* As a rich source of bioactive compounds, the by-products of *Cornus mas L.* offer promising potential for transformation into high-value applications within the food, pharmaceutical, and cosmetic sectors. Although *Cornus mas L.* fruits are typically used in their fresh form for various culinary and medicinal purposes, this study focused on the valorization of processed fruits remaining after liqueur production. The presence of residual alcohol in the processed *Cornus mas L.* fruits poses a significant limitation for their direct incorporation not only into animal feed—due to potential toxicity and altered nutritional value—but also into food products, where alcohol content may be undesirable or non-compliant with food safety regulations. In this context, the present research aimed to extract the residual alcohol and repurpose it as a substrate for natural vinegar production. Beyond vinegar production, processed *Cornus mas L.* pulp can be repurposed as a natural filling for desserts, adding both nutritional and functional value. Moreover, dried and ground residues can be incorporated into bakery formulations, either as a flour additive or as a partial flour substitute, offering a promising approach to enhancing the dietary fiber and antioxidant content of baked goods.

Key words: *sustainable valorization, circular bioeconomy, sustainable processing, bioactive compounds, circular economy.*

Acknowledgment: *The research was supported by Institutional Project, subprogram 020405 "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS, being implemented at the Technical University of Moldova.*

THE CRYOPROTECTIVE EFFECT OF WAXY WHEAT FLOUR ON BAKER'S YEAST IN FROZEN DOUGH

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Abstract: The study investigated the influence of waxy wheat flour supplementation on the viability of baker's yeast (*Saccharomyces cerevisiae*) in frozen dough for mini baguettes. Due to its high amylopectin content and enhanced water retention capacity, waxy flour contributes to mitigating cellular damage induced by ice crystal formation during freezing. The results indicated that the addition of 10–20% waxy flour preserved yeast fermentative activity and improved the quality of the final baked products**.** Freezing of leavened dough is a valuable technology in bakery processing; however, yeast viability is reduced due to osmotic stress and the formation of ice crystals. Waxy wheat flour, characterized by an amylose content below 5% and an amylopectin content above 95%, exhibits functional properties that recommend it as a cryoprotective agent.
In the present study, supplementations of 10%, 15%, and 20% waxy flour were tested in the formulation of frozen mini-baguettes stored at −18 °C. The analysis of CO_2 release by yeast demonstrated that samples containing waxy flour exhibited higher values compared to the control sample, even after 56 days of frozen storage. Fermentative activity was positively correlated with texture and specific volume of the mini-baguettes, confirming the protective role of waxy flour on yeast cells. The incorporation of waxy wheat flour into frozen mini-baguette dough enhances yeast resistance to thermal stress, maintains cellular viability, and ensures superior sensory attributes of the final product. This flour can be successfully employed as a cryoprotective ingredient in modern baking.

Key words: *fermentative activity, frozen storage, Saccharomyces cerevisiae, viability*

FROM WASTE TO VALUE: DEVELOPMENT OF WHEY BEER AS A LOW-ALCOHOL FUNCTIONAL BEVERAGE

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Abstract: Whey, a by-product of curds or cheese production, is a valuable resource that can be used in beverage manufacturing. Whey beer is a viable solution for valorisation, as it adds freshness, balance, and contributes to sustainable recovery of by-products from the dairy industry. Fir buds bring freshness, a resinous aroma, tonic effects, vitamin C and essential oils, and high-quality malt offers taste, color, and natural antioxidants. Whey beer was obtained using a conventional method, including mashing, filtration, boiling, cooling, fermentation, maturation, pasteurization, and bottling. Deproteinized whey was replaced with 30% of water in the manufacturing recipe, and a proportion of raspberries, elderflowers, and fir buds were introduced for sensory improvement. The whey beers were analyzed for real extract, apparent extract, alcohol content, carbon dioxide content, color, pH, and bitterness value using EBC-methods. The highest score was achieved in variant 3, whey beer with fir bud syrup. Whey beer presents distinct sensory, functional, and ecological characteristics, blending food innovation, the valorization of renewable resources, and the circular economy. Whey alcoholic beverages are suitable for a broader range of consumers due to their low lactose content, reduced allergenicity, extended shelf life, and enhanced antioxidant activity.

In conclusion, the study proposes obtaining a low-alcoholic beer-type beverage that can be easily reproduced on an industrial scale, from micro-factories to large-capacity production companies, under food safety conditions.

Key words: *beverage, environment, fir buds, dairy industry, valorisation, whey*.

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NUTRIENT-RICH BY-PRODUCTS OF THE FERMENTATION INDUSTRY: QUALITY AND APPLICATIONS

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Abstract: Malting, brewing and winery industries produce different by-products available in large quantities throughout the year and can be utilized in different ways. The second most important by-product from the brewing industry is spent brewer's yeast (SBY) after spent grain, which is still underutilized or must be disposed of despite its nutritional value (about 50% protein, dry weight) and technological promise. Wine lees (WL), the least studied by-product of the winemaking industry, are residues formed at the bottom of wine containers after fermentation, storage, or treatments. Residues from first distillation in malt whisky are known as pot ale (PA) or burnt ale. Pot ale as a light brownish turbid liquid, with acidic pH (below 4) with high concentration of organic materials and solids. These solids are mainly intact yeast, yeast residues, soluble protein and carbohydrates and a significant but variable amount of copper. Pot ale contain important amounts of protein that are currently underutilised. Wine lees contains bioactive molecules (especially fibres and polyphenols) with potential functional properties.

Transforming these by-products into value-added ingredients should take account about their characteristics and constraints. WL, SBY and PA are low-cost, poorly reused by-products of nutrient-rich composition available in large amounts that could be used in more applications.

Key words: *brewer's spent yeast, circular economy, pot ale, reutilization, wine lees*

Acknowledgments: *This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0121, within PNCDI.*

ANTIOXIDANT PERFORMANCE OF LIPOSOMAL CAROTENOIDS UNDER SIMULATED IN VITRO DIGESTION

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Abstract: Carotenoids are essential natural antioxidants with significant roles in preventing oxidative stress–related diseases, including cardiovascular disorders, diabetes, and cancer. Despite their bioactive potential, carotenoids are highly unstable during gastrointestinal digestion, which limits their bioavailability and practical application. Liposomal encapsulation is a promising strategy to improve the stability, protection, and controlled release of carotenoids in functional foods.
This study evaluated the antioxidant activity of liposomal formulations containing carotenoid-rich sea buckthorn extract under simulated gastric (pH 1.8 ± 0.1) and intestinal (pH 8.2 ± 0.1) conditions over 2 hours. Results indicated that encapsulated carotenoids exhibited superior antioxidant activity compared to non-encapsulated extract during gastric digestion. Specifically, the encapsulated lipophilic extract (CLE) showed an initial antioxidant activity of 92.68±0,89%, increasing to 94.65±1.15% after 2 hours, compared to the free extract (LE) with 87.58± 1.35% rising to 90.13±0.65%. This confirms the protective role of liposomes in acidic environments and the enhanced stability of carotenoids.
In contrast, under intestinal conditions, antioxidant activity declined for all samples, with liposomal formulations showing lower stability. The CLE sample decreased from 24% to 21% after 2 hours, while the non-encapsulated extract (LE) declined from 37% to 33%. These findings suggest that although liposomal encapsulation enhances carotenoid stability in acidic environments, optimization of liposomal systems is required to improve their performance in alkaline conditions.

Liposomal encapsulation represents an effective approach to preserve carotenoids during gastric digestion and increase their bioavailability. Further development of more stable formulations may contribute to the application of carotenoid-loaded liposomes in functional food products.

Key words: *antioxidant activity, carotenoids, gastrointestinal stability, liposomes, sea buckthorn*

Acknowledgment: *The research was supported by the State Project for Young Researchers **25.80012.5107.10TC** "Stabilization of Plant-derived Bioactive Compounds by Liposomal Encapsulation", running within Technical University of Moldova.*

VALORIZATION ON SEA BUCKTHORN THROUGH THE DEVELOPMENT OF INNOVATIVE TECHNOLOGIES FOR OBTAINING FUNCTIONAL FOOD

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Abstract: Reducing and valorizing by-products and food waste are key challenges for the agro-industrial sector and central to the circular economy transition. Poor management of these major global waste streams harms the environment, making zero-waste strategies essential to more sustainable agri-food systems. In this context, the implementation of zero waste principles is recognized as an essential strategy for increasing the sustainability of agri-food systems. The novelty and relevance of this study derives from its alignment with international initiatives to promote circular economy practices and reduce food losses and waste, while valorizing an underexploited biological resource in order to obtain food products with high nutritional and functional value. The paper proposes a full utilization of sea buckthorn biomass through a set of innovative technologies aimed at the development of functional and sustainable food products. More specifically, sea buckthorn juice is used as the main ingredient for the formulation of a sparkling alcoholic beverage obtained from deproteinized whey – a valuable by-product of the whey cheese manufacturing process. The by-products resulting from juice are processed using advanced technologies and subsequently incorporated into food products of animal origin, including dairy and meat products. The aim of the research is to develop minimal waste processing chains, based on the integration of innovative technologies in order to obtain food products with high added value and an optimized functional profile. From an economic perspective, the approach aims at the complete use (100%) of plant raw materials and by-products resulting from processing, reducing losses and creating new opportunities for valorization in the circular economy.

Key words: *circular economy, food losses, value-added products, zero waste*

HAZELNUT-BASED ALTERNATIVE TO DAIRY IN FUNCTIONAL ICE CREAM FORMULATIONS FOR LACTOSE-FREE CONSUMERS

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Abstract: This study evaluates the technological feasibility and nutritional performance of replacing cow's milk with hazelnut-based ingredients in the formulation of functional ice cream designed for lactose-intolerant consumers. Building upon prior research on plant-based milk alternatives, the experimental work focused on hazelnut beverage (3.5% fat) and hazelnut cream (30% fat) as natural substitutes for milk and dairy cream. Nine hazelnut-based formulations were developed and compared with a conventional dairy control sample, under identical technological conditions—high-speed homogenization, 12-hour maturation at 2–5 °C, and freezing at −18 °C. Comparative analysis revealed that hazelnut formulations presented lower energy density (98–318 kcal/100 g vs. 187–301 kcal/100 g for dairy samples) and a favorable lipid profile, characterized by reduced saturated fats and increased unsaturated fatty acids. Although the protein content was slightly lower (1.0–6.6 g/100 g vs. 2.5–12.4 g/100 g in dairy), the hazelnut matrix contributed valuable amino acids and antioxidant compounds absent in traditional milk. Physico-chemical assessments (pH, titratable acidity, °Brix, FT-IR spectroscopy) and rheological measurements confirmed comparable colloidal stability and pseudoplastic flow behavior between plant-based and dairy formulations. Sensory evaluation indicated that samples containing higher proportions of hazelnut cream achieved superior scores for creaminess, aroma, and overall acceptability, approaching those of the conventional control. The absence of lactose, combined with the enhanced nutritional quality and sustainable origin of the ingredients, positions hazelnut-based matrices as a promising alternative for the development of lactose-free, functional ice cream. Future research will focus on optimizing formulation parameters and enriching prototypes with probiotic and prebiotic ingredients to further enhance their health-promoting potential.

Key words: *antioxidants, alternatives, cream, intolerance, milk plant-based.*

APPLICATION OF DIFFERENTIAL SCANNING CALORIMETRY (DSC) IN IDENTIFYING ADULTERATION OF COLD- PRESSED WALNUT OIL WITH REFINED SUNFLOWER OIL

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Abstract: Authentication of cold-pressed walnut oils is a key strategy for enhancing their value and a way to preserve walnut biodiversity. One of the most important issues related to the quality of walnut oil is adulteration through the addition of lower-priced oils. In this context, the present study aimed to evaluate the usefulness of combining Differential Scanning Calorimetry (DSC) analysis with Gas Chromatography–Mass Spectrometry (GC-MS) fatty acid composition analysis to detect walnut oil adulteration with sunflower oil in proportions of 5%, 10%, 20%, 30%, 40%, and 50%. Each oil composition exhibited distinct thermal profiles, which were identified through DSC analysis. Walnut oil showed a crystallization onset temperature (T_{onset}) of –41.53 °C and an enthalpy of 21.61 J/g, indicating a high content of saturated and monounsaturated fatty acids specific to walnut oil. In comparison, sunflower oil displayed a significantly lower crystallization enthalpy (5.22 J/g) and a higher T_{onset} (–40.52 °C), suggesting a different lipid profile characterized by a higher content of polyunsaturated fatty acids. As the proportion of sunflower oil increased in the mixtures, gradual changes in thermal parameters were observed. Samples containing 40% and 50% sunflower oil showed low crystallization enthalpy values (5.43 J/g and 6.06 J/g, respectively), clearly exhibiting thermal characteristics specific to sunflower oil, which indicates its dominant influence at higher substitution levels. This trend confirms that thermal parameters can serve as sensitive indicators of the authenticity of vegetable oils and can accurately reveal adulteration of walnut oil with other types of oils. GC-MS analysis further showed that the fatty acid composition of walnut oil differs from that of sunflower oil. Linoleic acid is the main fatty acid in walnut oil, followed by oleic, linolenic, palmitic, and stearic acids.

