

**INTERNATIONAL  
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“STUDENT IN BUCOVINA”  
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**STUDENT IN BUCOVINA  
ABSTRACTS**

Organized by:  
***Faculty of Food Engineering,***  
*Stefan cel Mare University of Suceava, Romania*

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**Book of Abstracts  
of the International Conference  
for Students**

**STUDENT IN BUCOVINA  
13<sup>th</sup> December 2024**

## ***HEALTHY EATING IN THE VIEW OF A STUDENT***

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Coordinating Professor: Associate prof. Ph.D. bioeng. Maria POROCH-SERIȚAN<sup>2</sup>, Lecturer  
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### **Abstract:**

Food plays an essential role in our lives, both for survival and as a social and cultural activity, with people making over 200 food-related decisions every day. However, nowadays, food is no longer just a source of pleasure, but also a concern for health. Thus, in order to maintain our well-being, a diet corresponding to short- and long-term health objectives is necessary, a fact that can be difficult due to daily temptations .

Healthy eating recommendations consist of consuming an adequate number of calories and nutrients, including natural and protein-rich foods, and avoiding processed foods high in salt, sugar, and fat. Also, maintaining an active lifestyle and following food safety rules are crucial for a healthy and long life.

For me as a student, a healthy and ideal dinner would consist of baked vegetables with chicken, summer salad and a cup of green tea, with a diverse content of nutrients (macronutrients and micronutrients) and a total of 1637.4 kcal.

In conclusion, adopting a healthy diet is not only about knowledge about nutrition, but also about applying it in everyday life; the practical implementation of these principles being the major challenge, especially in an environment where temptations and unhealthy options are omnipresent.

**Key words:** *active lifestyle, food, food principles, healthy eating, nutrients, student*

## ***PRODUCT CERTIFICATION IN THE FOOD INDUSTRY: CONSUMER AWARENESS, PERCEPTIONS AND ATTITUDES***

Student: Anthony AMOTOE-BONDZIE,  
Coordinating Professor: Ph.D. Eng. Peter ZAJAC  
*Faculty of Biotechnology and Food Science,  
Slovak University of Agriculture in Nitra, Slovakia*

### **Abstract:**

This study assessed consumer awareness, perceptions, and attitudes regarding certified products, emphasizing their determinants and practical implications. Product certification guarantees food safety and quality, especially in the European Union (EU), where strict frameworks maintain global standards. A survey was conducted with 203 respondents from various occupational backgrounds between February and April 2024. The survey questionnaire covered socio-economic demographics, awareness of product certification, perceptions, attitudes, barriers, and behavioral patterns. Consequently, the data analysis utilized binary logistic regression and Kendall's coefficient of concordance. Consumer awareness significantly influences the identification of certified products, with 77.3% acknowledging awareness of certification programs. Male respondents exhibited twice as compared to female respondents, higher awareness, while education, income, and age showed no significant impact. Perceptions of certification schemes vary, with organic certification ranking highest for credibility. Factors influencing purchasing behavior include cost (91.1%), environmental and ethical considerations (87.7%), accessibility (76.4%), and mistrust in certifications (57.6%). Cultural and religious preferences, local production, and convenience also shape consumer choices. In contrast, 29.6% made purchasing decisions based solely on certification labels, and most (70.4%) did not. Various factors, including perceived value, social responsibility, and pricing influence consumer perceptions and attitudes towards certified products. While certifications are valued for ensuring product quality and safety, mistrust and insufficient knowledge persist. Enhancing transparency, accessibility, and education in certification processes is crucial for building consumer trust and promoting informed choices. These findings underscore the importance of continually evaluating and improving product certification programs to meet evolving consumer demands and foster sustainable practices in the food industry.

**Keywords:** *awareness, attitudes, food industry, perception, and product certification*

# ***QUALITY AND STABILITY OF FUNCTIONAL MARSHMALLOW DURING STORAGE***

Student: Elena SERGHEEVA,  
Coordinating Professor: Ph.D. Natalia NETREBA  
*Faculty of Food Technology,  
Technical University of Moldova, Republic of Moldova*

## **Abstract:**

This study investigated enriched marshmallows' sensory, textural, and microbiological parameters during 40 days of storage. Adding pumpkin pomace powder (PPP) to marshmallows improves their quality parameters due to its antioxidant and antimicrobial activity and greatly the microbiological stability of marshmallows during storage. Sensory analysis showed that tasters positively assess the organoleptic characteristics of the fortified product, and the optimal amount of added powder is 15%. The microbiological parameters of the developed product, such as QMAFAnM, mold, and yeast, are within the normal range and the product does not contain pathogenic microorganisms. The recommended shelf life was extended due to the antimicrobial activity of PPP. The textural parameters of the experimental marshmallow also change depending on the concentration of added pomace: the hardness, cohesiveness, and gumminess increase. During storage, these parameters changed: the hardness and gumminess increased, and the cohesion decreased. The 10-30% addition of PPP to foamy confectionery products led to the improvement of textural parameters, thus also contributing to the extension of the shelf life of foamy confectionery products by 10 days compared to the control sample. The research results indicate that PPP use in foamy confectionery manufacturing products can significantly increase their biological value and sensory characteristics and ensure a significant product shelf life.

**Keywords:** *antimicrobial activity, confectionery, pomace, pumpkin, sensory characteristics, texture.*

**Acknowledgments:** The research was supported by the *Institutional Project, subprogram 020405 "Optimization of Food Processing Technologies in the Context of Circular Bioeconomy and Climate Change," Bio-OpTehPAS, implemented at the Technical University of Moldova.*



## ***ARONIA POMACE EXTRACT JELLY***

Students: Valentina-Ionela UNGUREAN, Diana-Mihaela  
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Eugen-Sebastian ȚEHANCIUC-CALANCEA  
Coordinating Professor: Lecturer Ph.D. Cristina GHINEA  
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Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Fruit pomace, a by-product of fruit processing, is usually thrown directly into landfills or used in animal feed production. The use of fruit pomace in various food products is the subject of in-depth studies, as it can contribute to the circular economy. The aim of this work was to enhance the value of aronia pomace by incorporating aronia pomace extract into jellies. Aronia extract was obtained in two ways by addition of water: at 95 °C over fresh pomace and at room temperature over dried pomace, followed by maceration for 10 hours and filtering the resulting mixture. Aronia extract, water, agar-agar, xylitol and lemon juice were used to prepare the jelly. Parameters such as water activity, pH and color of jelly samples were investigated. All jelly samples had water activity values above 0.8. The highest value (0.935) was recorded for jelly sample with extract from fresh aronia pomace, while the control sample (without aronia extract) had the lowest water activity value (0.905). The pH values obtained for the jelly samples ranged between 3.51 and 3.88. The jelly samples were also analyzed from a sensory point of view. The color, appearance, and consistency of the jelly samples were highly appreciated. The differences between the samples were not statistically significant in terms of sensory attributes.

**Key words:** *aronia, color, food waste, jelly, pomace, sensory attributes*

## SPECIFICS OF CRAFT PRODUCTION MANAGEMENT IN BREWING

Student: Yurii KLIAHIN,  
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### **Abstract:**

The modern development of the brewing market demonstrates a significant increase in the popularity of craft beer, distinguished by its unique recipes, high quality, and limited production volumes. An important factor for success is combining innovation with the preservation of traditions. The use of local or organic ingredients and the development of unique beer varieties, considering global trends such as seasonal flavors or beers with fruits, enhance the authenticity and competitiveness of the product. Effective inventory and logistics management also play a crucial role in the operation of craft breweries. Optimizing procurement processes, implementing FIFO systems, and accounting for seasonal demand fluctuations help reduce costs, minimize waste, and ensure consistent product supply. Furthermore, marketing strategies are an integral part of management. Organizing brewery tours, tastings, and workshops not only promotes products but also helps build a loyal consumer base. Thus, effective management of craft brewing production requires a balance between flexibility, quality control, innovation, traditions, and effective marketing strategies. Implementing these approaches allows small and medium-sized breweries to enhance their competitiveness, ensure sustainable development, and expand their market share.

**Key words:** *brewing, craft, engagement, flexibility, innovation, management, marketing, traditions*

## ***MATHEMATICAL MODEL OF VACUUM COOLING OF BREAD***

Students: Oleksandr KOZAK, Nazariy KOLBA  
Coordinating Professor: Prof. Volodymyr TELYCHKUN  
*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

Vacuum cooling is a modern method that significantly reduces the cooling time of bakery products. The process is based on the adiabatic evaporation of moisture when the pressure in the vacuum chamber is reduced, which ensures effective heat removal. Various cooling methods are used in enterprises, including natural (convective) cooling, cooling with cooled air, and vacuum cooling. The vacuum method offers advantages such as reduced cooling time, improved rheological properties of the bread, and extended shelf life. To integrate vacuum cooling into continuous production, it is necessary to improve both the theoretical aspects and technological parameters. In particular, rapid pressure reduction in the vacuum chamber can damage the crumb and crust of the products. The vacuum cooling process involves heat and mass transfer, phase transitions, and mechanical effects on the structure of the products. To optimize this process, we developed a mathematical model that predicts the behavior of the product under various technological conditions. The mathematical model created for the vacuum cooling process of a 0.5 kg loaf made from premium wheat flour takes into account literature analysis and experimental data on the rheological properties of the crumb and the gas permeability of the crust. The developed model allows optimizing the cooling process, determining technological parameters to ensure high product quality with minimal costs. It is an effective tool for automating the process, increasing productivity, and reducing energy consumption. Calculations from the model show that the optimal parameters ensure cooling of a 0.5 kg loaf in 27 seconds.