Key words: *fatty acids, authenticity, food control, DSC, adulteration, cold-pressed walnut oils*

EFFECTS OF GERMINATED BUCKWHEAT FLOUR ADDITION ON DOUGH RHEOLOGICAL PROPERTIES DURING EXTENSION AND FERMENTATION

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Abstract: The majority of the population consumes bread every day. Unfortunately, the varieties on the market contain more and more additives, and in addition, white wheat bread is nutritionally depleted due to the refining process. The aim of this study was to highlight the possibility of using germinated buckwheat flour (BGF) as an addition to the white bread making recipe, in order to improve it from the nutritional point of view, without negatively affecting the quality attributes. For this study, the buckwheat grains were germinated for two and respectively for four days. In order to grind germinated buckwheat grains, firstly they were subjected to the lyophilisation process and was used a non-additive wheat flour from a local company. The dough was obtained using BGF in varying doses (5%, 10%, 15% and 20%). To highlight the effect of the BGF addition on dough characteristics, alveographic tests and reofermentometric tests were performed. The alveographic test showed that small percentages of BGF addition are recommended for obtaining optimal samples. The decrease in the values of the P, L and W parameters, which occurred especially at higher percentages of BGF addition, is a consequence of the fact that it replaced part of the gluten in the dough matrix. The rheofermentometric test indicated that at an additional percentage of BGF 2.5%, the values of the H'm, VT, VR parameters increased, which was attributed to the improvement of the fermentation process, but also to the better ability of the dough to retain gases in the system. At an BGF addition of 5% and 7.5%, respectively, a gradual decrease in these values occurred, probably due to the fact that the gluten network was weakened due to the replacement of wheat flour. Thus, it can be concluded that from the point of view of the rheofermentometric test, low percentages of the addition of germinated buckwheat flour are recommended.

Key words: *alveograph, buckwheat, dough, germination process,* lyophilisation, *rheofermentometer*

A REVIEW OF UNCONVENTIONAL YEAST IN THE BAKERY SECTOR

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Abstract: The transition to meals of the future starts with subtle but creative substitutes, and yeast is surprisingly involved in this change. *Saccharomyces cerevisiae* has long dominated the baking sector because of its consistent and dependable fermentation. However, interest in unusual yeast species has increased due to the growing demand for baked foods that are artisanal, nourishing, and environmentally friendly. The potential of alternative yeasts like *Torulaspora delbrueckii, Candida milleri, Pichia anomala,* and *Yarrowia lipolytica* to improve bakery procedures is highlighted in this paper. Because of their unique metabolic characteristics, these species are able to produce complex fragrance and flavor compounds that enhance the taste and texture of bread, such as esters, higher alcohols, and organic acids. Their industrial attractiveness is further supported by their resilience to stressors like high temperatures, excessive sugar, or salt, as well as their capacity to ferment a variety of substrates. However, problems still exist: unconventional yeasts sometimes have a lower capacity for leavening, are more susceptible to processing, and lose volatiles when baked. Nevertheless, hybrid fermentations that combine traditional and non-traditional yeast have the potential to improve dough performance and final product quality. All things considered, the use of these substitute yeasts in baking is a progressive strategy that fits with consumer demands for sustainable and healthful solutions while providing chances for product innovation.

Key words: *bakery products, nutrition, osmotolerance, Saccharomyces cerevisiae, stress tolerance unconventional yeast.*

FOOD SECURITY STATUS AND DIETARY INFLAMMATORY POTENTIAL: LINKING NUTRITION EPIDEMIOLOGY WITH BIOTECHNOLOGICAL INNOVATION

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Abstract: Food insecurity is a persistent public health challenge that shapes dietary behaviors and contributes to inflammation-related chronic diseases. This study examined the association between food security status (FSS) and the Dietary Inflammatory Index (DII) in a nationally representative U.S. sample (NHANES 2011-2018; n=19,908 adults). FSS was categorized as secure, marginal, low, or very low. DII scores were calculated from two 24-h dietary recalls, reflecting the inflammatory potential of the diet, where negative scores indicate anti-inflammatory and positive score indicate pro-inflammatory diets (range -5 to +5). The overall mean DII score was 0.84 ± 1.95. DII scores increased progressively with lower FSS: DII among adults with food secure 0.65 ± 1.94 to 1.37 ± 1.91 for very low food security. Multivariate models adjusted for sociodemographic and anthropometric factors, confirmed that lower FSS independently predicted higher DII ($\beta = 0.094$, $p < 0.001$). These findings highlight how socioeconomic barriers restrict access to nutrient-dense foods rich in anti-inflammatory compounds such as polyphenols, omega-3 fatty acids, and antioxidants. To address these disparities, food system innovations can play a pivotal role in enhancing the availability, affordability, and functional quality of foods. Approaches such as biofortification, fermentation, and plant-based formulations can increase the nutrient and phytochemical content of staple foods while maintaining accessibility for food-insecure populations.

Expanding the development of fortified and functional foods with anti-inflammatory potential, coupled with equitable pricing and distribution, may help mitigate inflammation-related disease risk. Integrating nutritional epidemiology insights (e.g., DII patterns) with biotechnological advances provides a framework for creating resilient, equitable, and health-promoting food systems. Collaboration between nutrition science, biotechnology, and public health policy will be essential to ensure that innovation benefits those most affected by food insecurity.

Key words: *biotechnology, dietary inflammation index, dietary patterns, food innovation, food security, public health.*

A REVIEW ON HAZELNUT BY-PRODUCTS: A VALUABLE SOURCE OF BIOACTIVE COMPOUNDS

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Abstract: This study provides an overview of the current scientific data regarding hazelnut by-products and their valorization for optimizing population health. Hazelnut processing generates a large number of by- products, such as the hazelnut shell, hazelnut skin, husk, and leaves. The analysis focuses on the biochemical composition of these materials with the aim of fully exploiting their potential for human health.

The specialized literature lists a range of phenolic compounds extracted from hazelnut shells that prevent many human diseases as a result of their antioxidant properties. The by-products are rich in bioactive compounds, phytosterols, vitamins, minerals, and compounds such as taxanes (paclitaxel), which play a role in inhibiting cancer cell proliferation. The presence of polyphenols and dietary fibers offers, in addition to antioxidant and antibacterial properties, important prebiotic sources and also possible antiparasitic properties.

Given that these by-products often end up being treated as waste, it is essential to integrate extraction techniques for bioactive substances to increase their value and expand their applications in human health. Thus, the integral valorization of hazelnuts, including their by-products, is particularly important, transforming them into bioactive substances with increased health potential and expanding applications in the food, cosmetic, and pharmaceutical industries

Key words: *antioxidant properties, bioactive compounds, hazelnut by-products, human health, phenolic compounds, valorization*

BEAD MILLS IN PHARMACEUTICAL AND BIOTECHNOLOGY PRODUCTION

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Abstract: The cells of mycelial fungi, yeast, unicellular algae and bacteria contain valuable components, for example, proteins, polysaccharides, lipids, enzymes, biodegradable polymers, vitamins, amino acids, and also produce the substances with therapeutic properties. The method of disruption of cells of microorganisms in the bead mills is used mainly for mycelial fungi, yeast and certain types of unicellular algae, with the aim of their further separation into liquid and solid phases and extraction of valuable components.

The bead mill consists of the following main parts: working chamber; working elements; working bodies (beads); bead separator; cooling jacket of the working chamber; suspension circulation system; suspension cooling system; drive of working elements; drive of the bead separator; frame; fixing device of the working chamber.

The orientation of the working chamber – vertical, horizontal and conical affects its functionality and slightly affects productivity.

The working elements of bead mills are discs, fingers or turbines. Disc working elements can have a flat surface or grooves (gaps) – blind and through, straight and complex, usually spiral-shaped. The main purpose of the grooves is to create intensive circulation of beads in the working chamber of the mill. The rotational speed of the working elements of the bead mill is usually 1000–2500 rpm.

The diameter of beads for disruption of the microbial cells is usually 0.4–0.6 mm; the turbine-type working elements allows the use of a smaller bead size. The slot, cartridge and centrifugal separators can be used for separation the processed suspension of microorganisms from the beads. Most often, a combination of a cartridge and centrifugal separator is used.

Keywords*: beads, cell, destruction, microorganism, mill, structure.*

EFFECT OF TABLET DENSITY ON ITS STRENGTH AND COMPRESSION FORCE

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Abstract: The aim of the research was to determine the effect of tablet density on its strength and compression force. Cylindrical tablets based on microcrystalline cellulose and lactose monohydrate (10 mm diameter, 3 mm height) were tested for destructive stress during diametrical compression. The tablet strength exhibited a complex dependence on density, characterized by three zones. In Zone I, strength increased proportionally with density; in Zone II, it rose more rapidly, following a parabolic trend. The transition from Zone I to Zone II occurred at a tablet density of 2 g/cm³. For some materials, Zone I was less pronounced, and the overall dependence could be approximated as parabolic, with higher density enhancing strength more intensively. In Zone III, the increase in strength slowed and, beyond a certain density, began to decline. The maximum strength of the studied tablets was 4.6 MPa, while the recommended working range was 1.5–3 MPa. At densities above 4 g/cm³, strength decreased and delamination occurred. Tablets with densities below 1.6 g/cm³ had insufficient strength, crumbling during handling or abrasion testing, and were unsuitable for coating, packaging, or transportation. The obtained data on tablet strength and compression force are essential for optimizing pressing parameters and for the design of pressing units and drives, since excessive force fluctuations cause unstable machine operation.

Key words: *Tablet, Press, Strength, Quality, Force*

Section 2
Applied Engineering Sciences

SHEEP'S MILK FROM BOTOȘANI, ROMANIA – NUTRITIONAL VALUE AND OPPORTUNITIES FOR THE LOCAL COMMUNITY

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Abstract: Understanding the chemical and physical components of milk is essential for assessing its nutritional value and consumer acceptance. Compared to cow's and goat's milk, sheep's milk is richer in fat (particularly short- and medium-chain fatty acids), proteins and minerals, while containing lower levels of lactose. Its fat fraction differs not only quantitatively, but also qualitatively from that of bovine milk. Moreover, sheep's milk is an important source of bioactive compounds with beneficial health functions. Given its medicinal and therapeutic potential, the future of sheep's milk lies in the development of cost-effective functional foods that meet the needs of urban populations, whose lifestyles are rapidly changing, and that contribute to the management of various health conditions.

This study highlights the significant potential of sheep's milk and its bioactive compounds in therapeutic applications, including wound healing, functional nutrition and chronic disease management. A case study was conducted on local production practices at a family-owned sheep farm in Ungureni, Botoșani County, Romania. Established in 1990 with 50 animals, the farm has grown to 490 heads by 2025, illustrating both the challenges and opportunities of sustainable local development in the dairy sector.

Keywords: *Bioactive compounds, Functional foods, Local development, Nutritional value, Sheep's milk, Therapeutic potential*

COST-EFFECTIVE MICROBIALLY INDUCED CALCITE PRECIPITATION FOR BIOCEMENT PRODUCTION USING LOW-COST NUTRIENTS AND CALCIUM SOURCES

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Abstract: Biocement production via microbially induced calcite precipitation (MICP) offers a sustainable alternative to conventional cement. Reducing production costs by using low-cost nutrients and calcium sources is key to its large-scale applicability.

Urease-producing bacteria enable MICP by converting urea into carbonate ions that combine with calcium to form calcium carbonate. To obtain a significant amount of bacterial biomass for effective biocementation, a certain amount of nutrients is required, including sources of carbon, nitrogen, phosphorus, and minerals. Using low-cost substrates such as kitchen waste, food industry by-products, and agricultural residues can diminish production costs while providing essential nutrients for bacterial growth.

Calcium ions are crucial for MICP, as they react with bacterially produced carbonate ions to form calcium carbonate, which precipitates in pores under alkaline conditions and strengthens the material. Affordable calcium sources, including eggshells, shellfish waste, and other industrial by-products, can substitute expensive reagents (Yan, 2025).