**Key words:** *bakery products, loaf, mathematical model, operational parameters, pressure, vacuum cooling*

## **TREATMENT OF DUAL-SPECIES BIOFILMS WITH A MIXTURE OF ESSENTIAL OIL AND SURFACTANTS FROM RHODOCOCCLUS ERYTHROPOLIS IMB Ac-5017**

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<sup>1</sup>*Department of Biotechnology and Microbiology,  
National University of Food Technologies, Ukraine*

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### **Abstract:**

Combined biofilms are responsible for infections and are commonly encountered. The biological activity of *Rhodococcus erythropolis* IMV Ac-5017 surfactants can be enhanced by introducing yeast into the cultivation medium. A synergistic antimicrobial effect was observed with a complex of *R. erythropolis* IMV Ac-5017 surfactants and tea tree essential oil. *R. erythropolis* IMV Ac-5017 was cultured in a mineral medium with 2% (v/v) ethanol. Live cells of *Saccharomyces cerevisiae* BTM-1 were used as inducers. The degree of destruction of biofilms (%) was determined using a spectrophotometric method. The maximum degree of destruction of the biofilms *Escherichia coli* IEM-1 with *Staphylococcus aureus* BMS-1 and *Bacillus subtilis* BTM-2 with *Pseudomonas* sp. MI-2 after treatment with a mixture of lemongrass essential oil and IMV Ac-5017 surfactants (320-640 µg/ml), synthesized with yeast cells, was 85-86%. In contrast, under the influence of the monobiocides the degree of destruction did not exceed 59-68%. Consequently, there is the possibility of a significant increase in the degree of destruction of dual-species biofilms under the action of a mixture of lemongrass oil and IMV Ac-5017 surfactants, synthesized with *S. cerevisiae* BTM-1, compared to the effect of the monobiocides.

**Key words:** *biological inducer, destruction, dual-species biofilms, essential oil, R. erythropolis* IMV Ac-5017 surfactants, synergism.

## ***STUDY ON IMPROVING THE NUTRITIONAL PROFILE OF SEMI-GLUTEN BISCUITS BY ADDING ALFALFA POWDER***

Ph.D. Student: Loredana-Mariana HUȚUȚUI (STAN),  
Coordinating Professor: Prof. Ph.D. Eng. Eufrozina ALBU  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

According to evidence, biscuits date back to 2500 BC, and were traditionally prepared at home by women in Greece, and the first industrial biscuits appeared in England in the 20th century. Although biscuit consumption is very popular, the low-quality protein of wheat flour has been a major concern over time. Wheat protein is deficient in essential amino acids such as lysine, threonine, tryptophan. This problem can be solved either by replacing all or part of the wheat flour, or by adding plant protein sources. This study presents a nutritionally improved biscuit variant in which wheat flour was partially replaced by rice flour and alfalfa powder was added in three different concentrations for added protein. In 2009, alfalfa received official permission for use in human nutrition because it is rich in valuable nutrients, including essential amino acids, minerals, vitamins and dietary fiber. Rice flour belongs to the category of gluten-free flours, and is also an important source of protein, fibre, minerals and vitamins. The samples obtained were subjected to several physico-chemical analyses and the results showed a significant improvement in nutritional value, while the taste, aroma profile, color, and texture remained largely unchanged compared to the control sample.

**Key words:** *alfalfa powder, biscuits, nutritional value, protein, rice flour, semi-gluten biscuits*

## ***PROTEIN ISOLATES FROM BY-PRODUCTS OF THE LOCAL OILS INDUSTRY***

Students: Corina COTOROBAL, Cristina CHIRTOCA  
Coordinating Professor: Assoc. prof., Ph.D. Alina BOIȘTEAN  
*Faculty of Food Technology,  
Technical University of Moldova, Republic of Moldova*

### **Abstract:**

The growing interest in sustainable food production methods has highlighted the importance of utilizing by-products from the food industry, such as those from the oils sector. This research focuses on the extraction of protein from sunflower meal, a by-product of the local oils industry, using a sodium chloride extraction method. The study investigates the effectiveness of this method in isolating proteins. One possible explanation for the lower-than-expected yield is the presence of albumins in the sunflower meal, which are water-soluble and partially soluble in concentrated saline solutions, as well as heat-denaturable. These factors may have limited the protein recovery. In addition, the study explored the potential of the Lowry method for the quantitative determination of protein content in sunflower meal, which may provide more accurate measurements of protein concentration. The findings also highlight the need for further optimization of extraction techniques to improve protein yield and quality.

**Key words:** *by-product's valorization, oils and fats industry, protein extraction, sunflower meal, sustainable food production, waste reduction.*

**Acknowledgment:** The research was supported by Project 23.70105.5107.06T, “Valorization of vegetable proteins from secondary products of the local fat and oil industry” (ProVeg), being implemented at the Technical University of Moldova.

## ***FUNCTIONAL ECO-FRIENDLY PACKAGING FOR PENCILS***

Students: Roman SAVCHUK, Yuliia SLOBODIANIUK  
Coordinating Professor: As. Prof. Ph.D. Olena CHEPELIUK  
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### **Abstract:**

Pencil manufacturers primarily focus on their price and sufficient service life. Pencils of different softness, pastels, and watercolors are quite expensive and require reliable protection. Packaging for pencils is often made more attractive using printing design. However, its functionality is frequently overlooked. Patent documentation on this issue is primarily focused on achieving ease of use, characterized not only by the use of packaging as a place to store pencils but also by the presence of devices for sharpening and fixing them. The packaging design focuses on the convenience of holding and removing pencils. The package consists of a base, a top lid, a place for attaching the pencils, and a mechanism for lifting the pencils to a vertical position. When the lid is opened, the pencils automatically rise to a vertical position, from which it is convenient to take pencils by hand, both long and reduced in size due to prolonged use. The packaging has a place for an eraser, sharpener, and other accessories. The production of pencil packaging by means of FDM 3D printing technology is a reasonable and promising solution that meets modern requirements for eco-friendliness, functionality, and adaptability of production processes. The material used for production is PLA plastic, a thermoplastic and biodegradable polymer made from renewable resources, like corn starch or sugar cane. Using PLA for 3D printing reduces energy costs and minimizes environmental impact.

**Key words:** *design, eco-friendly, FDM 3D printing, packaging, pencils, PLA plastic*

## **VALORIZATION OF BY-PRODUCTS OBTAINED DURING THE PRODUCTION OF LIQUEUR FROM CORNELIAN CHERRY (*CORNUS MAS L.*)**

Students: Ana TROHINA, Alexandru CRICLIVÎ

Coordinating Professor: Assoc. prof. Ph.D. Aurica Chirsanova; Assoc. prof. Ph.D. Alina BOIȘTEAN

*Faculty of Food Technology,  
Technical University of Moldova, Republic of Moldova*

### **Abstract:**

In recent years, some of the industrial waste and by-products from liqueur industry have been studied to evaluate their nutritional composition and the presence of bioactive compounds. In fact, these by-products showed enormous potential as source of compounds with antioxidant, and antimicrobial activities that might have interest to pharmaceutical, food, agriculture, or cosmetic industries. Thus, the purpose of this study was to evaluate the secondary plant raw materials obtained after the production of liqueur from *Cornus Mas L.* for the content of polyphenols and antioxidant activity, and further use in the production of a new functional vinegar with appropriate biological properties. Aqueous extracts were prepared from the spent cotyledons at 1:1, 1:2 and 1:3 ratio, which were further used for acetic fermentation. The obtained vinegar was evaluated for total polyphenol content, antioxidant activity and color. From the data obtained, we can conclude that most of the studied parameters are good indicators of the vinegar quality. We also found that vinegar has health benefits. For example, the antioxidant properties of vinegar from used *Cornus Mas L.* were comparable to other commercially available vinegars.

**Key words:** *antioxidant activity, food industry waste, plant extracts, polyphenols, vinegar, waste reduction.*

**Acknowledgment:** This work supported by the Institutional Project 020405 Optimization of food processing technologies in the context of the circular bioeconomy and climate change-Bio-OpTehPAS, and the Project supported by MECC of RM and Agence Universitaire de la Francophonie Valorisation intelligente des résidus viti-vinicoles dans le contexte de l'économie circulaire-ValinVit, being implemented at the Technical University of Moldova.



## ***THE EFFECT OF TEMPERATURE ON THE SIZE OF BIOSYNTHESIZED SILVER NANOPARTICLES***

Valeriia MARCHENKO, Oksana SKROTSKA  
*Department of Biotechnology and Microbiology,  
National University of Food Technologies, Ukraine*

### **Abstract:**

Silver nanoparticles (AgNPs) are actively studied worldwide for their potential applications in various fields. Among modern synthesis approaches, biological synthesis is highlighted for its environmental friendliness and practicality. Biosynthesized silver nanoparticles exhibit high potential biological activity against pathogens, including bacteria, fungi, and viruses. Moreover, the biological synthesis method allows for adjusting the shape, size, and dispersity of AgNPs, thereby improving their biological properties. In our research, a cell-free aqueous extract of *Saccharomyces cerevisiae* M437 yeast and a silver nitrate solution at a final concentration of 1 mM were used for AgNP synthesis. The samples were incubated under static conditions for 21 days at temperatures of 30, 35, 40, 45, and 50 °C. The size of the AgNPs was measured using the Zetasizer Nano ZS. We observed an increase in nanoparticle size in the temperature range from 30 to 40 °C, from 165 to 224 nm. At 50 °C, the nanoparticle size was 151 nm. The smallest size of AgNPs was recorded at a biosynthesis temperature of 45 °C. Thus, the formation of AgNPs of varying sizes at different biosynthesis temperatures confirms the possibility of optimizing this process.

**Key words:** *biosynthesis, ecological synthesis, nanoparticles, Saccharomyces cerevisiae, silver, yeast*

## **DEVELOPMENT AND VALIDATION OF FAST CHROMATOGRAPHIC METHOD FOR INDOLEACETIC ACID DETERMINATION PRODUCED BY BACTERIA**

Student: Mykhailo TYMOFIENKO,  
Coordinating Professor: Prof. Ph. Liudmila BUTSENKO  
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National University of Food Technologies, Ukraine*

### **Abstract:**

A new high-performance liquid chromatography method with fluorescence detection (HPLC-FLD) for the rapid and efficient quantification of indoleacetic acid (IAA) in bacterial cell cultures was developed and validated. Existing methods for determination of IAA often face significant challenges, including complex sample matrices, the presence of interfering substances, and the need for time-consuming and labor-intensive sample preparation. This study focused on overcoming these challenges by simplifying the sample preparation process and optimizing the analytical workflow. The newly developed HPLC-FLD method leverages a straightforward and efficient sample preparation protocol, significantly reducing the time and solvent amounts required for analysis. The method was validated in accordance with the guidelines of the International Conference on Harmonisation (ICH), assessing key parameters such as specificity, linearity, accuracy, and repeatability. To evaluate its performance under practical conditions, the method was applied to the analysis of IAA production by two bacterial strains: *Bacillus subtilis* 26D and *Bacillus amyloliquefaciens* IMV A4. The results confirmed that the method could effectively differentiate IAA production levels and consistently quantify the hormone, even in biologically complex samples.

**Key words:** *bacterial cultures, HPLC-FLD, IAA, method development, rapid screening*

## ***DEVELOPMENT OF TECHNOLOGY OF ORGANIC MARSHMALLOW BASED ON VEGETABLE FOAMING AGENT***

Students: Anna BILYK, Nadiia KOLESNYK  
Coordinating Professor: Prof. Ph. Olena KOKHAN  
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National University of Food Technologies, Ukraine*

### **Abstract:**

The article presents the results of research on the possibility of completely replacing egg white in the recipe of organic marshmallows with aquafaba vegetable foaming agent. To obtain a vegetable foaming agent, chickpea grains were used, which were grown in compliance with the principles of organic production. Rational parameters for the preparation of aquafaba based on organic chickpea grains were established. The main technological indicators of foam based on egg white and aquafaba were studied. The need to use technological techniques for stabilizing foam based on vegetable protein has been established. The study of quality indicators of the marshmallow mass made it possible to adjust the parameters of its preparation and the stage of formation of the product blanks. To increase the dimensional stability of the marshmallow halves made on the basis of aquafaba, it is suggested to boil sugar-agaro-molasses syrup to a higher content of dry substances, and to carry out the forming process at a lower temperature of the marshmallow mass in comparison with the control sample on egg white. Analysis of the quality indicators of ready-made samples of organic marshmallow based on aquafaba showed their compliance with the requirements of the current documentation. The developed samples are close to the reference marshmallow sample in terms of their quality indicators, have a harmonious taste and maintain their quality during the warranty period of storage.

**Key words:** *aquafaba, chickpeas, foam, marshmallow, organic production, quality*

***PARAMETRIC SYNTHESIS OF THE FUNCTIONAL MODULE OF ACCUMULATION  
AND POSTAL ISSUANCE OF ARTIFICIAL FOOD PRODUCTS IN PACKAGING  
MACHINES***

Students: Anton KOKHAN, Oleksandr GAVVA,  
Coordinating Professor: Ph.D.Sc. Lyudmyla KRYVOPLIAS-VOLODINA  
*Acad. I.S. Hulyi Educational and Scientific Engineering and Technical Institute,  
National University of Food Technologies, Ukraine*

**Abstract:**

The stable operation of artificial food products packaging machines significantly depends on the rhythmic supply of the product to the packaging module. For smooth operation of the loading device, minimizing the duration of the operation and energy consumption, it is necessary to perform its parametric synthesis. The research materials are the design schemes of loading devices and physical and mechanical properties of artificial products of food production. The synthesis of device parameters was carried out by the method of mathematical modeling.

For the mathematical modeling of the operation of individual separation of the product under the action of the foot of vibration, the foot of the products is adopted as a two-mass dynamic model consisting of the separating product and the foot of the products located above, given by one body. Damping properties of the foot are reflected by elastic and dissipative elements. Using such a model will make it possible to divide the operation into two stages. The first stage describes the vertical movement of the foot under the action of inertial force. The second stage is the longitudinal movement of the product at minimum values of normal reactions between the components of the foot of the product. The performed numerical calculations of mathematical models of the movement of a single product made it possible to establish that during the action of vibrational oscillations on the foot of the products, the driving force of piece-by-piece separation of the product decreases by 30%.

**Key words:** *artificial product, functional module, packing machine, scheme, synthesis, vibration*

## ***CERTIFICATION OF TRADITIONAL ROMANIAN FOOD PRODUCTS: A PATHWAY TO PRESERVING HERITAGE AND QUALITY***

Student: Mirela JALBĂ,  
Coordinating Professor: Lecturer Ph.D. Sergiu PĂDUREȚ  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

In Romania, products with national recognition include Traditional Romanian Products, Consecrated Romanian Recipes, and Mountain Products. These foods significantly preserve cultural heritage, reflecting the region's culture, history, and identity while supporting the local economy. Traditional Romanian foods embody elements unique to the national cuisine, aligning with the growing emphasis on national identity and traditionalism. The consumption of these products strengthens ties to cultural heritage and is often associated with superior taste, superior nutritional value, and affordability compared to mass-produced alternatives. The "traditional product" concept was officially regulated in Romania in 2004 through Order 690/2004, which established the criteria and conditions for certifying such products. Traditional food products are vital to developing the rural food industry globally, embodying traditional production methods, local natural ingredients, and region-specific recipes. Villages, inherently linked to tradition, serve as hubs for these practices. The promotion of traditional products has garnered significant attention, becoming a valuable asset for both small and large food producers. Traditional products are foods made using local raw materials, traditional recipes, and processes, without additives, and distinct from similar items. They are listed in the National Register of Traditional Products (RNPT). Regulatory bodies like ANSVSA (National Sanitary, Veterinary, and Food Safety Authority) and ONVPV (National Office of Vine and Wine Products) ensure compliance with quality, food safety, hygiene, and consumer protection standards, safeguarding the integrity of these products.

**Key words:** *food, heritage, local, recipes, rural, traditional*

# ***THE IMPACT OF PAR-BAKING TECHNOLOGY ON TEXTURAL AND PHYSICOCHEMICAL PROPERTIES OF BAKERY PRODUCTS***

Student: Vicol-Beniamin LAZĂR  
Coordinating Professor: Lecturer Ph.D. Sergiu PĂDUREȚ  
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## **Abstract:**

Baked products are a staple food globally, providing essential nutrients like carbohydrates, protein, dietary fiber, vitamins, and antioxidants. The origins of breadmaking trace back to prehistoric times when early humans discovered that crushed plant seeds mixed with water could be heated to create food. The Egyptians are credited with refining and popularizing breadmaking worldwide. Over time, bakers have explored various methods to prolong the shelf life of dough, which is typically constrained by the natural processes of yeast fermentation, enzymatic activity, and the gradual relaxation of gluten. The primary motivation behind these efforts has been to enhance production efficiency, culminating in the development of what is now referred to as partially baked bread (par-baking). Par-baking technology enhances bread production efficiency, but the degree of par-baking varies across product types and intended sales markets, resulting in differences in the final product's quality. A key benefit of par-baking is the flexibility it offers to bakers, restaurants, and consumers, allowing them to bake products as needed based on demand.

**Key words:** *color, dough, par-baking technology, physicochemical properties, quality, textural properties*

## ***USE OF SECONDARY DAIRY RESOURCES FOR THE PRODUCTION OF NEW PRODUCTS***

Student: Anton OSMAK,  
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National University of Food Technologies, Ukraine*

### **Abstract:**

The development of waste-free technologies with the maximum use of useful components that are part of the secondary raw materials is relevant for the food industry. Due to the insufficient number of innovative developments, a significant part of the nutrients and regulatory substances necessary for the human body is being lost.

Work on the implementation of methods of the full cycle processing of whey by isolating, concentrating, modifying its properties and developing innovative technologies for its use in food products, including the intended purpose has a certain resource-saving orientation. This will allow effectively use of the technological properties of fillers, their synergistic interactions with each other and with whey.

The introduction of resource-saving technologies and the production of high-quality and safe products with high consumer properties, contributes to solving the problem of protein deficiency, as well as providing the population of various social groups and living conditions with complete, balanced and bioavailable micronutrient composition, combined and multi-component target food products is of current importance area of research.

The analysis of literature shows that development of innovative whey technologies, and its complex use with food from animal and vegetable raw materials is a promising direction in the development of resource-saving food technologies.