MICP can produce sustainable biocement when low-cost nutrients and calcium sources are used. This approach reduces production costs while maintaining material performance.

Key words: *biocement, MICP, calcium sources, low-cost nutrients, urease-producing bacteria*

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INFLUENCE OF PENICILLIUM ROQUEFORTI ON THE FORMATION OF FLAVOR AND AROMA COMPOUNDS IN BLUE CHEESE

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Abstract: *Penicillium roqueforti* is a crucial microorganism in blue cheese ripening, responsible for the generation of characteristic aroma and flavor compounds. Its metabolic activity defines the sensory profile of the final product. Studies on the domestication of *P. roqueforti* have revealed that different populations of this species, adapted to various environments, exhibit distinct metabolic profiles. It was established that strains from the Roquefort cheese population demonstrated more efficient proteolytic and lipolytic activity compared with other *P. roqueforti* populations not associated with cheesemaking (isolated from silage and spoiled food), resulting in higher levels of amino acid– and fatty acid–derived metabolites. Methyl ketones (mainly 2-heptanone and 2-pentanone), secondary alcohols, esters, and short-chain fatty acids were identified as key contributors to the characteristic pungent and fruity notes of ripened blue cheese. These volatile and flavor compounds were most abundant in cheeses inoculated with Roquefort strains, reflecting human-driven selection for improved sensory properties finished product (Caron et al., 2021). The influence of *P. roqueforti* on blue cheese flavor and aroma is determined by strain-specific metabolic activity. Strains with higher proteolytic and lipolytic efficiency generate greater amounts of key volatile compounds, shaping the characteristic sensory profile of the final cheese.

Key words: *aroma, blue cheese, flavor, lipolysis, Penicillium roqueforti, proteolysis, volatile*

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DEVELOPMENT OF AN INNOVATIVE BASIS FOR COSMETIC EMULSION PRODUCTS

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Abstract: There are many technologies for extracting valuable components from plant raw materials, but the search for new, more sophisticated methods of obtaining extracts that can be used for the production of emulsion products remains relevant.
For a more complete extraction of various biologically active substances from plant raw materials, a method of extraction using a system of solvents of different polarity – a two-phase extractant system (TPS) – has been proposed.
To obtain mint extract, a two-phase extractant containing a mixture of olive oil and a water-alcohol solution in various ratios was used. The experiments were conducted at temperatures ranging from 40 to 70 °C and at solid-to-liquid phase ratios of 1:10, 1:20, and 1:30, with durations ranging from 30 to 80 minutes.
The effectiveness of two-phase extraction for ensuring deeper extraction of valuable components of peppermint was determined. It was shown that to obtain peppermint extracts using the DSE method, it is effective to use a two-phase extractant with a 70% water-alcohol solution and olive oil.
It has been established that the optimal parameters for the extraction of peppermint using a two-phase extractant are: a hydromodule of 1:20 at a temperature of 60 °C and a process duration of 60 minutes.
The studies showed the effectiveness of using two-phase extraction, which allowed for more efficient extraction of biologically active substances from peppermint.

Key words: *cosmetic, emulsion, two-phase extractant system, TPS, peppermint extract.*

Section 3.
Food Products Quality and Safety

STUDIES ON THE NUTRITIONAL QUALITY OF BREAKFAST CEREALS AVAILABLE ON THE ROMANIAN MARKET

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Abstract: This study evaluated the nutritional quality of 119 breakfast cereal products available on the Romanian market, including cereal bars, muesli, flakes, bran cereals, and cereals with fillings or coatings. Products with and without gluten were compared. Nutritional parameters analyzed included energy value, total fat, carbohydrates, sugars, protein, salt, and dietary fiber. Results revealed substantial variability across cereal types, with cereal bars, muesli, and bran cereals exhibiting the highest energy and fat content per 100 g. Gluten-free products generally showed slightly higher energy and protein levels, while gluten-containing cereals had marginally higher fat and fiber content. Differences between products with and without gluten were otherwise limited. The findings indicate that regulated label information alone may not reliably reflect the overall nutritional quality of breakfast cereals, highlighting the importance of careful interpretation of product labels to inform consumer choices. Breakfast cereals provide a significant source of carbohydrates, contributing approximately 10% of daily caloric intake for adolescents. These results underscore the need for transparent and informative labeling to facilitate healthier dietary decisions.

Key words: *breakfast cereals, carbohydrates, dietary fiber, energy value, fat, gluten, protein*

ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF SELECTED EDIBLE MUSHROOM SPECIES

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Abstract: Edible mushrooms are widely consumed in many countries around the world. Their consumption has increased significantly due to their pleasant taste, ease of availability, and appeal as functional foods, being naturally low in calories, sodium, fat, and cholesterol. Mushrooms are also notable for their high content of proteins, fiber, and vitamins. In addition to their nutritional value, mushrooms are rich in bioactive compounds, including phenolic compounds, terpenes, and steroids.

The aim of this study was to determine the antioxidant and antimicrobial activity, as well as the content of biologically active substances—total polyphenols, flavonoids, and phenolic acids—in 11 species of edible mushrooms collected from the Prievidza locality (280 m a.s.l., Slovak Republic). The species studied were: oak mushroom (*Boletus reticulatus*), spruce mushroom (*Boletus edulis*), aspen bolete (*Leccinum aurantiacum*), edible chanterelle (*Cantharellus cibarius*), trumpet mushroom (*Craterellus cornucopioides*), golden coral (*Ramaria largentii*), Siberian buttercup (*Suillus sibiricus*), cow buttercup (*Suillus bovinus*), sticky buttercup (*Suillus viscidus*), hill buttercup (*Suillus collinitus*), and lemon-yellow buttercup (*Suillus nueschii*).

To assess antioxidant activity, the phosphomolybdenum and DPPH methods were used. The total polyphenol content was determined by a colorimetric method using Folin–Ciocalteu reagent. Total flavonoids were measured spectrophotometrically using a flavonoid–aluminum complex, while phenolic acids were quantified using

the spectrophotometric method with Arnova reagent. Antimicrobial activity was evaluated using the disk diffusion method.
The DPPH method revealed antioxidant activity ranging from 5.5 ± 0.06 to 6.57 ± 0.03 g TEAC/g (TEAC – Trolox equivalent antioxidant capacity), with the highest value recorded in the golden coral. According to the phosphomolybdenum method, the highest antioxidant activity was observed in the hill buttercup (121.7 ± 2.05 g TEAC/g), while the lowest was in the trumpet mushroom (43.36 ± 1.5 g TEAC/g). Golden coral also showed the highest polyphenol content (24.68 ± 0.94 mg GAE/g; GAE – gallic acid equivalents). The hill buttercup had the highest flavonoid content (11.3 ± 0.13 mg QE/g; QE – quercetin equivalents), whereas the aspen bolete had the lowest (0.86 ± 0.02 mg QE/g). The highest content of phenolic acids was again found in the golden coral (18.35 ± 1.14 mg CAE/g; CAE – caffeic acid equivalents). Antimicrobial activity testing revealed that certain mushrooms were effective against *Salmonella enterica* subsp. enterica CCM 3807, *Candida tropicalis* CCM 8223, and *Haemophilus influenzae* CCM 4454. The strongest antimicrobial effects were exhibited by the oak mushroom (5.11 ± 0.11 mm; 8.57 ± 0.14 mm; 4.12 ± 0.09 mm) and the aspen bolete (4.99 ± 0.01 mm; 9.57 ± 0.12 mm; 5.12 ± 0.07 mm). These results demonstrate that edible mushrooms should not be viewed solely as food, but also as valuable sources of natural bioactive compounds. Their antioxidant and antimicrobial properties make them potential candidates for use as natural additives not only in the food industry, but also in pharmaceutical and cosmetic applications.

Key words: *alternative sources, polyphenols, flavonoids, phenolic acids, antimicrobial activity*

Acknowledgment: *This study was supported by the project APVV SK-PL-23-0001 "Edible insects and mushrooms as perspective alternative sources for food industry".*

TOWARDS HEALTHIER BREAD: REDUCING SODIUM INTAKE THROUGH FOOD INNOVATION

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Abstract: Reducing sodium content in bread remains a critical objective in public health nutrition, given the established association between excessive sodium intake and increased risk of diseases. As bread constitutes a significant source of dietary sodium globally, targeted reformulation strategies are essential. A progressive reduction in salt content allows for gradual consumer adaptation, minimizing sensory rejection. Additionally, partial substitution of sodium chloride with lower-sodium alternatives, such as potassium chloride, offers a viable pathway, though its application requires careful optimization due to potential bitterness. Fermentation techniques, particularly those involving sourdough and yeast, contribute to enhanced flavor complexity and can amplify the perception of saltiness, thereby supporting sodium reduction without compromising sensory quality. Furthermore, the incorporation of flavor-enhancing compounds, including yeast extracts, glutamates, and nucleotide-based ingredients, can effectively mimic the taste profile of salt while maintaining low sodium levels. Achieving meaningful sodium reduction in bread and related products demands a synergistic approach that integrates reformulation techniques with consumer education and policy support, fostering long-term improvements in dietary patterns and public health outcomes.

Keywords: *bread, consumer health, sodium chloride, technological processes, sourdough.*

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AROMATIC NOTES AND SENSORY PROFILE OF COFFEE PROCESSED IN SUCEAVA, ROMANIA

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Abstract: Coffee is one of the most consumed beverages worldwide, valued for its stimulating properties and complex sensory profile. In a market where consumers demand quality and transparency, sensory evaluation has become a key instrument for quality assurance, product differentiation, and consumer retention. This study focuses on roasted coffee assortments processed in Suceava, Romania, thus supporting regional production and the development of the national coffee sector.
Four commercial varieties-Mattina Clasic, Mattina Maestro, Guatemala Mayor, and El Salvador-were evaluated for aromatic notes, body, acidity, aftertaste, and balance. A standardized sensory protocol was applied by a trained tasting panel, complemented by a consumer survey addressing origin, brewing method, taste intensity, and health perceptions.
Results showed consistently high sensory quality across all assortments, with brewed coffee generally scoring higher than beans. A strong correspondence was observed between panel evaluations and producers' descriptions, confirming reliable brand communication. Consumers expressed growing interest in specialty products, prioritizing taste, tradition, and transparency, with many indicating willingness to pay a premium for superior quality.
These findings demonstrate that coffees processed in Suceava hold strong competitive potential within the specialty coffee sector. By integrating sensory science with consumer-oriented research, this study offers valuable insights for producers and highlights the role of regional identity as a driver of authenticity, innovation, and market differentiation.

Keywords: *aromatic profile; coffee quality assessment; consumer perception; sensory attributes; specialty coffee; volatile compounds*

EFFECT OF THE HOMOGENISATION METHOD ON THE STABILITY OF 30% MAYONNAISE SAUCE

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Abstract: Recently, there has been a growing trend to replace animal ingredients in food products with plant analogues in order to improve their nutritional value, reduce environmental impact and ensure animal welfare. This trend also applies to the technology of mayonnaise sauce production. However, the replacement of traditional raw materials has a direct impact on the shelf life, consistency, structure and organoleptic quality of mayonnaise sauces [1].

In this research was investigated the effect of mechanical processing on the physicochemical parameters of low-calorie mayonnaise sauces, in particular their particle size and viscosity. The samples were prepared using the same technology, the difference was in the type of processing.

To assess stability, the particle size of emulsions (PSA 1190, Anton Paar) and their rheological properties (Visco QC-300, Anton Paar) were monitored. Figure 1 shows the volumetric particle size distributions for the studied samples in graphic format during storage for 22 days. The researches show that additional treatment causes a decrease in droplet size, but is accompanied by a slight expansion of the volumetric distribution [2].

In terms of average droplet size or percentile D50, the smallest droplet size was achieved with additional ultrasonic treatment, however, when stored for 22 days, the droplet sizes increased for samples 1 and 3, and for the second one remained unchanged, which indicates higher emulsion stability.

It is shown that sample 2 has the highest viscosity in a state close to the rest state (0.1 s-1), however, the viscosity drop during storage is also the largest for it. At high speeds, the viscosity drop for all samples is 31-35% [3].

Determination of the yield point of emulsions showed that sample 2 has the strongest structure (51.4 N/m2), and sample 1 has the weakest (43.1 N/m2). The yield point of sample 3 was 47.1 N/m2. Based on the results presented, centrifugation and ultrasonic treatment can be recommended as additional methods of homogenization of emulsions, which ensure the formation of a stronger spatial structure and positively affect the stability of samples during long-term storage [4].

Key words: *chemical content, wheat, Triticum aestivum, Triticum spelta, Triticum monococcum*

COMPARATIVE STUDY OF SOME PHYSICO-CHEMICAL CHARACTERISTICS OF WHEAT, RICE, AND CORN FLOURS

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Abstract: Wheat flour ensures good taste and high calorific value of foods, but, on the other hand, it has comparatively high gluten content, which is adverse for individuals with gluten intolerance. That is why, despite strong tradition of consuming wheat flour, there is a growing topicality of its partial or complete replacement with other, less-gluten-containing types of flour. Therefore, it seems interesting to study and compare some of the rheological and sensorial parameters of wheat, corn, and rice flour to improve the understanding of the effect of the latter two components on the properties of wheat flour in the context of possible partial substitution of wheat with such less-gluten-containing components. Both possible substituents are widely cultivated and easily available in Ukraine, which facilitates their utilization as additional components of various types of dough.

This study was conducted with unbranded samples of wheat, rice and corn flour, for which the water (WAC), grease/oil (GAC) absorption capacities, and swelling were investigated.

It was found that WAC of rice and corn flour was substantially greater than that of wheat flour, while their GAC did not differ much (Fig. 1). The GAC of 1 g of wheat flour is approximately equal to that of 1 g of rice or 0.75 g of corn flours.

Comparing swelling of similar samples of wheat, rice, and corn flour in a 24-h series, one can see that corn flour shows the most intense swelling, followed by rice, and then wheat flour. Corn and rice flours continue to swell even after 24 h (fig. 2), while wheat compositions start to subside. Intense fermentation and proliferation of microorganisms has been registered in the corn compositions after 48 h.

Basing on the above, the substitution of wheat flour with rice or corn should not adversely affect the texture and porosity of pastry if the dough storage time does not exceed 48 h.

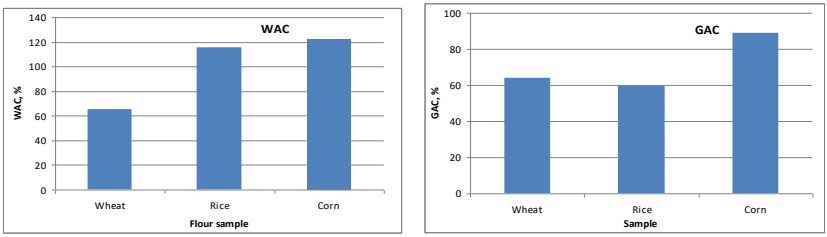

Figure 1. WAC (left) and GAC (right) of wheat, rice, and corn flour.

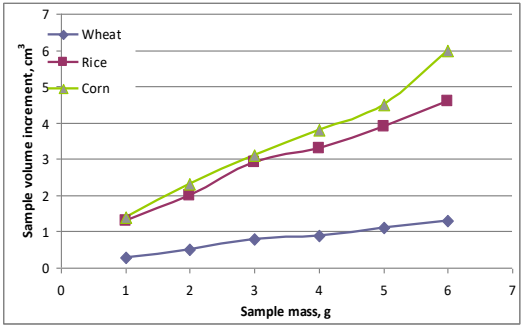

Figure 2. The increment in the sample's volume after a 24-h-long swelling for wheat, rice and corn flours.

Corn and rice have higher swelling capacity, which should not deteriorate the texture and sensorial properties of the end products. However, a less stable gluten matrix and changes in the pastry structure, color, and odor must be considered when adjusting recipes for pastry and other products based on corn/rice/wheat blends.

Since the oil absorption capacities of rice and wheat are very close, replacement of wheat flour with rice is not supposed to affect oil consumption in the technological processes, while adding extra oil can be required in the case of replacing wheat with corn, since its GAC is higher than that of wheat by approximately 25 %.

Key words: *corn flour, grease absorption capacity, rice flour, swelling, water absorption capacity, wheat flour*

DEGRADATION OF FOOD PACKAGING MATERIALS, WITH EMPHASIS ON BIODEGRADABLE PLASTIC, IN DIFFERENT ENVIRONMENTS

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Abstract: In recent decades, the issue of plastic pollution has become one of the most debated topics worldwide, and research attention has increasingly focused on identifying sustainable alternatives. In this context, biodegradable plastics have been proposed as an innovative solution, capable of significantly reducing the negative impact on the environment. This study presents experimental results on the degradation behavior of food packaging made of biodegradable plastic, compared with other commonly used materials – paper, conventional plastic, aluminum, and polyethylene (PE) – in three environments: soil, water, and compost.

The results show that biodegradable plastic exhibits real degradation potential, especially in compost, where mass loss reached approximately 25% after 35 days. In soil, degradation was lower (~16%), while in water it was almost negligible (~7%). By comparison, paper degraded rapidly and completely (100% in soil and compost during this period), while conventional plastic and aluminum remained practically unchanged. Polyethylene showed an intermediate behavior, with around 45% degradation in compost, but much lower in soil and water.

These findings confirm the potential of biodegradable plastics to contribute to the transition towards a circular economy but also highlight their limitations: efficient degradation occurs mainly under controlled conditions, such as those in industrial composting systems.

In conclusion, the research demonstrates that biodegradable plastics show favorable degradation behavior in composting conditions, which recommends them as a viable alternative for food packaging.

Key words: *biodegradable plastic, compost, degradation, food packaging, polyethylene, sustainability*

INFLUENCE OF ETHYLCELLULOSE CONCENTRATION ON THE STRUCTURAL, RHEOLOGICAL, TEXTURAL, AND SENSORY PROPERTIES OF SUNFLOWER OIL-BASED OLEOGELS

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Abstract: The replacement of saturated and trans fats in processed foods remains a key nutritional objective. This study investigates the influence of EC concentration (1%- 3%, w/w) on the structural, rheological, textural, and sensory properties of edible oleogels. Oleogels were prepared by dispersing EC in sunflower oil at elevated temperatures (>150 °C), followed by controlled cooling. At 1% EC, gels exhibited low firmness, poor oil binding capacity (OBC < 85%), and limited structural integrity. Increasing EC to 2% significantly improved mechanical strength, cohesiveness, and OBC (~95%), with rheological analysis confirming gel-like behavior ($G' > G''$) of a stable elastic network. At 3%, oleogels displayed maximum hardness and oil retention (OBC > 98%), but also increased brittleness and reduced spreadability. Instrumental texture profile analysis (TPA) correlated well with sensory evaluation results. Samples containing 2% EC were rated as having acceptable firmness, smoothness, and mouthfeel, showing no significant differences compared to products formulated with traditional fats. In contrast, 1% EC led to excessive softness and oiliness, while 3% was perceived as overly firm or crumbly. These findings suggest that an EC concentration of 2% provides an optimal balance between structural functionality and sensory acceptability. This formulation strategy supports the development of healthier food systems by enabling the partial or total replacement of saturated fats with oleogel-based alternatives.

Key words: *ethylcellulose, oleogel, fat replacement, rheology, texture, sensory evaluation, oil binding capacity*

OLEOGELS AS AN ALTERNATIVE TO SATURATED AND TRANS FATS

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Abstract: According to the guidelines of the European Food Safety Authority and the World Health Organization, fats should represent between 20% and 35% of total energy intake. A minimum level of 20% is necessary to ensure a sufficient intake of energy and essential fatty acids, as well as to facilitate the absorption of fat-soluble vitamins. In terms of composition, trans fatty acids should not exceed 1% of total energy, and saturated fats should not contribute more than 10%. However, compliance with these recommendations is more difficult for the consumer to achieve. To overcome this problem, structured emulsions called oleogels have been designed. Oleogels can be developed using a diverse range of structuring agents, which promote distinct gelation mechanisms at the nano- and micro-scale, thereby generating specific macroscopic properties. According to their molecular weight, oleogelators are divided into low-molecular-weight compounds and polymeric gelators. These structuring agents may be non-triacylglycerol types—such as crystalline particles, self-assembled structures, fibrillar networks, emulsions, polymers, or inorganic compounds—or lipid-based gelators, including waxes, fatty acids, fatty alcohols, and monoglycerides. The formulation and characterization of various oleogels, as well as their application as substitutes for conventional fats, represent a significant area of research aimed at developing innovative food products.

Key words: *fat replacer, food, gelling agents, oleogel, saturated fats, trans fats*.

TOTAL PHOLYPHENOLIC CONTENT AND ANTIOXIDANT POTENTIAL OF WALNUT OILCAKE

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Abstract: The principles of the circular economy (reduce, reuse, recycle) aim to minimize by-products and maximize resources efficiency. Walnut oilcake (WOC), a by-product of the oil extraction process, contain high amounts of bioactive compound (proteins, lipids and fiber) and can be incorporated in both animal and human diets. WOC was grounded and defatted in order to analyze the total polyphenols content and antioxidant activity. Four factors (type of solvent, time, temperature and amplitude used for ultrasound-assisted treatment) were varied to obtain a model of the extraction solutions.

Walnut press cake is an important source of polyphenols and natural antioxidants (699.75 mg GAE/100g and 85.19%). To maximize their extraction, methanol, high temperature, low amplitude, and short extraction time were found to be the most effective conditions. The extract with the highest polyphenol content was analyzed for individual phenolic acids. The phenolic acids identified in WOC, in descending order, were: protocatechuic acid, 4-hydroxybenzoic acid, vanillic acid, caffeic acid, myricetin, quercetin, p-coumaric acid, chlorogenic acid, luteolin, and rosmarinic acid.

Walnut oilcake is a low-cost, renewable by-product with significant potential as a co-product in the development of novel, high-value food products and dietary supplements. Additionally, future applications include the production of edible and biodegradable food packaging materials, contributing to both sustainability and innovation in food technology.

Key words: *by-product, valorization, sustainability, walnut oilcake, antioxidant potential.*

DEVELOPMENT AND STABILITY ASSESSMENT OF FILMS BASED ON CELLULOSE, GRAPE POMACE PECTIN, AND BURSERA GRAVEOLENS ESSENTIAL OIL

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Abstract: The widespread use of synthetic polymers, such as polyethylene, polyvinyl chloride, polyesters, and polypropylene, has led to serious environmental concerns due to their poor biodegradability. Natural biopolymers like chitosan, cellulose, gums, and starch have been widely investigated for their suitability in film production, owing to their desirable mechanical, optical, and barrier properties. This study aimed to develop composite films formulated from carboxymethyl cellulose (CMC), grape pomace pectin (GPP), and *Bursera graveolens* essential oil (BGEO), using glycerol as a plasticizer. The films were characterized in terms of thickness, mechanical properties (tensile strength and elongation at break), optical properties (opacity and color parameters), and structural features *via* FT-IR spectroscopy. Results indicated that the incorporation of BGEO influenced the optical characteristics of the films; opacity values ranged from 8.12 to 11.10. FT-IR analysis of films containing CMC, 10% GPP, and BGEO revealed prominent absorption peak at 2910 cm^{-1}, attributed to C–H bending vibrations. These findings demonstrate that films based on CMC and GPP, enhanced with 2% BGEO, offer promising potential for application in sustainable food packaging and functional material development aimed at reducing environmental impact.

Key words: *Bursera graveolens essential oil, cellulose, grape pomace pectin, mechanical properties, optical properties, water content*

DEVELOPMENT OF INTELLIGENT MEAT PACKAGING USING POLYPHENOLIC COMPOUNDS FROM ARONIA MELANOCARPA AND SAMBUCUS NIGRA

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Abstract: The exploitation of bioactive phytochemical compounds from plants such as elderberry *(Sambucus nigra)* and chokeberry *(Aronia melanocarpa)* represents an innovative approach to increasing food safety. In this study, anthocyanin extraction was performed using the ultrasonic-assisted extraction (US) method. The samples obtained were subjected to physical and chemical analyses. Elderberry and chokeberry are valuable sources of polyphenols, especially anthocyanins, which have a remarkable ability to change color depending on the pH of the environment, from red in acidic conditions to blue or yellow in alkaline environments. Fresh meat is a perishable product that needs to be stored at 0-4°C and has a shelf life of 1-5 days, depending on the type. During storage, meat is prone to spoilage under the influence of microbiological, chemical, and physical factors, and during the spoilage process, an unpleasant odor is produced due to the formation of volatile compounds, ammonia (NH_3), and hydrogen sulfide (H_2S). There is also a change in color and texture change, and most importantly, pH variation. The integration of these phytochemical compounds into smart packaging allows visual monitoring of meat freshness through color changes that vary with pH changes. This provides consumers with direct information about the condition of food and contributes to increased food safety, reduced waste, and the sustainable use of plant resources.