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

***BIOSYNTHESIS OF COPPER NANOPARTICLES USING CELL-FREE EXTRACT OF SACCHAROMYCES CEREVISIAE M437***

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Coordinating Professor: Assoc. Prof. Ph.D. Oksana SKROTSKA  
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Department of Biotechnology and Microbiology,  
National University of Food Technologies, Ukraine*

**Abstract:**

Interest to new technologies for metal nanoparticles production grows all over the world, including biosynthesis with living microorganisms and cell-free extracts. Research were made on obtaining of nanoparticles of noble metals, earth metals and their oxides, iron, etc. with use of bacterial, fungal and yeast cultures. There is a lack of information about using yeast in general and particularly saccharomycetes in copper and copper oxide nanoparticles biosynthesis. This inspired us to figure out the possibility of such synthesis and to characterize obtained nanoparticles. On the Biotechnology and Microbiology chair of National University of Food Technologies experiment on copper NPs biosynthesis are performed using cell-free extract of *Saccharomyces cerevisiae* M437 with 1 mM copper sulfate solution at temperature range 35 – 50 °C. As result, nanoparticles of copper oxide were obtained with mean diameter about 164 nm and UV absorption wavelength 245 nm, which is corresponding to surface plasmon resonance wavelength of copper oxide. Zeta-potential of nanoparticles was about -10 mV.

**Key words:** *biosynthesis, cell-free extract, copper, nanoparticles, saccharomyces*



## ***FACTORS FOR SELECTING AN EFFECTIVE INOCULANT FOR CHICKPEAS***

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National University of Food Technologies, Ukraine*

### **Abstract:**

Global protein nutrition deficiency is one of the key problems of the modern world, especially in countries with low consumption of animal products. The cultivation of legume crops provides an effective solution to this problem. In growing chickpea (*Cicer arietum*) as an ecological alternative to mineral fertilizers it is advisable to use a bacterial inoculant based on *Mesorhizobium ciceri* species. The main problem of effective use of inoculants for chickpea is biochemical specificity of certain strains of *M. ciceri* to certain chickpea varieties and selection of inoculants based on their biochemical characteristics. When inoculants with weakly expressed factors promoting symbiosis are used, native strains of *M. ciceri* will have an advantage during the whole period of plant development. There are two types of biochemical factors for nodule formation on chickpea roots: Nod factors, which are proteins that specifically bind to NFS factors on chickpea roots and T3Es factors that act similarly to pathogenic bacteria by penetrating the cell. Symbiotic efficiency does not give a consistent result in most cases, ranging from 5-25% yield increase on fertile soils and 20% to 80% on poor soils. Selection of biological agent for chickpea inoculation based on biochemical factors will stabilize the symbiosis efficiency and provide a reliable, predictable solution for farmers and make chickpea cultivation more attractive, which will reduce its production cost, thus providing an additional basis for solving food safety problems.

**Key words:** *agriculture, chickpea, food safety, inoculants, nitrogen fixation, M. ciceri*

## ***INCREASE THE EFFICIENCY OF THE MALT EXTRACT FILTER***

Student: Anton LOVKIN

Coordinating Professor: Assoc. prof. Mykola DESYK,  
Lesia MARTSYNKEVYCH

*National University of Food Technology, Ukraine*

### **Abstract:**

Malt extract contains a complex of biologically active substances that gives the extract high nutritional and health-promoting value, contributing to its widespread use in the production of functional foods. The growing demand for healthy food products is leading to improvements in technological processes and equipment. One of the important stages of this production is filtration, which directly affects the composition of the final product, its stability and nutritional value. The aim of the research is to improve the efficiency of the filter for malt extracts in the production of health food products by improving design features of the equipment. The node of study is the filter's sub-sieve space with outlet tubes. The parameters to be investigated are the wort velocity in the sub-sieve space and the turbulence in the wort outlet zone. The influence of the geometry of the transitional cone outlet pipes of the wort discharge from the apparatus is studied. The main geometrical parameters of the transition cone nozzles were changed: 1) The range of diameters of the cone nozzles - from 32/25 mm to 80/25 mm; 2) The length of the cone nozzles - from 11 mm to 102 mm; 3) Cone angles from 15° to 20°. The modelling was performed in the Autodesk CFD software package. It was found that using the angular transition with the following parameters: length of the angular transition 36 mm, angle of transition 20°, diameters - 50/25 mm, we get an increase in the productivity of the filtration apparatus by 15.4% and a decrease in the turbulent kinetic energy of the fluid movement by 75.2% compared to the largest value, that is, with these parameters, the quality of the wort will be stable.

**Key words:** *conical nozzle, filter, malt extract, modeling, productivity, turbulence*

## ***BIOPROTECTION IN PRODUCTION OF FERMENTED MILK PRODUCTS***

Ph.D. Student: Anatolii LUKASHCHUK,  
Coordinating Professor: Professor *Galina POLISCHUK*,  
*Associate Professor Tetiana OSMAK*  
*Educational and Scientific Institute of Food Technology,*  
*National University of Food Technology, Ukraine*

**Abstract.** Fermented milk products, such as yogurt, sour cream, kefir and others, are quite important food products for the average European consumer. One of the most significant requirements for food is safety for the health of the consumer. At the same time, consumer demands that correspond to global market trends such as “natural”, “clean label”, and “zero food waste” are gaining increasing popularity. A significant advantage of fermented milk products compare to milk is the presence of lactic acid bacteria (LAB). These bacteria are the components of starter cultures, which are necessary for the fermentation of milk and its transformation into yogurt, kefir, or other fermented milk product. LAB during fermentation can produce not only lactic acid but a number of bioactive compounds.

Such bioactive compounds could be  $\gamma$ -aminobutyric acid, antimicrobial peptides, exopolysaccharides (EPS) etc. EPS produced by LAB during fermentation cause to achieve high viscosity and firm texture of the final product. High concentration of LAB in starter cultures and bioactive compounds they produce during fermentation allows to use an additional hurdle “competitive microflora” as a bioprotection against harmful bacteria which are the main reason of shorten shelf life and microbial spoilage of the food.

Comprehensive research into the influence of different types of starter cultures and additional functional cultures on the properties of the fermented milk products, as well as the use of their bioprotective properties, is a promising direction for the development of highly effective hurdle technologies of fermented milk products with an extended shelf life.

**Key words:** *bioprotection, clean label, fermented milks, hurdle technologies, lactic acid bacteria, shelf life, yoghurt*

## ***PLANT-BASED FERMENTED BEVERAGES***

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Coordinating Professor: Associate Professor Tetiana OSMAK  
*The Department of Milk and Dairy Products Technology,  
National University of Food Technologies, Ukraine*

### **Abstract:**

The growing interest in vegan dairy-free products is reshaping trends in the food industry. Plant-based dairy alternatives are typically designed to mimic the physicochemical and organoleptic properties of traditional milk. However, these alternatives often lack nutritional balance, and their flavor profiles limit consumer acceptance. Fermentation of plant-based milk offers an opportunity to enhance its sensory attributes, nutritional value, texture, and microbiological safety.

This study focuses on the development of plant-based fermented beverages, aiming to optimize their nutritional quality and functional properties through innovative approaches.

A key aspect of this investigation is the evaluation of plant-based milk as a substrate for lactic acid bacteria and its effect on the quality and efficiency of fermentation. Additionally, the study highlights the contribution of plant proteins in enhancing the amino acid profile and overall biological value of these beverages. Particular attention is given to the integration of advanced stabilization technologies designed to create beverages with consistent texture and extended shelf life.

The findings of this study are expected to address critical, practical and theoretical challenges in the field of plant-based dairy alternatives, improving their quality and aligning them more closely with traditional dairy products in terms of nutritional value, sensory appeal, and functionality.

**Key words:** *dairy milk alternatives; fermentation technology; plant-based beverages; plant milk; plant proteins; vegan dairy-free products*

## ***IMPROVEMENT ON THE WHEY PROTEIN-POLYSACCHARIDE CONCENTRATES TECHNOLOGY***

Ph.D. Student: Petro PARKHOMETS

Coordinating Professor: Ph.D.Sci. Prof. Galina POLISHCHUK, Ph.D. assoc. Prof. Tetiana OSMAK

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**Abstract:** Reduction of raw materials use, industrial waste processing and integration of secondary materials are among the main sustainable business practices. To this day, processing of available whey remains unsolved cause on the vast amount of dairy processing plants and farms. Whey, while being sold in bulk as livestock feed or thrown away as sewage, remains a source of high-value milk proteins. Extracted whey proteins may be used as a natural food additive. They are currently being used as stabilizing and thickening agents, as well as food fortifiers, as the good source of essential amino acids. A systematic literature review was conducted in order to assess potentially profitable and easy-to-implement protein concentration methods. One of the most promising methods of whey proteins extraction is based on the complexation ability of certain types of polysaccharides. Depending on the dosage and conditions of usage, the same polysaccharide can be both a stabilizer and a flocculant. The flocculating effect of polysaccharides may be manifested both by bridging or depletion flocculation. Addition of the smallest doses of polysaccharides can destabilize the colloidal system of whey and lead to the precipitation of proteins. Previously conducted researches indicate the possibility of such use of known food additives, such as modified starch, chitosan and pectins. New research should be done to evaluate the processability and possible application for obtained complexes.

**Key words:** *Complexation, flocculation, polysaccharides, precipitation, whey, whey proteins*

## *DIFUSE*

Students: Marina-Dumitrița CIUBOTARIU, Ana-Cristina COLNICEANU, Ionuț PREDA,  
Andrei-Nicolae TOMA, Debora-Adina ZEGREA

Coordinating Professor: Prof. Ph. D. Eng. Adriana DABIJA, Prof. Ph. D. Eng. Amelia  
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*Faculty of Food Engineering,  
Stefan Cel Mare University of Suceava, Romania*

### **Abstract:**

DiFuse is a consumer-oriented product that falls under the tea category, which is not only innovative in the way it is formulated, but by the positive impact it has on the environment as well. Each ingredient that goes into the making of our product is carefully selected and processed so that each customer fully benefits from all the functional values it brings with each cup. This product is unique in the world, both for its sensory properties and the solvable sachet that quickly dissipates when introduced into hot water. Amongst the innovative ingredients present in the mix, we mention cedar syrup, dandelion syrup, lavender, and nettle, all of which are locally sourced. Our primary packaging is unique in that it is made from natural ingredients, which can be safely consumed. There is no need to discard the packaging after finishing the product; it simply dissolves, leaving no residue. This significantly reduces packaging waste.

The innovative aspects of the DiFuse product are:

**Edible packaging:** this revolutionary solution eliminates plastic and paper waste, making DiFuse a delicious and sustainable product. This packaging perfectly encapsulates the ingredients in order to prevent degradation with a very low Water Vapor Permeability and the special formulation from natural ingredients used to craft the film makes it suited for human consumption, adding a touch of innovation and sustainability in all aspects of the product.

**Unique ingredients on the local market,** such as cedar syrup and dandelion, which give the tea a signature and distinctive flavor: DiFuse stands out by using the highest quality natural ingredients, most of them being locally sourced. This choice ensures an authentic product that reflects the richness and diversity of local resources.

**Redefining standards in the tea industry,** making it an ideal choice for those seeking a truly special product: through these innovations, DiFuse becomes more than just a simple tea. It is a product that combines tradition with innovation, offering consumers a unique, sustainable, and flavorful experience.

**Innovative manufacturing recipe:** The worldwide uniqueness of the product is mostly due to the eco-innovative elements involved in the manufacturing recipe of the finished product. The use of cedar and dandelion syrup, as raw materials, fruit extract in herbal infusion and the valorification of cherry pits and stems, as well as apples from which we extract pectin and juice. The uniqueness at national level is given by the first assortments of tea with edible package, without sugar and additives addition.

DiFuse ingeniously and sustainably valorizes by-products: we use their cherry pits and stems, as well as apples from which we extract pectin and juice. These ingredients not only reduce food waste but also enrich our tea with authentic flavors and essential nutrients. The apple juice adds a natural sweet note, harmoniously complementing the taste of cedar and dandelion syrup.

**Key words:** *edible packaging, difuse, dissolvable packaging, sugar-free, syrups, tea*

## ***MULTIPHASE MODELING OF PARTICLE MOVEMENT IN A HORIZONTAL BEAD MILL WITH DISK AGITATORS***

Artem PONOMARENKO, Maksym KASYNIUK, Kateryna HRININH, Oleksii GUBENIA  
*National University of Food Technologies, Ukraine*

### **Abstract:**

The multiphase modeling of particle movement in a horizontal bead mill with disk agitator using ANSYS Fluent and Rocky DEM. The modeling allowed for the analysis of particle dynamics, velocity distribution, and contact frequency with the material, revealing the impact of mill design on grinding efficiency. The combination of flow modeling (Fluent) and particle motion analysis (Rocky DEM) provided insights into their interaction.

As a result of research, it was found that:

1. Turbulent zones between the disks facilitate active mixing, while optimizing their geometry minimizes stagnant zones.
2. Most bead-particle contacts occur in the peripheral zone, where velocity is highest.
3. Increasing bead density enhances contact frequency but may lead to wear.
4. Optimized disk design improves particle circulation and grinding uniformity.

The modeling identified key parameters affecting the efficiency of the mill. The results can be utilized to improve the design, enhance productivity, and achieve uniform grinding.

**Key words:** *ANSYS Fluent, bead, dynamic, mill, modeling, multiphase, particle, Rocky DEM*

## **VALORIZATION OF JOSTA BERRY IN SUGARY CONFECTIONERY PRODUCTS**

Students: Elena VASILACHI , Olga SMEREA  
Coordinating Professor: Assoc. prof. Olga BOESTEAN, Ph.D.  
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*Technical University of Moldova, Moldova*

### **Abstract:**

Confectionery products are extremely popular and consumed among consumers and the demand for these products is constantly increasing. An effective strategy in this regard is the introduction of a new ingredient in the recipe for the production of marmalades, namely wild berries. Berries are rich in valuable biologically active substances and compounds that contribute to the good formation of marmalade structures. In this context, jostaberry are proposed for the production of marmalades. Josta is the hybrid between black currants and gooseberries. The high content of biologically active compounds is its main advantage, because it contains components of gooseberry and currant at the same time. These berries add a distinct and pleasant flavor, providing a special taste experience. In addition, jostaberry are rich in vitamins, minerals and antioxidants, which give marmalades or superior nutritional value when used as an ingredient. The use of josta extract in the manufacture of marmalades offers an interesting option and diversifies the range of flavors available.

The objectives of this study were to investigate the effect of josta extract on the quality, color and textural properties of marmalade based on different gelling agents. The sensory, physicochemical, texture parameters and color indicators of marmalades based on agar-agar and pectin with the addition of josta extract in a proportion of 1-5% were analyzed. It was proposed to study the influence of josta extract on the quality of marmalade during their storage. The optimal score was given to samples with 5% josta extract. The results of the present research described the following values for the experimental samples based on agar-agar and pectin, respectively: the values of moisture, acidity and the content of reducing substances have insignificant changes, josta extract positively influenced the texture parameters in both types of marmalades, once the amount of josta extract was increasing, the texture parameters also increased. In the case of marmalades based on agar-agar with josta extract, a decrease in water activity from 0.742 to 0.649 is observed, and in the case of pectin-based marmalades, an increase (0.535-0.561).

According to the quality indices obtained, the marmalade can be considered a safe product for consumption, which retains its quality indices during a storage period of 35 days under the prescribed storage conditions and can be recommended in the diet of various consumer groups.

**Keywords:** *confectionery products, jostaberry, josta extract, marmalade*



## ***DETECTION OF WALNUT OIL ADULTERATED WITH SUNFLOWER, RAPESEED AND SOYBEAN OIL USING FTIR ANALYSIS***

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Coordinating Professor: Prof. Ph.D. Eng. Mircea-Adrian OROIAN  
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Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

In this study the possibility to discriminate genuine walnut oil from counterfeit walnut oil based on FTIR spectra was investigated. Four types of genuine walnut oil (obtained by cold pressing in the laboratory) were adulterated with two types of sunflower oil, two types of rapeseed oil and two types of soybean oil in different percentages (5%, 10%, 20%, 30%, 40% and 50%). The use of different spectroscopic sampling methods, including Attenuated Total Reflectance (ATR) and data analysis software, allows a fast and reliable approach for oil authentication. The FTIR spectra of the 154 samples analyzed are very similar and show a specific feature of absorption peaks for common triglycerides. The infrared spectra of tocopherols reveal distinct, strong absorption bands, located prominently in the 1500-1000  $\text{cm}^{-1}$  region. Using absorptions in the frequency region of 4000-650  $\text{cm}^{-1}$  makes FTIR analysis to be used as a rapid method to differentiate between walnut oil and its adulteration with sunflower, rapeseed and soybean oil. This technique is able to qualitatively and quantitatively discriminate genuine and adulterated foods.

**Key words:** *adulteration, cold pressing, FTIR, spectral characteristics, walnut oil*

## **BREADMAKING QUALITY PARAMETERS OF DIFFERENT VARIETIES OF TRITICALE CULTIVARS**

Ph.D. Student: Sergiu PAIU

Coordinating Professor: Aliona GHENDOV-MOSANU<sup>1</sup>, Georgiana CODINĂ<sup>2</sup>,

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<sup>2</sup>*Faculty of Food Engineering, Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Triticale, a hybrid of rye and wheat, is valued for its high production potential, adaptability, and nutritional benefits, such as high fiber and essential amino acid content. Its cultivation has expanded since the 1990s, with Europe being the leading producer. A study examined seven triticale varieties from the Republic of Moldova: Ingen 93, Ingen 33, Ingen 35, Ingen 40, Ingen 54, Costel, and Fanica - to evaluate their potential for bread production using only triticale flour. This research provided the first comprehensive analysis of triticale dough's technological behavior, assessing rheological, textural, and physicochemical properties. Triticale flour samples were evaluated for physicochemical quality using ICC standards. Dough rheological properties during mixing and pasting were analyzed with Mixolab device, and bread was made with controlled fermentation and baking. The bread's quality was evaluated both physicochemically and sensorially. Results indicated moisture content between 12.1% and 12.4% for good storage potential. Ash content ranged from 1.5% to 1.73%, with Ingen 35 showing the highest protein content (14.6%). Dough ashows revealed differences in water absorption, with Ingen 40, Ingen 54, and Fanica showing the highest stability. Bread evaluation showed Ingen 93, Ingen 54, and Ingen 35 had the highest sensory scores. Ingen 35 and Ingen 33 had high volume values linked to gluten content. Ingen 40 and Ingen 54 had high stability and long development times, and Ingen 33, Costel, and Fanica showed reduced starch retrogradation for longer shelf life. Overall, Ingen 33 and Ingen 35 were promising for superior bread quality.