Key words: *anthocyanins, chokeberry, elderberry, meat, phytochemical, safety*

IMPACT OF DRYING METHODS AND PARTICLE SIZE ON THE CHARACTERISTICS OF SLOE BERRY POMACE

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Abstract: Processing of *Prunus spinosa* fruits (sloe berry) generates valuable by-products rich in polyphenols and minerals that can be valorized. This paper aimed to highlight the impact of drying conditions (lyophilization and hot-air drying at 45, 55, and 65°C) and particle size (L > 300 µm, 200 µm < M < 300 µm or S < 200 µm) on the physical and chemical properties of sloe berry pomace obtained after juice extraction. The results revealed that protein, ash, and fat content decreased with particle size increase, and the values were smaller for lyophilized samples compared to hot-air dried. The samples with L particle size had the highest crude fiber content. The highest Zn, Na, Fe, and Cu content was observed in the samples with M particle size dried by hot-air. Mineral content varied depending on the drying temperature and treatment type. Red nuance and hue angle increased with oven drying temperature rise, and the highest results for L*, a*, C*, and h° were observed for lyophilized powders. FT-IR spectra revealed the presence of bioactive compounds such as fibers and polyphenols, and the intensities increased with particle size decrease. The degradation temperature increased with particle size. These results can be useful for researchers and producers interested in novel food development by using sloe berry pomace as a functional ingredient.

Keywords: *Prunus spinosa by-product, nutritional value, thermal properties, hot-air drying, lyophilization*

EVALUATION OF THE ANTIOXIDANT POTENTIAL AND PHYTOCHEMICAL PROFILE OF HORSERADISH (ARMORACIA RUSTICANA) LEAVES AND ROOTS

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Abstract: Horseradish (*Armoracia rusticana*) is a lesser-explored plant with promising nutritional and antioxidant potential, particularly in its leaves and roots. This study aimed to evaluate and compare the antioxidant activity and phytochemical composition of aqueous and hydroalcoholic extracts from horseradish leaves and roots, in order to identify their potential for functional food and nutraceutical applications.
Antioxidant capacity was assessed by the DPPH radical scavenging assay, which revealed higher activity in the hydroalcoholic extract of roots, while the aqueous extract of leaves exhibited superior antioxidant effects.
Overall, the total chlorophyll content in lyophilized horseradish leaf powder was 470.73 ± 3.39 mg/100 g dry matter. Additionally, significant levels of carotenoids were detected, contributing to the antioxidant and nutritional value of the leaves. Vitamin C content was significantly higher in horseradish leaves than in roots. The methanol–water (1:1, v/v) extract of lyophilized leaves contained 299.78 ± 2.89 mg/100 g vitamin C, whereas the root extract contained only 105.32 mg/100 g. Phytochemical analysis identified 9 key polyphenols via HPLC, including *p*hydroxybenzoic acid, quercetin, rosmarinic acid, vanillic acid, *p*-coumaric acid, kaempferol, chlorogenic acid, myricetin, and caffeic acid.
These findings suggest that horseradish leaves, often discarded as byproducts, are a valuable source of natural antioxidants and bioactive compounds, while the roots also contribute important phytochemicals and functional properties. Their combined incorporation into food or supplement formulations could enhance the functional and nutritional value of final products. The study supports the valorization of the entire horseradish plant and promotes a sustainable, full-plant utilization approach.

Key words: *biodegradable plastic, compost, degradation, food packaging, polyethylene, sustainability*

QUALITY CHARACTERISTICS OF READY-TO-DRINK COFFEE-BASED PRODUCTS

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Abstract: Sensory characteristics are important factors for coffee-based products i.e. cappuccino. The objective of this study was to verify the physico-chemical stability and the sensory profile of coffee-based products and especially cappuccino found on the refrigerator shelves of supermarkets at refrigeration temperature (±4ºC). For these purpose attention was paid to five samples from Nescafe, Mizzo, Meggle, Caffemio and Iced Coffee S for which acidity, sugar content, color evaluation and caffeine content were analyzed.

The pH parameter for each individual cappuccino sample was between 6.75 and 6.35; likewise, the titratable acidity for each sample was established to be between 2.2 T° to 2.9 T°. The total soluble solids analysis indicate the higher value for Mizzo coffe - 17.9 °Brix, and the lowest values are found in Nescafe cappuccino sample (11.97°Brix). The detection of caffeine content at the 206 nm area, showed that the Nescafe cappuccino sample at the retention time of 7.341 had the highest values of 41.13 mg/L, and the product Meggle Cappucino with the lowest concentration of caffeine is 21.24 mg/L at a retention time of 7.333. It can be noted that the aroma, taste and smell values for cappuccino are dependent on the amount of coffee and the sugar content.

Key words: *adulteration, caffeine, darkness, sensory profile.*

THE INFLUENCE OF SOY LECITHIN ON THE RHEOLOGICAL PROPERTIES OF DOUGH AND BREAD QUALITY FORMULATED WITH 650 TYPE WHEAT FLOUR

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Abstract: The aim of this study was to investigate the effects of soy lecithin incorporation into 650 type wheat flour on dough rheology, bread quality attributes, and sensory characteristics. Six formulations were prepared using wheat flour, yeast, salt, and increasing concentrations of soy lecithin (0%, 0.5%, 0.75%, 1.0%, 1.25%, and 1.5%), with the 0% formulation serving as the control sample. To evaluate the quality of both the raw materials and the final products, a series of standardized analytical methods were applied. For flour and dough, analyses included alpha-amylase activity, ash and protein content, rheological behavior during heating and cooling, protein and starch behavior (assessed using the Chopin Mixolab), viscoelastic properties (G′ and G″ moduli), and textural profile analysis (TPA). For the baked bread, physical parameters such as mass, volume, and crumb porosity were measured, alongside textural profile analysis. The results demonstrated that soy lecithin positively influences dough rheology and bread quality. Its addition improved dough texture, elasticity, and volume, while also enhancing shelf-life by maintaining freshness. Furthermore, lecithin contributed to improved dough stability, gas retention, and viscoelastic properties. Among the tested concentrations, 1.25% soy lecithin yielded the most favorable results across all evaluated parameters.

Key words: *bread quality, dough rheology, rheological properties, soy lecithin, textural analysis, viscoelastic properties, wheat flour.*

EVALUATION OF THE CHEMICAL AND SENSORY COMPOSITION OF A MARSHMALLOW PRODUCT ENRICHED WITH TOMATOES (LYCOPERSICON ESCULENTUM)

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Abstract: This work assesses the physicochemical composition and sensory profile of an artisanal marshmallow-type confection enriched with tomato pomace powder (*Lycopersicon esculentum*), formulated in three levels. Analyses included crude fiber, protein, ash, lipids, moisture, color in the CIE Lab* space, and texture profile analysis (TPA: hardness, springiness, cohesiveness, gumminess, chewiness, adhesiveness). A 20-member sensory panel rated color, odor, taste, consistency, creaminess, appearance, and overall liking on days 1, 10, and 20. Tomato pomace addition raised fiber content in a dose-dependent manner (up to ≈0.42%) while keeping lipids low (≈0.06–0.14%) and proteins moderate (≈4.8–7.0%). Color measurements showed increased yellow-red hues in enriched samples; TPA indicated a soft-elastic bite with a gradual decline in hardness during storage, with the mid-level enrichment showing the best textural stability. Sensory data confirmed high initial scores (8–10/10) and better preservation of color and consistency in enriched marshmallows versus the control up to 20 days. Overall, tomato pomace acts as a functional ingredient that enhances fiber intake and supports sensory stability without compromising the technological quality of gelatin-based aerated confections.

Key words: *CIE Lab*; fiber; marshmallow; sensory evaluation; tomato pomace; TPA.*

STUDY ON THE PHYSICOCHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS OF CHILDREN'S SAUSAGES

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Abstract: Meat in a diet for children of all age groups is a valuable source of essential microelements and macroelements necessary for the growth and development of the body. This paper presents a study on the physicochemical and microbiological characteristics of some types of sausages for children, both in fresh condition and during storage in the original packaging at a temperature of 4°C. Physicochemical parameters such as pH, sodium chloride content, and nitrite content were determined in the children's sausage samples. The analyzed samples showed an initial pH ranging between 6.12 and 6.52, and no significant changes in pH occurred during storage. The sodium chloride content for the examined samples ranged between 1.52% and 2.86%, while the nitrite content varied between 0.11 mg/kg and 0.3 mg/kg. The texture and textural parameters were also determined, along with the color of the children's sausages. Regarding the parameters of hardness, chewiness, and gumminess, it was observed that the hardest sample was P1, which contains 85% pork meat, while the other samples contain either chicken or turkey meat. It can also be noted that sample P1 showed the highest values of chewiness and gumminess, indicating that it is a product requiring more energy to be broken down into a form acceptable for swallowing. The chroma (C) values for the membrane color ranged between 33.09 and 37.97, while for the cross-section color, the C values ranged between 15.48 and 25.74. That is, some sausages had more saturated or intense colors compared to the rest of the samples. The microbiological examination was performed on different days, starting with day 0 (the day the packaging was opened). The evolution of the microbial load was studied after 4 and 7 days post-opening, during which the samples were kept under refrigeration. The results indicated a high microbial load, ranging between 40×10^5 CFU/g and 345×10^5 CFU/g, as well as the presence of *Enterobacteriaceae* and coliform bacteria in one of the examined samples.

Key words: *chroma, meat, microorganisms, nitrites, sausages, texture.*

MUSHROOMS AS A SUSTAINABLE PROTEIN SOURCE AND FUNCTIONAL INGREDIENT IN THE MEAT PRODUCTS

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Abstract: In the last decade, both food industry producers and end consumers have shown an increased interest in plant-based proteins, leading to a constant expansion of the market for alternative protein ingredients. Among the emerging sources, edible mushrooms (especially the *Pleurotus* and *Agaricus* genera) show significant potential for partial or total replacement of meat in innovative products, due to their nutritional and functional profile. The protein content of mushrooms ranges between 19–40% dry matter, comparable to that of beef or pork, and proteins and peptides derived from mushrooms exhibit both high nutritional value and relevant bioactive activities: antimicrobial, antiviral, anticancer, antioxidant, hypotensive, and specific enzymatic activity. Mushroom cultivation is considered resource-efficient and sustainable: it requires short development times, minimal water and energy consumption, and can utilize residual agro-industrial substrates, contributing to the circular economy. Thus, they represent an accessible, economical and environmentally friendly source of high-quality proteins for the alternative food industry. Currently, research focuses on optimizing the isolation and functionalization of fungal proteins to improve gelling, emulsifying and water-retention capacity, essential properties in the development of, for example, mushroom-based burgers with texture and juiciness comparable to meat products. Bioactive compounds extracted from mushrooms are also being evaluated for applications in the nutraceutical and pharmaceutical industries, with potential in the prevention of metabolic diseases and modulation of the immune response.

Key words: *alternative protein, bioactive compounds, circular economy, innovative products, nutritional value, plant-based-protein*

STUDY ON THE INFLUENCE OF SEA BUCKTHORN POMACE ADDITION ON THE PHYSICO-CHEMICAL AND TEXTURAL CHARACTERISTICS OF PLANT-BASED ICE CREAM

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Abstract: Vegan ice cream represents an alternative to dairy products, meeting the demands of health- and sustainability-conscious consumers, while also offering functional products through plant-based ingredients with high nutritional value and being suitable for individuals with lactose intolerance. This study aimed to valorize a by-product, namely sea buckthorn pomace, by incorporating it into plant-based ice cream at 1%, 3%, and 5% levels and analyzing its influence on physico-chemical, rheological, and textural properties. Increasing the concentration of sea buckthorn pomace led to a decrease in pH and an increase in acidity (from 33 °Th in the control sample to 69 °Th at 3% addition, exceeding the acceptable limit at 5%), negatively affecting structural stability. Compared to the control, enriched samples showed significant color changes, confirming that fruit bioactive pigments improve nutritional value and can act as natural colorants, reducing the need for synthetic additives. Pomace addition significantly increased total polyphenol content (from 19.02 mg GAE/L in the control to 20 mg GAE/L at 3% and 31 mg GAE/L at 5%), with similar trends observed for flavonoid content and antioxidant activity. Texture and rheological analyses revealed that higher concentrations increased hardness, whereas lower concentrations (1–3%) produced softer and more flexible structures (G' 259–523 Pa, G'' 80–218 Pa). The results suggest that 1–3% sea buckthorn pomace is optimal for producing plant-based ice cream with enhanced antioxidant properties, while higher levels (5%) negatively affect acidity and pH, requiring technological adjustments such as the use of stabilizers.