**Key words:** *Hybrid, Nutritional benefits, Physicochemical quality, Rheological properties, Sensory evaluation, Triticale*

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## ***EFFICIENCY OF CYCLIC RECTIFICATION FOR ETHANOL PRODUCTION***

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### **Abstract:**

The efficiency of the ethyl alcohol rectification process depends on the degree of purification of the final product from organic impurities and the heating vapour flow rate in the distillation unit. Studies of the efficiency of the technology of cyclic rectification of ethyl alcohol, providing for the implementation of controlled cycles of liquid delay on the column plates and its overflow without interruption of heating vapour supply have been carried out. The design of the rectification column for its realization is developed. Hydrodynamic modes of operation of sieve and flake plates in cyclic mode are established: vapour velocity in the free section of the column and plate openings for mass exchange between liquid and vapour and liquid preflow. The research results obtained in production conditions proved the advantages and feasibility of using the innovative technology: in the process of separation of alcohol-containing fractions in full measure head impurities of alcohol are allocated, the degree of extraction of the higher alcohols of sivush oil increases by 38%, methanol – by 15,6%, the multiplicity of concentration of head impurities increases by 25%, higher alcohols – by 40%, methanol – by 34%, acrolein – by 36%, isopropyl alcohol – by 42%. At the same time vapour consumption in the impurity concentration column is reduced by 40% in comparison with typical units operating in the stationary mode and does not exceed 12 kg/dal of absolute alcohol (a.a.) introduced with feed.

Increasing the contact time of vapor and liquid on each plate up to 30–40 s allows increasing the degree of purification of rectified alcohol from volatile impurities and reducing energy costs by at least 40%.

**Key words:** *alcohol, column, distillation, energy, extraction, impurity*

## ***CRYOPROTECTIVE PROPERTIES OF FUNCTIONAL MIXTURES IN SAUSAGE PRODUCTS***

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Student: Bohdan PITSENKO

Coordinating Professor: Prof. Iryna SHEVCHENKO

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### **Abstract:**

The sausage was prepared using a cryostabilizing mixture with a content of 2.0, 2.5, 3.0 and 3.5 %. The cryostabilizing mixture comprised animal protein, bamboo fiber, wheat fiber and sodium alginate in a ratio of 1:0.5:0.5:0.5. The sausages were frozen at  $-18\text{ }^{\circ}\text{C}$  for 30 days. The addition of the cryostabilizing mixture to minced meat systems significantly improves their moisture retention (by 9.7–17.3%) and fat retention (by 9.4–9.7%), and increases the stability of the systems by 15.7–16.5%. The use of a mixture of 2.5–3% provided better sensory characteristics, including greater juiciness and structure density. Weight loss during defrosting and heat treatment decreased by 10.24–14.67%, and water activity decreased by 0.048, which contributed to the shelf life of sausage products. The cryostabilizing mixture also reduces the cryoscopic temperature of meat systems by 2.82–4.52 $^{\circ}\text{C}$  and improves the structural and mechanical properties of products after defrosting.

The most significant changes in sensory quality indicators: insufficient juiciness, fragility of the structure, lower yield, and higher losses during heat treatment by 6.18–7.25% were observed in control samples after freezing, storage for 30 days, and thawing. The best structural and mechanical properties (penetration stress 27.37–27.63 Pa) were obtained for thawed samples of sausage products with the addition of a cryostabilizing mixture in the amount of 2.5%–3.5%. The consistency and density of such products almost did not differ from the consistency of chilled products, and single stratifications of the structure were visible in their section, but in a very small amount. The study proved that the use of 2.5–3% cryostabilizing mixture improves the sensory and structural and mechanical properties of cooked sausages.

**Key words:** *cryoprotectant, cryostabilizing, freezing, rheology, sausage*

## ***LABELS WITH DIGITAL PRINTING***

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Coordinating Professor: Nataliya KULYK

*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

Despite all the difficulties of today, the consumer market in Ukraine is developing and demonstrates an increase in the variety and number of offers, the spread of brands, which requires an increase in the number of different labels, but in smaller volumes, as well as an increase in the requirements for their economic competitiveness, environmental friendliness, manufacturability, creativity and decorative designs.

Due to the economic benefits of small print runs and the technological capabilities to provide personalization, personalization and creativity of designs, digital printing is now showing increasing trends in both volume and total value of label production orders. A modern label can even involve the consumer in creating unique gift wrapping for holiday events. For example, a color sticker with a patriotic, wedding or New Year's theme, which the consumer can stick on himself, can give a product or drink in ordinary packaging a unique look, creativity and decorativeness, and the consumer - unforgettable emotions of involvement in the process of creating a gift.



**Key words:** *digital printing, label, personalization, personification*

## ***INFLUENCE OF ROTARY TABLE SPEED ON TABLET FRIABILITY***

Students: Dmytro OSADCHYL, Oleksandr ZOMENKO

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*National University of Food Technologies, Ukraine*

### **Abstract:**

Friability of tablets was studied using the "ERWEKA TAR II" device, which has a cylindrical drum (diameter 283–291 mm, rotation speed  $25\pm 1$  rpm) and a blade that lifts and drops tablets from a height of  $156\pm 2$  mm. The procedure involves weighing 10 pre-cleaned tablets, operating the device for 4 minutes, and re-weighing the tablets to assess weight loss.

Observations revealed that tablets produced at higher rotary table speeds (35–80 rpm) show increased friability (0.15% to 1.24%) and reduced strength. This effect is attributed not to the drum's rotation speed but to the velocity of punches and tablet ejection. High ejection speeds generate intense friction, damaging the outer tablet layer, which leads to defects during coating, transport, and packaging.

The relationship between friability and ejection speed resembles phenomena observed in other industries. Products with high adhesion, like bread or meat, experience significant stress at high sliding speeds, while low-moisture items are less affected.

Other factors, including vibrations in press tools, die and punch surface roughness, and polishing methods, likely influence friability. These factors, alongside production optimization, require further investigation to improve tablet quality and durability during manufacturing and handling.

**Key words:** *compression, friability, hardness, quality, strength, tablet*

## ***INFLUENCE OF ROTARY TABLE SPEED ON TABLET STRENGTH***

Students: Andrii PLESHUK, Yevhen SAVITSKYI

Coordinating Professor: Oleksandr ZOMENKO

*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

In tablet manufacturing, a rational rotary table speed of compression machine is established for each tablet type. It were analyzed two typical sample of the tablets manufactured on an industrial rotary compression machine. Tablet strength was evaluated by measuring diametrical breaking stress. During experiments with rotary table speeds of 35 to 80 rpm, a nearly linear relationship between speed and tablet strength was observed.

At high rotary table speed, and, accordingly - pressing speeds, tablet strength decreases. Tablet structures lack time to form properly, and elevated ejection speeds increase friction, damaging the outer layers. Within this range, tablet strength decreased by up to 20%.

To maintain stable quality, rotary table speeds above 50 rpm are inadvisable. Tablet strength is also influenced by the dwell time, determined by the flat surface area of the punch head contacting the pressing roller. However, increased punch speed and acceleration from reduced curved punch head areas can adversely affect quality at higher pressing speeds. These factors limit the rotary table speed of the tablet press. For this study's tablets and the Korsch XL 400 press, an optimal speed of 50 rpm was identified. Productivity increases are possible with more frequent polishing of die and punch surfaces, mitigating strength and friability issues.

Therefore, the quality of the pressed materials can be partially adjusted using the pressing modes – the speed of rotary table of the compression machine, as well as using periodic polishing of the pressing tool.

**Key words:** *compression, friability, hardness, quality, strength, tablet*

## ***CHANGE IN TABLET STRENGTH DURING ROTARY COMPRESSING MASHINE WORKING***

Students: Serhii SAMARCHUK, Anatoliy ZHEBROVSKYI  
Coordinating Professors: Oleksandr ZOMENKO, Oleksii GUBENIA  
*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

The strength (or breaking limit) of the tablet was determined using a widely accepted method in pharmaceutical practice: the tablet was compressed in a diametric direction, and the force  $P$  at which the tablet failed was measured.

The breaking limit of the tablet is defined as the ratio of the breaking force to the cross-sectional area of the tablet. In this study, the breaking force and strength of the tablet were determined using the PTB-M 300 N Pharma Test device. The device's accuracy is 1 N, and each test was repeated 10 times.

The effect of compaction pressure (or tablet mass) on tablet strength has been sufficiently studied. In our case, three distinct phases can be identified: a preliminary compression phase, where strength changes only minimally; an intensive compression phase, during which strength increases rapidly; and a tablet fracture phase, in which strength decreases as compaction pressure continues to rise.

The number of compression cycles (number of tablets produced) in the die-punch pair affects tablet strength: after 300,000 cycles, the tablet loses, on average, up to 8% of its strength. This is due to product adhesion to the die and punch surfaces, increasing their roughness and consequently raising the friction coefficient and adhesion strength. As a result, the outer layer of the tablet exhibits lower strength and undergoes intense degradation.

**Key words:** *compression, friability, hardness, quality, strength, tablet*



## ***STREET LEVEL NOISE IN SUCEAVA, ROMANIA***

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Coordinating Professor: Lecturer Ph.D. Cristina GHINEA

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*Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The purpose of this paper is to investigate noise pollution in a street area located in Suceava, Romania. The SAUTER SU 130 Sound Level (ranging from 30 to 130 dB, with a resolution of 0.1 dB) was used to record the noise level at three points located on Universităţii Street. The first measurement point was the intersection of Universităţii Street and 1 Mai Boulevard, the second point was halfway down the street and the last point was the intersection of Universităţii Street and George Enescu Boulevard. Four different times of the day were chosen for the measurements: morning (between 7 and 8 am), midday (between 11 am and 12 pm), afternoon (between 3 and 4 pm) and evening (between 7 and 8 pm). Measurements were performed during and at the end of one week. The recommended noise level for road traffic during the day is 53 dB(A) according to the World Health Organization and between 74 dB(A) and 80 dB(A) according to European Legislation. The results showed that street noise levels are "very high" and "extremely noisy". During the week, noise levels are highest between 7 and 8 am (93-102 dB), and 3 - 4 pm (99-110 dB), and slightly lower on weekends between 7 am and 12 pm (80-86 dB). There was also observed an increase in noise levels on Friday between 7 and 8 pm. The highest values were obtained at street intersections, and the lowest (70-72 dB on weekends) at mid-street.