Key words: *ice cream, sea buckthorn pomace, antioxidant activity*

FORTIFICATION OF SET YOGURT WITH CITRUS PEEL POWDER – EFFECT ON PHYSICOCHEMICAL AND SENSORY PROPERTIES

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Abstract: Yogurt is a widely consumed fermented dairy product valued for its nutritional and functional properties. Fortification of yogurt with fiber-rich materials, such as fruit by-products, has gained increasing attention as a means to enhance its health-promoting properties and functional value. In the present study, yogurt was fortified with lemon and lime peel powders at concentrations of 0.25%, 0.50%, and 0.75%, and the resulting samples were evaluated for their physicochemical and sensory properties. Citrus peel addition significantly affected pH and titratable acidity, which remained within acceptable ranges, while protein and fat contents were not influenced by fortification, indicating compositional stability. Yogurts containing lime peel exhibited higher total fiber, highlighting the nutritional advantage of fortification. Incorporation of citrus peel powders improved viscosity and reduced syneresis, enhancing texture, and positively influenced color and appearance, especially at lower inclusion levels. Among the formulations, yogurt with 0.50% lemon peel achieved the highest overall sensory acceptability. These findings demonstrate that lemon and lime peel powders can serve as effective functional fortifying agents in yogurt, with 0.50% inclusion offering an optimal balance of nutritional enhancement, improved textural quality, and consumer preference.

Key words: *citrus peel powder, dietary fiber, yogurt fortification, physicochemical properties, sensory evaluation*

THERMAL BEHAVIOR AND STABILITY OF CARNAUBA WAX–STRUCTURED SUNFLOWER AND PUMPKIN SEED OIL OLEOGELS

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Abstract: Oleogels have emerged as promising alternatives to solid fats in food applications due to their ability to structure liquid oils without the use of trans or saturated fats. Their thermal behavior plays a critical role in determining functionality, stability, and potential application. The present study aimed to investigate the influence of carnauba wax concentration on the thermal stability of oleogels prepared with sunflower oil and pumpkin seed oil. Oleogel samples were formulated with 2, 4, 6, 8, and 10% (w/w) carnauba wax and were characterized using differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). The DSC results revealed that both the melting and crystallization temperatures increased progressively with rising wax concentration, indicating the formation of more ordered crystalline structures and stronger intermolecular interactions between wax components and the oil matrix. TGA analysis showed that thermal degradation occurred in two distinct stages: the first associated with the volatilization of vegetable oil components and the second with wax decomposition. The onset of thermal degradation shifted toward higher temperatures as wax concentration increased, confirming improved thermal stability of the oleogels. Overall, the study demonstrates that increasing the proportion of carnauba wax enhances the thermal stability and structural integrity of sunflower and pumpkin seed oil-based oleogels.

Key words: *carnauba wax, oleogels, pumpkin seed oil, sunflower oil, thermal properties*

Acknowledgement: *This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS – UEFISCDI, project number PN-IV-PCB-RO-MD-2024-0173, within PNCDI IV.*

LUPIN PROTEIN ISOLATE: EXTRACTION AND PERSPECTIVES FOR PASTA FORTIFICATION

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Abstract: The increasing global need for sustainable, protein-rich ingredients has renewed interest in underutilized legume sources, among which lupin (*Lupinus spp*.) stands out for its exceptional nutritional profile and functional potential. In particular, Andean lupin (*Lupinus mutabilis*, also known as "chocho") represents a promising raw material for producing lupin protein isolate (LPI), offering up to 45% protein in its flour, low starch levels, and favorable techno-functional properties ideal for cereal-based product fortification.

The present work aims to explore the perspective of obtaining LPI from lupin flour, previously defatted using hexane to remove residual oil and enhance protein concentration, followed by aqueous-alkaline extraction and isoelectric precipitation to isolate the protein fraction

Its potential application in pasta enrichment is discussed based on recent literature reporting improvements in protein quality, emulsifying, foaming, and water-binding properties, as well as a balanced amino acid profile comparable to soy or dairy proteins.

These characteristics suggest a strong potential for the technological and nutritional application of LPI in pasta, contributing to texture enhancement, protein fortification, and product sustainability.

Thus, future work will focus on optimizing extraction parameters and evaluating the rheological, sensory, and nutritional effects of LPI incorporation into pasta products, alone or in combination with rapeseed and hemp protein isolates, as discussed in our previous studies.

Key words: *innovation*, *lupin protein isolate, Lupinus mutabilis, pasta, protein enrichment.*

DEVELOPMENT AND PSIHICO-CHEMICAL EVALUATION OF NEW PLANT-BASED BLUEBERRY ICE CREAM USING OILSEEDS AS FAT SOURCE WITHOUT SUGAR

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Abstract: Ice cream is one of the most widely consumed dairy products globally. The incorporation of natural sweeteners and plant-based fat sources in ice cream production aligns with the growing consumer demand for natural, nutritionally balanced foods. This study investigated five ice cream samples formulated with vegetable seed creams: pine seed cream (P1), hemp seed cream (P2), pumpkin seed cream (P3), sunflower seed cream (P4), and hazelnut cream (P5), compared to a reference sample (PR) made with 35% dairy cream. All samples were prepared using the same proportions of water, blueberry jam, and apple concentrate.The analysis focused on evaluating the chemical composition (dry matter, protein, fat, ash content, titratable acidity, pH, soluble solids, and water activity), overrun, texture, rheological and viscoelastic properties. Color parameters (L*, a*, b*, C*, and h*) were assessed, and FTIR spectroscopy was employed to compare the chemical profiles of the samples.Among the tested formulations, sample P3—containing pumpkin seed cream—demonstrated superior performance across most evaluated parameters. It exhibited the highest values for dry matter, protein content, and overrun, along with balanced pH, soluble solids, and titratable acidity. These results suggest that P3 is the most promising candidate for the development of an innovative, functional ice cream product.

The choice of cream base significantly influences the chemical composition, sensory attributes, and functional properties of the final product, highlighting the potential of plant-based ingredients in creating healthier alternatives to conventional ice cream.

Key words: *functional ice cream, natural sweeteners,vegetable seeds cream, blueberry, natural, apple.*

FERMENTED PLANT-BASED MATRICES FOR SUSTAINABLE NUTRITION

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Abstract: The growing demand for sustainable and health-promoting foods has motivated the use of alternative plant sources in the formulation of functional fermented products. This study examined the influence of lactic acid fermentation on the nutritional, physicochemical, and bioactive characteristics of matrices obtained from lentil, pea, rye, and oat flours, used both individually and in mixed systems. Fermentation was carried out with *Lactiplantibacillus plantarum* and *Lacticaseibacillus casei*, two strains with complementary proteolytic and phytase activities, under controlled conditions (30 °C, 24–48 h). The process resulted in a pH decrease from 6.2 to 4.0, a 42–56% reduction in phytic acid, and a 30–40% decrease in tannins, leading to enhanced mineral bioavailability and protein digestibility. The total phenolic content increased more than twofold, while the antioxidant capacity (DPPH assay) rose by about 70%, indicating the release of bound polyphenols and the generation of bioactive peptides. The combined action of *L. plantarum* and *L. casei* provided a clean-label biotechnological route for designing nutritionally enriched and sensorially balanced legume–cereal mixtures for further development and industrial application**,** contributing to Moldova's alignment with European strategies for sustainable food innovation and nutrition-focused research.

Key words: *Fermentation; Legume–cereal mixtures; Functional foods; Sustainable nutrition.*

Acknowledgment: *The research was supported by Moldovan Government within project of Young Researchers 25.80012.5107.11TC BIO-FERM - Valorization of bioactive compounds from alternative plant sources for the development of functional fermented foods, running at Technical University of Moldova.*

THE INFLUENCE OF COCOA POWDER ON THE QUALITY OF WHEAT BREAD

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Abstract: One of the main goals of bakery manufacturers is to develop new products that have good taste and an attractive appearance. Along with developing new flavors, the nutritional and energy value of the products should be considered for improvement. A promising approach is the use of cocoa bean byproducts, which not only have a unique flavor but also contain many beneficial substances. Numerous recipes for cookies, gingerbread, and cakes contain cocoa powder. Products with cocoa powder-containing fillings are also popular. Unfortunately, there are no bakery product recipes that directly add cocoa powder to the dough.
Cocoa powder has several advantages, including its high fiber content (up to 35-37%) and its content of trace elements such as calcium, magnesium, copper, potassium, and zinc, which is significantly higher than many other products.
Studies were conducted to examine the effect of cocoa powder containing 10-12% fat on the quality of wheat bread. Dough was prepared using a straight-dough method based on a white wheat bread recipe, with 2, 4, and 6% cocoa powder added. It was found that adding cocoa powder reduced dough moisture by 1-3% compared to the control sample. This is likely due to the high water absorption capacity of cocoa powder. This fact should be taken into account in future studies to determine the optimal dough moisture content and kneading time.
The specific volume of bread with cocoa powder decreased by 3-9% compared to the control. The diameter-to-height ratio of bread baked on a baking sheet increased, but porosity decreased and the crumb became denser. Therefore, the crumb of bread with added cocoa powder was harder to chew, especially for bread containing 6% cocoa powder. With an increased cocoa powder dosage, a slight unevenness of the surface appeared, caused by small tears in the dough on the surface of the breads during molding. This is most likely due not only to the increased water absorption capacity of the dough, but also to the effect of alkaloids and tannins on gluten.
However, a significant advantage of this bread is its pleasant cocoa flavor and aroma. The attractive brown color and its intensity depended on the amount of cocoa powder in the recipe.
Based on the taste characteristics of baked goods, cocoa powder has potential for use in bakery recipes. To improve crumb structure, crust surface, and volume, it's important to optimize the dough's moisture content and explore the effects of adding fats and sugar to the recipe.

Key words: *bakery products, cocoa powder, bread flavor, assortment, baked goods*

POTENTIAL OF OILSEED CAKES AS SOURCES OF HIGH-VALUE PROTEIN ISOLATES FOR FUNCTIONAL FOODS

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Abstract: In the context of a growing demand for sustainable, plant-based protein sources, oilseed cakes – by-products resulting from the cold-press extraction of oil – offer significant untapped potential. Typically considered agro-industrial residues, cakes from seeds such as sunflower, flax, hemp, and pumpkin are rich in proteins, dietary fibers, and bioactive compounds. These by-products represent a promising raw material for the development of high-value protein isolates suitable for use in functional food formulations. Furthermore, the utilization of these protein-rich by-products contributes to waste reduction and aligns with circular economy principles.

This study aims to explore the valorization of cold-pressed oilseed cakes through the extraction and functional characterization of plant-based protein isolates. Various eco-friendly extraction methods, including alkaline solubilization followed by isoelectric precipitation, are evaluated to maximize protein yield while maintaining functional integrity. Oilseed cakes demonstrate strong potential as sustainable and economically viable sources of plant-based protein isolates. Their successful valorization can contribute to the development of innovative functional food ingredients, offering both nutritional and environmental benefits. Further research on optimizing extraction methods and testing application in food matrices is essential to fully unlock their commercial potential.

Keywords: *by-product valorization, functional food ingredients, oilseed cake, protein isolates, sustainability, vegetable protein.*

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ANALYSIS OF THE NUTRITIONAL CONTEXT IN RELATION TO THE CONSUMPTION OF ORGANIC FOOD PRODUCTS

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Abstract: The growing awareness of the link between diet, health, and environmental sustainability has significantly shaped consumer behaviour across Europe. This study examines the nutritional context and trends in the consumption of organic food products, highlighting factors that influence purchasing decisions and dietary preferences. Statistical data indicate a gradual shift toward plant-based and minimally processed foods, accompanied by a general decrease in animal protein intake in recent years. Nevertheless, the consumption of organic products remains relatively modest, constrained by high prices, limited accessibility, and low consumer awareness. A sociological survey conducted among local consumers in 2025 revealed that the main motivations for purchasing organic foods were associated with perceived health benefits, product safety, and environmental protection. Younger consumers (aged 18–35) demonstrated a higher openness toward eco-friendly dietary patterns, whereas older age groups tended to maintain more traditional eating habits. Despite an overall favourable attitude toward organic products, many respondents expressed scepticism regarding the authenticity of labelling and the reliability of certification systems. The findings underscore the importance of nutritional education, transparent labelling, and local promotion strategies in strengthening consumer trust and expanding the organic food market.

Keywords: *consumer behaviour, environmental sustainability, nutritional trends, organic food, plant-based diet, public health.*

Acknowledgment: *The research was supported by the Institutional Project, subprogram 020405 "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS, being implemented at the Technical University of Moldova.*

CURRENT AND EMERGING BIOTECHNOLOGIES FOR THE CONTROL OF LISTERIA MONOCYTOGENES IN MILK AND DAIRY PRODUCTS

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Abstract: The presence of *Listeria monocytogenes* in dairy products remains a major concern in the context of food safety, necessitating the identification of effective and sustainable control strategies. In this regard, the research focused on the application of modern biotechnologies with potential to reduce the incidence of this pathogen throughout the milk processing chain. Selected native lactic acid bacteria (LAB) strains exhibiting antimicrobial activity were characterized for their ability to produce bacteriocins effective against *L. monocytogenes*. These starter cultures not only contribute to improving the microbiological profile of dairy products but also support shelf-life extension. In parallel, natural antimicrobial compounds extracted from plant sources were evaluated for their potential integration into functional dairy formulations or use as biological sanitizers in processing environments. From the category of emerging technologies, non-thermal treatments such as high-pressure processing (HPP) and pulsed light (PL) irradiation were tested, demonstrating significant microbial load reduction without altering the sensory characteristics of the final products. By integrating these biotechnological approaches—both microbiological and technological—this research outlines promising strategies for modern pathogen control, aligned with current industry standards and consumer expectations. Future directions aim at incorporating these methods into intelligent packaging systems and real-time microbial monitoring technologies.

Key words: *antimicrobial compounds, bacteriocins, food safety, lactic acid bacteria, microbial monitoring technologies*

CHARACTERISTICS OF TRITICALE DOUGH FERMENTATION PROCESS: EFFECT OF TWO TYPES OF FERMENTED BREWERS' SPENT GRAIN ADDITION ON DOUGHS RHEOLOGICAL PROPERTIES

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Abstract: Dough rheological properties during fermentation had been determined by using a Rheofermentometer device (Chopin Rheo, type F4, KPM, Tripette et Renaud, Paris, France) as fallowing: volume of the gas retained in the dough at the end of the test (VR, mL), total CO_2 volume production (VT, mL), retention coefficient (CR, %) and maximum height of gaseous production (H'm, mm). Three different triticale varieties Ingen 33, Ingen 54, Ingen 93 cultivated in the Republic of Moldova were used in this study. Two types of brewer's spent grain resulted from the blonde (BSGB) and dark (BSGD) lager beer brewing process, from the Î.M. "Efes Vitanta Moldova Brewery" S.A., Chisinau, the Republic of Moldova had been used. The brewers' spent grain had been dried at 40°C up to a moisture value of 6.3% and then then had been obtained sourdough with an acidity of 8–10 degrees. A 10% brewers' spent grain in a fermented form had been added in dough recipe. The BSGL significant increase all fermentation values VR, VT, H'm and CR whereas BSGD decrease them. This indicates a more intense fermentation produced by BSGL addition which ensures a higher gas formation at a good rate and dough ability to retain gases whereas BSCD had an opposite effect which led us to the conclusion that bread with BSGL will have a higher volume whereas those with BSCD a lower one.

Key words: *triticale varieties*, *rheofermentometer*, *dark brewers' spent grain*, *light brewers' spent grain*

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SEA BUCKTHORN POMACE – A SOURCE OF BIOACTIVE COMPOUNDS FOR FUNCTIONAL FOODS

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Abstract: Sea buckthorn (*Hippophaë rhamnoides* L.) production is a strategic direction for the agri-food sector in the Republic of Moldova, with high potential in both fruit processing and by-product valorization. Pomace obtained from juice extraction is a valuable source of bioactive compounds and was analyzed for its functional and nutritional potential within the circular bioeconomy framework.
The results revealed a high moisture content (92.95%) and a pH value of 3.49, reflecting the acidic nature of the raw material (titratable acidity – 2.81%). The nutritional composition indicated considerable amounts of fat (30.07% per 100 g dry weight), protein (19.92%), ash (3.15%), and carbohydrates (1.26%), while the low water activity (a_w = 0.228 c.u.) suggests enhanced stability under dry storage conditions.
In addition, the pomace showed a high content of bioactive compounds, including L-ascorbic acid (22.98 mg/100 g DW) and total carotenoids (96.4 mg/100 g), which are essential for supporting human health due to their antioxidant and immunostimulatory properties. Antioxidant activity was confirmed by DPPH (3.36 mg TE/100 g DW) and ABTS (3.57 mg TE/100 g DW) assays, while the total polyphenol content was 10.94 mg TE/100 g DW. These values support the potential application of this by-product as a functional ingredient in value-added food products.
Based on these characteristics, sea buckthorn pomace can be classified as a high-value secondary product, demonstrating real opportunities for its valorization in the food industry.

Key words: *antioxidant activity, bioactive compounds, circular bioeconomy, functional foods, physicochemical characterization, valorization*

Acknowledgments: *The research was supported by Project PN-IV-PCB-RO-MD-2024-0214 "Integral valorisation of sea buckthorn fruits through the development of new functional food products"*

THE INFLUENCE OF STABILISERS ON PLANT-BASED FERMENTED BEVERAGES

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Abstract: The global demand for plant-based dairy alternatives is continuing to rise, reflecting a steady shift in consumer preferences and eating habits. One of the key technological challenges in developing these products is achieving a texture and consistency comparable to that of conventional dairy. The challenge is especially highlighted by fermented beverages, where maintaining texture stability and a pleasant mouthfeel is complex during processing and storage.
To address this issue, various stabilisers, such as starches, xanthan gum, guar gum, and locust bean gum, are commonly used; however, systematic studies comparing these stabilisers remain limited. This lack of knowledge is due to several factors, among which is the use of different starch varieties, often without specifying their botanical origin. The diversity of raw materials used to produce plant-based alternatives, for example, coconut, soy, almond, rice, and oat, remains a persistent challenge to systematically cross-correlate the existing data. Another bottleneck is the application of varied processing conditions, which are difficult to reproduce in research laboratory settings and compare as is. All of these underpin the need for systematic research under unified and carefully controlled conditions to provide a more consistent understanding of the plant-based fermented beverages manufacturing. This work addresses this issue, with an emphasis on the use of stabilisers of differing origin and quality.

Keywords: *fermented beverages; plant-based dairy alternatives; processing conditions; raw materials; stabilisers; texture stability*

IMPROVEMENT OF FERMENTED MILK DESSERTS USING SECONDARY DAIRY RAW MATERIALS

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Abstract: The need to create functional dessert products with the introduction of secondary resources is relevant. First, the original formulations for dairy desserts are rarely used. The production of non-traditional types of desserts, such as multi-component dessert products, has no analogs on the market yet. Second, the use of whey as a raw material is relevant due to the current shortage of milk worldwide.

Whey is a by-product in the production of protein dairy products. The main component of whey is lactose, about 70 % by weight of all solids. Whey contains a significant amount of biologically valuable whey proteins, free amino acids, and minerals. The content of whey proteins in whey reaches 0.5…1.5 %. The main ones are β-lactoglobulin (7…12 % of the total amount of milk proteins), α-lactalbumin (2…5 %), whey albumin, immunoglobulins, and components of the protease-peptone fraction.

Whey proteins (albumins and globulins) have valuable biological properties that contain the optimal set of vital amino acids. There is a small amount of fat in whey (0.05…0.4 %) but its value is that it is dispersed into balls with a diameter of less than 2 μm.

The main macronutrients of whey are calcium, phosphorus, magnesium, potassium, sodium, chlorine, and sulfur (found in proteins). Whey proteins contain the following trace elements: iron, copper, zinc, manganese, aluminum, selenium, iodine, and others.

Therefore, the development and improvement of sour milk desserts using secondary milk raw materials is a promising area of research.

Key words: *whey, desserts, secondary resources, food products, waste-free technologies*

ASSESSMENT OF THE INFLUENCE OF THE ADDITION OF FRUIT FLOURS ON THE FUNCTIONAL - TECHNOLOGICAL PROPERTIES OF WHEAT FLOUR

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Abstract: The rising demand for nutritious and sustainable foods has sparked interest in unconventional ingredients like fruit flour, which offers a nutrient-rich alternative to traditional flours by enhancing bakery products with fiber, antioxidants, vitamins, and bioactive compounds, while improving flavor and texture. In the face of growing populations and limited resources, incorporating fruit flour helps diversify food sources, reduce reliance on conventional crops, and promote healthier diets through its high fiber content and beneficial phytochemicals.

Three fruit samples from the *Prunus* genus (apricot, peach, and nectarine) were lyophilized using a Biobase BK-FD12S freeze dryer and finely chopped with a Thermomix TM6 to obtain the flour. The effects of incorporating these flours at levels of 5%, 10%, 12.5%, and 15% were evaluated based on dough properties, including sensory characteristics, rheological behavior, color, and texture. As fruit flour is added, the dough becomes darker, with intensified yellow and red tones. Increased levels of fruit flour result in reduced hardness and adhesiveness in the dough's texture. Additionally, rheological properties such as viscosity and elasticity improve with higher fruit flour incorporation.

This study highlights that innovative food incorporating lyophilized fruit species offer promising nutritional benefits and appealing sensory qualities, such as intense color, making them especially suitable for sour-sweet bakery products and enhancing their market potential.

Key words: *fruit flours, dough, nutritional properties, sensory evaluation, bakery products.*

MODIFICATIONS IN SORGHUM FLOUR PROPERTIES FOLLOWING GRAIN HEAT TREATMENT

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Abstract: This study evaluated the nutritional and rheological properties of heat-treated and untreated sorghum flour, focusing on the medium-sized fraction (M) and whole (integral) flour. Amino acids were analyzed by high-performance liquid chromatography, fatty acids and volatiles by gas chromatography, minerals by atomic absorption spectrophotometry, and rheological properties by dynamic testing.

Dry heat treatment of sorghum flour reduced essential amino acids overall, but lysine content increased in the treated M fraction compared to the control. Non-essential amino acids significantly decreased after heat treatment and grinding. Treatment at 133 °C combined with fractionation increased mono- and polyunsaturated fatty acids while decreasing saturated fatty acids in the treated M fraction. Significant variations in sodium, iron, zinc, and copper were also observed.

Heat treatment reduced the volatile compound 2,4-pentadienenitrile and introduced 2,4-hexadienenitrile in the treated M fraction. Dough made from the treated M fraction exhibited slightly higher elastic energy than dough from whole flour treated at the same temperature. The treated M fraction showed a lower maximum gelatinization temperature and greater compliance during creep and recovery tests compared to the control.

Overall, dry heat treatment and fractionation significantly altered the nutritional and rheological profiles of sorghum flour

Key words: *sorghum flour, heat treatment, nutritional properties, rheological properties*

THE IMPACT OF HEAVY METAL CONTAMINATION ON CASEIN IN COW'S MILK

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Abstract: This research study looked at the effect of heavy metals lead (Pb), cadmium (Cd), and copper (Cu) in artificially contaminated cow's milk by analyzing their presence in casein under different processing conditions, using two coagulation methods: enzymatic and acid. The study evaluated the influence of two important variables: the level of contamination and the coagulation method. Experimental contamination was carried out at the maximum level permitted by current legislation, as well as at a level 10 times higher than the maximum permitted limit. The coagulation processes used were: enzymatic by adding lactic cultures and acid by using diluted acetic acid to adjust the pH to 4.6. Cow's milk was collected from farms in different geographical areas of the country. For each area and each combination (2 contamination concentrations × 2 coagulation methods), the percentage of metal found in casein was analyzed using atomic absorption spectrophotometry (AAS). Health risk assessment was performed by calculating the estimated daily intake (EDI), health risk index (HRI), target hazard quotient (THQ), hazard index (HI), and target cancer risk (TCR). The results showed that the level of contamination with Pb, Cd, and Cu significantly influences their distribution in milk fractions, with a majority retention in casein (>83%) for all metals, but for increased levels of contamination, retention in casein decreases, which can be explained by a partial redistribution to whey and fat, which may affect the quality of secondary dairy products. The choice of coagulation method may have implications for the oxidative stability and nutritional value of dairy products

Key words: *cadmium, casein, copper, fat, milk, lead, whey*

Section 5.
Ecology and Environment Protection

LIFE CYCLE ASSESSMENT OF SWEET CHERRY COMPOTE

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Abstract: This study assessed the environmental impact of sweet cherry compote produced in a Romanian factory. Therefore, life cycle analysis method was used to evaluate the potential environmental impact throughout the life cycle of this product. As a functional unit was selected 5,000 kg of cherries, from which six pallets with 2,448 jars (800 g each) of cherry compote were obtained. The system boundaries included the following stages: cultivation, transportation, cherry compote production in the factory (washing, sorting, grading, stem removal, inspection, rectification, dosing, exhaustion, sealing, pasteurization, container conditioning, and storage). The inputs considered in this study were: raw material (cherries), water (both in the production process and for washing), sugar, electricity, and fuel, while the outputs were: the finished product (cherry compote), vegetable waste, glass packaging waste, wastewater (loaded with various pollutants, especially suspended solids and organic substances), and atmospheric emissions from both transport and combustion plant (particles, CO, SOx, NOx). The results showed that emissions from the cherry compote production process contribute most to human toxicity potential (HTP), followed by eutrophication potential (EP) and global warming potential (GWP). The treatment of wastewater resulting from the cherry compote production process is responsible for the eutrophication potential. It contributes 95% to this impact category, followed by the production stage itself with 3%, and transport and cultivation stages (each with a contribution of 1%).