**Key words:** *noise levels, noise pollution, road traffic, sonometer, urban environment*

# ***APPLICATION POSSIBILITIES FOR ULTRASONIFICATION TREATMENT OF FRUIT PUREES***

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## **Abstract:**

In fruit processing, an important place is taken by the technological processes used to obtain purees for direct consumption and for use as ingredients in food products. Traditionally, the most commonly used method of producing purees is heat treatment. Heat treatment of raw materials contributes to the degradation of natural biochemical compounds, which in turn affects their biodiversity. A promising method for producing purees is ultrasound treatment, which preserves natural biochemical compounds. The impact of ultrasonic puree processing has not been extensively investigated so far. The parameters of ultrasonic cavitation - temperature and extraction time are optimized to obtain a maximum output of extractable substances and their biological activity. Ultrasound application is characterized by significant advantages compared to traditional technologies of raw materials processing. In particular, it provides deep penetration of the solvent into the cellular structured material, reduces processing time, ensures better efficiency, reduces solvent consumption, increases process speed, allows extraction of thermolabile substances. The equipment has low maintenance costs, less energy is used for processing; as a result, the process is more environmentally and economically feasible, more environmentally friendly.

**Key words:** biodiversity, compounds, green solvents, ingredients, raw materials, technological processes.

*Acknowledgments:* The research was supported by the *Institutional Project, subprogram 020405 "Optimization of Food Processing Technologies in the Context of Circular Bioeconomy and Climate Change," Bio-OpTehPAS, implemented at the Technical University of Moldova*

***RESEARCH ON THE CHARACTERISTICS OF BREAD OBTAINED WITH WHEAT FLOUR AND LEGUMES: TECHNICAL-FUNCTIONAL CHARACTERISTICS AND SENSORY EVALUATION***

Students: Eusebiu DRĂGOI, Nadina POPOVICI, Claudia-Dumitrița VĂRVĂRUC, Bianca-Aurica TAPALAGĂ, Cristian MITITIUC, Sergiu LAZĂR

Coordinating Professor: Sorina ROPCIUC, Ancuța PRISACARU and Daniela PAULIUC

*Faculty of Food Engineering,  
Ștefan cel Mare University of Suceava, Romania*

**Abstract:**

The present study evaluated the baking qualities and physicochemical properties of bread produced from wheat flour supplemented with lentil flour at different inclusion levels to assess its suitability for use in bread production. The introduction of fermented lentil flour into bread formulation has important nutritional effects, but its successful implementation in technology is challenging and requires a good understanding of the effect of flour functionality and the level of substitution on bread quality. One way in which lentils have been used as an ingredient in the food industry is in the form of flour, which is commonly used as a thickening agent, gelling agent and/or stabilizer in a wide range of food products due to its functionality. The percentages of replacement of wheat flour type 650 with fermented lentil flour were 0, 2, 6 and 10% [w/w]. Lentil flour in dough has the property of creating a three-dimensional structure, interacting with gluten, giving it superior properties compared to regular doughs. Analysis of the viscous and elastic moduli highlighted the superior effect of fermented lentil flour. The amount of gases formed was significantly higher when using lentil flour in doughs and the development of the dough was beneficially influenced by the functional components of lentil flour. From a sensory point of view, the bread was appreciated by consumers, obtaining favorable scores in the samples obtained with the addition of 2% lentil flour.

**Key words:** *bread, fermentation, lentil, rheology, sensory analysis, texture*

# ***REPLACING SOLID FAT IN FLUID DOUGH USING STRUCTURED OILS. IMPACT ON RHEOLOGICAL PROPERTIES AND BAKED PRODUCT QUALITY***

Students: Eusebiu DRĂGOI, Otilia FORTUNA, Claudia-Dumitrița VĂRVĂRUC, Nadina POPOVICI, Bianca-Aurica TAPALAGĂ

Coordinating Professor: Sorina ROPCIUC, Mariana SPINEI, Anca GÂTLAN  
*Faculty of Food Engineering  
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## **Abstract:**

In the food industry and especially in the bakery and pastry industry, the use of margarine remains indispensable, because it ensures the preservation of the sensory qualities appreciated by consumers. The effects of consuming hydrogenated fats on health are a vast topic that is still under research. Replacing with a healthy and chemically safe alternative and keeping the organoleptic properties area of application of our research. In this study, oleogels are presented as a healthy alternative to saturated fats, replacing margarine in well-known pastry products - muffins. Oleogels are unique semi-solid materials consisting of a network of structuring molecules that trap oil in liquid form, resulting in a gel-like texture. Oleogels were obtained using grape oil and walnut oil and carnauba wax as an oleogelating agent. The percentages of wax added to the oil for oleogelation were 0%, 7% and 11%. The rheological results on the muffin dough in which oleogel was incorporated showed an increase in the elastic modulus as well as the viscous modulus. The texture of oleogel muffins showed characteristics similar to margarine muffins. From a sensory point of view, the hemp oleogel muffins presented a bitter user taste and a specific smell, which led to the oil obtaining lower scores from the tasters. These results demonstrated that oleogels based on sunflower oil and hemp oil using carnauba wax as an oleogel agent can be used as margarine substitutes to reduce the consumption of saturated and trans fats in pastry products from fluid dough, while maintaining while the functional and sensory properties offered by solid fats.

**Key words:** *fluid dough, muffins, rheology, sensory properties, texture*

***OBTAINING AND CHARACTERIZING THE FUNCTIONAL AND SENSORY  
PROPERTIES OF A NEW MOZZARELLA CHEESE VARIETY***

Students: Aurelia-Angela ȘTEFANCU<sup>1</sup>, Bianca-Ramona ASOLTANEI<sup>1</sup>, Lavinia-Vasilica DORNESCU<sup>1</sup> and Diana-Georgiana GÎTMAN<sup>1</sup>

Coordinating Professor: Sorina ROPCIUC<sup>1</sup>, Florina DRANCA<sup>1</sup>, Mircea OROIAN<sup>1</sup> and Daniela PAULIUC<sup>1</sup>

*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

**Abstract:**

In this study, a new Mozzarella cheese assortment with a fruit and vegetable jelly core was obtained and analyzed. Unpasteurized whole cow's milk, lactic cultures and coagulation enzymes were used to obtain the cheese. The jelly for the core was obtained from carrot juice and gelled grape juice. The functional properties considered important for Mozzarella cheese are melting, spreading, free fat formation, elasticity and browning. Mozzarella cheese is a nutritious and delicious product that contains proteins, fats, vitamins and minerals. In addition to direct consumption, it is widely used to improve the sensory and textural properties in foods. Thus, Mozzarella cheese was appreciated by tasters for the association between the product core and the cheese paste considering that this assortment can also be consumed as a dessert. The pleasant aroma of this cheese, the ability to shred, melt and spread when hot make it ideal for fresh consumption, topping for pizza and sandwiches. In conclusion, cheese making has changed from a craft to a science due to better understanding and advances in the fields of milk and cheese chemistry, technology, and bacteriology.

**Keywords:** *functional properties, jelly, Mozzarella, pastification, melting, sensory analysis.*

## ***STUDY ON CONSUMER ACCEPTABILITY OF REPLACING MARGARINE WITH WAX-BASED OLEOGELS IN BAKED GOODS***

Students: Matilda BEJINARIU, Klausz-Ronald BALLA and Sabina DOBRINCU

Coordinating Professor: Cristina HREȚCANU,

Laura APOSTOL, Ovidiu-Aurel GHIUȚĂ and

Vasile-Florin URSACHI

*Faculty of Food Engineering,*

*Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The aim of this study was to compare puff pastry products made with margarine and margarine substitute-oleogel. One of the biggest challenges in creating a new food product is predicting how it will be accepted by consumers. There are a number of factors that determine consumer acceptance, including price, ingredients and packaging, but a key factor that deserves significant evaluation is the sensory experience that consumers have with the food. Acceptance and preference of the sensory properties of foods are among the most important criteria in establishing recipes for obtaining food products. Sensory testing is a method of evaluating food products in terms of the human senses of sight, smell, taste, touch and hearing. In this study, the testing was done in the form of a comparative analysis, where testers were asked which sample they preferred - the product with margarine or the product with oleogel.

Food manufacturers should consider using oleogelation, a recent technique for transforming liquid vegetable oil into a solid-like gel using organogels, which is being explored by researchers to create novel food ingredients that can have the functionality of fats and the nutritional profile of liquid oils. The topic of oleogelation is of great interest worldwide: a search of the ISI Web of Science Core Collection Clarivate Analytics for the combination of keywords “food” and “organogels” or “oleogels” in the subject fields revealed over 1,127 results.

Consumer acceptance studies help manufacturers gain insight into the acceptance of their products by showing whether people like or dislike certain products or ingredients used to make food products.