Key words: *environmental evaluation, food industry, impact categories, life cycle, sweet cherry*

MEASUREMENTS OF HEAVY METALS CONTENT IN SURFACE WATERS IN THE IASI REGION

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Abstract: Heavy metal pollution is a current public problem. Heavy metals act as toxic substances and generally inhibit cellular enzymatic processes or cause physiological disorders through their accumulation. Waste water contains metal ions such as iron, manganese, copper, chromium, zinc, lead, cadmium, etc., which mainly come from the activity of industries: ferrous and non-ferrous metallurgy, non-organic chemical industry, mining, machine building, electro-technical industry. Surface waters present the highest level of pollution risk. As a result of various types of water contamination, drinking water supplies to households and livestock farms are compromised and the health of people and animals is endangered.

This study presents the evaluation of the content of heavy metals (lead, cadmium, nickel, chromium, zinc) in water intended for animal consumption from surface waters and wells, from 5 villages in the Iași County. The study showed an average contamination of some sources with nickel.

Key words: *animals*, *heavy metal, nickel, pollution, surface waters*

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IMPACT OF FERMENTED BREWERS' SPENT GRAIN AND TRITICALE ADDITION ON DOUGH RHEOLOGICAL CHARACTERISTICS: AN ALVEOGRAPHIC STUDY

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Abstract: This study investigates the impact of incorporating two types of fermented brewers' spent grain (BSG) on the rheological characteristics of triticale-based dough. Light (BSGL) and dark (BSGD) brewers' spent grains were co-fermented with triticale flour until achieving a target acidity of 8–10 degrees and pH of 3.78 ± 0.01, then added at 10% level to six triticale varieties from the Republic of Moldova (Ingen 35, Ingen 40, Ingen 54, Ingen 93, Fanica, and Costel).

The rheological behavior during extension was evaluated using a Chopin Alveograph according to ICC 121 standard, analyzing dough tenacity (P), extensibility (L), baking strength (W), and swelling index (G).

Results showed a general decrease in dough performance following fermented BSG addition, with differential effects depending on BSG type. BSGL incorporation led to more significant reductions in dough tenacity (P), while BSGD addition resulted in more pronounced decreases in extensibility (L) and swelling index (G). Baking strength (W) showed no significant variations between BSGL and BSGD supplementation. Among cultivars, the Costel variety demonstrated the most substantial quality deterioration, recording the lowest extensibility and baking strength values.

The alveographic data indicate that 10% fermented BSG incorporation weakens the gluten network structure in triticale dough, negatively affecting bread-making potential. Therefore, these composite flours are not recommended for bread production without dough-strengthening agents, such as vital gluten, to compensate for rheological quality losses.

Key words: *Alveograph, Brewers' spent grain, Fermentation, Rheological properties, Triticale, Wheat dough.*

Acknowledgments: *This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0078, within PNCDI IV.*

Section 6.

Multidisciplinary Science

FUNCTIONALIZED POLYPHENOLS WITH AZAHETEROCYCLES SKELETON OF POTENTIAL INTEREST IN MEDICINE AND FOOD INDUSTRY

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Abstract: Naturally occurring and/or synthetic polyphenols are compounds containing at least one hydroxyl group anchored on a phenyl ring. The most general way for polyphenols classification is into three main categories: phenolic acids, flavonoids, and non-flavonoids. No matter they are natural or synthetic derivatives, polyphenols are of great interest in the food industry in almost all segments (from processing to food preservation), beauty products, the pharmaceutical industry, dietary supplements, etc.

In continuation of our research in the field of polyphenols of potential interest in medicine and the food industry, we present herein some core aspects related to synthesis, structure, and biological properties of some functionalized polyphenols with azaheterocycle skeletons derived from pyridine, quinoline, isoquinoline, bipyridine, pyridazine, phthalazine, pyrimidine, and quinoxaline.

Key words: *azaheterocycle, food industry, functionalized polyphenols, medicine, synthesis, structure*

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RESIDUAL WINE YEASTS AS A SUSTAINABLE SOURCE OF B-GLUCANS: EXPLORING MULTIFUNCTIONAL BIO-INGREDIENTS FOR NOVEL APPLICATIONS

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Abstract: Wine production generates significant by-products, with residual wine yeasts representing a valuable but underutilized biomass rich in β-glucans. These polysaccharides are multifunctional bio-ingredients with technological and health benefits, requiring efficient extraction and characterization, and the obtained results confirmed their potential, showing yields of β-(1→3)/(1→6)-glucans ranging between 8–12% of dry biomass. Structural analyses confirmed the presence of branched β-glucans with high molecular weight, contributing to significant rheological effects in food systems. Functionally, β-glucans exhibited strong water-holding and oil-binding capacities, improving the texture and shelf-life of model products. These findings highlight not only the technological benefits but also the potential role of yeast β-glucans as health-promoting bio-ingredients. The valorization process aligns with circular economy strategies, transforming winery waste into valuable resources. Incorporating yeast-derived β-glucans into food products can simultaneously enhance quality, extend shelf-life, and promote consumer health, while reducing the ecological footprint of the wine industry.

Key words: *circular bioeconomy, food sustainability, functional properties, innovative food applications, multifunctional bio-ingredients, sustainable valorization,*

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FUNCTIONAL EXTRUDATES FROM CARROT BY-PRODUCTS: A SUSTAINABLE APPROACH TO FOOD WASTE REDUCTION

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Abstract: The purpose of this paper is to present the potential of carrot by-products, pomace and leaves, considered agri-food waste resulting from the technological processing of carrots, to develop functional extruded products such as snacks or bars. The valorization of these by-products contributes to circular economy practices in the food industry, promoting resource efficiency and the design of functional, health-oriented products. Functional foods attract consumer interest due to the health benefits they provide, both through the production methods employed and the composition of the ingredients used. Extruded products obtained from carrot by-products are rich in dietary fiber which plays a key role in regulating intestinal transit, supporting intestinal flora, promoting satiety, reducing cholesterol levels and mechanically cleansing the colon. The vitamins and minerals present are essential for regulating metabolic processes, supporting immune function, protecting cells, contributing to the formation of tissues, bones and teeth, maintaining fluids and neurological balance, participating in enzymatic reactions and facilitating oxygen transport. Additionally, these by-products contain bioactive compounds such as polyphenols, carotenoids and flavonoids which exhibit high antioxidant activity, thereby protecting cells against oxidative stress. Therefore, such products offer significant nutritional benefits while also contributing to food waste reduction and advancing a sustainable and responsible consumption model.

Key words: *carrots by-products, extrusion, functional products, valorization, waste*

WINE TOURISM, THE CALLING CARD OF MOLDOVAN NATIONAL TOURISM

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Abstract: The quality and diversity of Moldovan wines represent the determining factors in the development of the dynamics of Moldovan wine tourism, and the "National Wine Day" has continued to attract thousands of tourists since 2022. The development of infrastructure in recent years and the emergence of wineries and modern accommodation units have complemented the already existing potential of wine tourism. 2% of the world's vineyard plantations are cultivated in the Republic of Moldova. The country ranks among the top 20 wine-producing countries and is 13th. Over 120 million liters of wine products have reached foreign markets, bringing approximately 190 million dollars to the national economy. Quality wines, landscapes, cultural heritage and traditions, throughout the year transform our country into a "welcoming host" with quality tourist services. The Republic of Moldova is home to some of the largest and most spectacular underground wineries in the world (Cricova, Milestii Mici, Castel Mimi, Purcari). Tourists visit the wineries, participate in grape picking and tasting, and there are various thematic wine routes at their disposal. Many wineries are examples of sustainability and certain ecological practices. This sector is constantly developing, with a major potential to attract international tourists in search of authentic and refined experiences. Wine tourism is well combined with local gastronomy that offers that "unique taste", always requested and sought by tourists.

Key words: *cultural heritage, destination, tourist product, wine tourism, wineries*

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RURAL AGRO-PENSIONS AND TRADITIONAL CUISINE-AUTHENTIC FORMS OF MOLDAVIAN RURAL TOURISM

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Abstract: Most often, rural agro-pensions offer tourists a refuge outside the noisy cities, in picturesque villages, in wine-growing, hilly areas or near forests and rivers. Here, tourists can participate in various agricultural activities (animal care, fruit and vegetable picking, haymaking, winemaking), hiking, craft workshops, cart, boat or bicycle rides. Agro-pensions have a traditional accommodation style, with elements of authentic local architecture. Various cultural evenings with folk music and dances, traditional crafts and presentations of folk costumes are organized here. It is here that foreign tourists can get acquainted with the real Republic of Moldova, a tourist destination full of history and cultural potential. Tourists at agro-pensions can learn interesting stories from locals, legends, tales. Here tourists can enjoy traditional dishes prepared from local products, namely in the rural environment that childhood taste persists in all dishes: pies, sarmale, stew, fish plate, polenta with cheese and sour cream, homemade wine, natural compotes. All of these in the complex make the stay at rural agro-pensiones increase the satisfaction of both local and international tourists.

Key words: *agro-pensions, cultural heritage, destination legends, Moldovan cuisine, sarmale, wine tourism, wineries*

Acknowledgment: *Institutional Project 020405 "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS, being implemented at the Technical University of Moldova.*

DESIGNING ERGONOMIC AND INCLUSIVE PRODUCTION KITCHENS FOR PUBLIC CATERING FACILITIES IN UKRAINE

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Abstract: It is studied the integration of ergonomic and inclusive design principles in the planning of production kitchens for public catering facilities in Ukraine. With approximately 2.84 million registered persons with disabilities (about 7% of the population) and an estimated 17% experiencing functional limitations, developing good professional environments is a pressing social and economic need. The aims of research is to develop the design recommendations ensuring safety, efficiency, and adaptability according to ISO 21542:2021 and EN 17210:2021, which define accessibility and usability of built environments. The methodological base includes spatial-flow modeling, anthropometric analysis, and ergonomic evaluation of work zones and circulation paths. The adjustable work surfaces (750–900 mm), unobstructed passages of at least 1.2 m, and control elements within 450–1200 mm enhance comfort, reduce physical workload by up to 15%, and lower occupational injury risk by 20–25%. The study concludes that incorporating ergonomic and inclusive parameters into kitchen design increases labor productivity and energy efficiency while fostering sustainable and equitable work environments in the hospitality sector.

Key words: *Ergonomics, Inclusive, Design, Kitchen, Hospitality, F&B*

SOCIO-ECONOMIC JUSTIFICATION OF CREATING HEALTH RESORT HOTEL FOR VETERANS

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Abstract: After 2022, Ukraine has a social challenge – the return of veterans with injuries and disabilities. Out of half a million combatants, one in ten requires long-term rehabilitation. An integrated approach is effective: physical recovery must be combined with psychological support and social reintegration. In Ukraine, the system is fragmented, which complicates logistics and prolongs treatment.

The project involves creating a single service ecosystem in partnership with the Superhumans Center, which has been providing prosthetics to patients free of charge since 2023. The business plan includes the construction of a five-story building with 120 rooms (mostly barrier-free) and two rehabilitation blocks. The estimated cost is about 15 million euros, part of which is covered by grants and soft loans.

The model is focused on government orders, corporate clients and self-payers. Bionic prostheses are printed on site, which reduces rehabilitation time from 21 to 8 days. EksoNR robotic walking reduces the duration of primary recovery by 16%. The project involves the use of heat pumps and solar collectors, which reduces energy consumption by 41%. Each job in the hotel stimulates the creation of two more in the service sector.

Integration of prosthetics, physical and mental rehabilitation with classic sanatorium services creates an effective model of supporting veterans and a profitable business. Implementation in the city of Morshyn will turn the resort into a center of post-war recovery, strengthen the region's economy and tourist attractiveness.

Key words: *hotel, Morshyn, rehabilitation, resort, tourism, veteran.*