**Key words:** *acceptability, margarine, oleogel, pastry, sensory analysis*

***STUDY ON THE SENSORY CHARACTERISTICS OF COFFEE VARIETY OBTAINED  
IN THE PROCESSING CENTER IN SUCEAVA, ROMANIA***

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FLOREA<sup>1</sup>

Coordinating Professor: Associate prof. Ph.D. bioeng. Maria POROCH-SERIȚAN<sup>1</sup>, Lecturer,  
Ph.D. Mihaela JARCĂU<sup>1</sup>,

<sup>1</sup>*Faculty of Food Engineering, Stefan cel Mare University of Suceava, Romania*

**Abstract:**

The present research explores the properties of coffee by analyzing its sensory characteristics based on the type of coffee, the processing methods applied after harvesting, and the roasting process. The study began with a market analysis aimed at identifying the motivations and preferences related to coffee consumption, as well as consumer behavior in the Suceava area. Data was collected through an online survey conducted on social media platforms, using a closed-question questionnaire. The research continued with the sensory evaluation of six coffee varieties processed at the Suceava processing center, employing methods such as tasting and instrumental analysis. The analysis focused on attributes such as aroma, color, and sensory perception of organoleptic properties, with the goal of better understanding coffee's impact on consumers' lifestyle and health.

**Key words:** *aroma, coffee, consumer behavior, color, perception, smell*

## ***NATURAL METHODS TO REDUCE LISTERIA MONOCYTOGENES IN MILK AND DAIRY PRODUCTS***

Ph.D. Student: Cristina-Ştefania AFLOAREI,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Ph.D. Ancuţa CHETRARIU  
*Faculty of Food Engineering,  
Ştefan cel Mare University of Suceava, Romania*

### **Abstract:**

Dairy products are susceptible to contamination by microorganisms such as *Listeria monocytogenes*. Essential oils, particularly those of oregano, thyme and rosemary, have been used to extend the shelf life of cheeses without significantly affecting the flavour. Plant extracts, such as citrus or apple peel, have been shown to be effective in preventing spoilage of dairy products. In the cheese industry, essential oils such as *Mentha spicata* and *Eugenia caryophyllata* have been shown to be effective in inhibiting pathogens. They can be used in combination with biodegradable nanoemulsions or films, improving preservation without significantly affecting sensory properties. Microalgae offer another source of natural biopreservatives, being used to extend the shelf life of foods. Algae extracts, due to their unique composition, contribute to improving the quality of food products. Essential oils and plant extracts represent a natural and effective solution for food preservation, being able to replace synthetic additives. Their antimicrobial and antioxidant efficiency, together with the potential to support food safety, place them at the forefront of innovation in the food industry. Combinations of essential oils with biopolymers or biocontrol agents offer a promising route to obtain safe and quality foods. However, further research is needed to optimize their use and integrate them into advanced technologies.

**Key words:** *biocontrol agents, essential oils, food safety, microalgae, plant extracts, shelf life*



## ***NEW ALTERNATIVE PROTEIN SOURCES FOR THE MEAT INDUSTRY***

Ph.D. Student: Maria-Raluca CIOBANU,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Ph.D. Ionuț AVRĂMIA  
*Faculty of Food Engineering,  
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### **Abstract:**

Meat is a main component of our regular diet, providing essential elements such as protein, fat, vitamins and minerals for the human body. The global meat market is expected to grow at a compound annual growth rate of 7.35% between 2024 and 2028. Globally, both average per capita consumption and the total amount of meat consumed are increasing, driven by rising average income and population growth. Europe holds the largest market share of herbal products, with a market share of 73%, followed by Asia-Pacific, North America, Latin America, the Middle East and Africa. Over the past 10 years, both producers and consumers have increased their interest in plant-based proteins, and the plant-based protein market has seen continued growth. Trends in changing preferences for meat analogues have been evident in recent years as health-conscious consumers seek healthier and safer food products. Plant-based diets have been shown to have a less harmful impact on blood pressure, diabetes, mortality and cardiovascular disease. The global demand for plant-based proteins has contributed to the development of new plant-based protein products and increased consumer preferences for more plant-based foods that have the same flavor, appearance, and texture as meat. The paper presents the main alternative protein sources used in the meat industry.

**Key words:** *allergens, cultured meat, insects, meat analogues, plant-based proteins, texture*

***ZEFER DRINK - ALCOHOLIC FERMENTED BEVERAGE MADE FROM  
DEPROTEINIZED WHEY***

Ph.D. Student: Elena-Ramona HUBER,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Lecturer Ph.D. Amelia BUCULEI  
*Faculty of Food Engineering,  
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**Abstract:**

Whey is a significant environmental contaminant. About half of the whey produced is thought to be consumed for human or animal use, with the remaining half being discharged into the environment as waste water, contributing to pollution. Therefore, its valorisation through the creation of health-promoting products is a significant step for the environment and the food industry in compliance with the standards set forth by the EU Green Deal Program. The specialized literature mentions a variety of whey-based beverages. Whey can be fermented with various yeasts to create wine-like beverages, such as liqueur-style drinks, drinks with an alcohol content of 10–14%. The goal of this study was to produce fermented beverages using deproteinised whey that has been endogenously impregnated with CO<sub>2</sub>. Utilizing regional components to enhance the nutritional content of the final product—berry syrup—was what made these drinks novel. The production procedure was technologically similar to the process used to make sparkling wines in bottles. Physical-chemical and sensory analyses were performed on the final goods. According to the study, a modern beverage should satisfy the four main needs of consumers: affordability, thirst-quenching qualities, sensory quality, and a favorable health profile.

**Key words:** *berry syrup, fermented drinks, pollution, sparkling wines, sweet whey, valorisation*

## ***NEW METHODS FOR IMPROVING THE FREEZING RESISTANCE OF BAKER'S YEAST***

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Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Lecturer Ph.D. Anca-Mihaela GÂTLAN  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The yeast strain is subjected to a variety of environmental factors during the majority of the baking process, including temperature, pressure, pH, osmotic water content, oxidation, and several chemical compounds. These extreme circumstances severely harm cell membranes and organelles, which eventually prevents cell growth or results in cell death. Therefore, in order to survive under this stress, it becomes important to acquire or induce various cellular processes of adaptation, such as the production of stress proteins, beneficial changes in membrane structure, and the up- and down-regulation of suitable gene expression. The development of yeast strains under fermentation circumstances can be greatly enhanced by stress tolerance qualities, which eventually raises product output. In order to get over these limitations, it is crucial to enhance traditional baker's yeast utilizing both traditional methods like genetic and evolutionary engineering as well as modern techniques like metabolic engineering, systems biology, and bioinformatics tools. The paper presents these new methods for improving the freezing resistance of baker's yeast.

**Key words:** *industrial properties, metabolic engineering, stress proteins, stress tolerance, systems biology, yeast strain*

***UNCONVENTIONAL STARTER CULTURES OF MICROORGANISMS WITH  
APPLICATIONS IN THE BAKERY INDUSTRY***

Ph.D. Student: Cristian MITITIUC,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Ph.D. Ionuț AVRĂMIA  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

**Abstract:**

The bakery products market is one of the most important in the food sector, with Romanians being some of the largest consumers of bakery products at a European level. Bakery products cannot be obtained without the contribution of starter cultures of microorganisms used as agents of alcoholic and lactic fermentations that take place during the dough manufacturing process. Until recently, industrial fermentation of dough used almost exclusively alcoholic yeasts belonging to the genus *Saccharomyces Meyen Rees* and the species *Saccharomyces cerevisiae*, also called baker's yeast. Recently, there has been an increased focus on the study of microbial diversity and evolution, with a particular focus on the collection of starter cultures provided by specialists in the bakery industry. The use of unconventional microorganisms in the bakery industry has increased significantly due to sensory and nutritional improvements in finished products, such as increased bioavailability of minerals, production of peptides with antioxidant activity, and preservative effects on bread, which improve shelf life. This paper presents the unconventional microorganisms for modern baking. The evolution of the fermentative trait and tolerance to baking-associated stresses as two important attributes of these microorganisms are discussed besides their contribution to aroma enhancement.

**Key words:** *alcoholic fermentation, improve shelf live, lactic fermentation, modern baking, nutritional properties, tolerance to baking*

## ***STUDY ON THE USE OF AGAVE SYRUP AS A NATURAL SWEETENER IN THE MANUFACTURE OF ICE CREAM***

Ph.D. Student: Mariana-Violeta POPESCU,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Ph.D. Ancuța CHETRARIU  
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### **Abstract:**

Agave syrup is a natural sweetener obtained from the hydrolysis of fructans. The nectar is extracted from the agave core and is the main reserve of carbohydrates in the form of fructans. The composition of agave syrup is mostly fructose, and to a lesser extent glucose, sucrose, mannitol, inositol and 1-ketose. It has a much lower glycemic index than other sweeteners (e.g. honey which has around 55) and a pH close to 4. Agave syrup is also sweeter than most syrup with high levels of glucose or sucrose (e.g. honey and maple syrups). Therefore, smaller amounts of agave syrup are needed to achieve the desired sweetness and translate into a lower caloric intake. Agave syrup is a promising substitute for sugar due to its slightly bitter taste. Agave syrup has recently gained popularity in the health, organic, functional, and diabetic food markets. This trend is due to its natural origin and nutraceutical properties. The agave syrup can be used in lots of food applications as an alternative to sucrose, for instance: muffins, cheese, cookies, gummy bear, ice cream, yoghurt etc. The fact that agave is a viable fat and sugar substitute was highlighted by a few studies that examined the effects of using agave syrup as a sugar and fat substitute in ice cream. The results showed that adding agave to low-fat ice cream improved its sensory, thermal, and textural qualities.

**Key words:** *fructans, glycemic index, low-fat ice cream, nutraceutical properties, sugar substitute, textural qualities*

## ***STUDY ON THE USE OF THE PRUNUS DOMESTICA FRUITS IN BAKERY PRODUCTS***

Ph.D. Student: Mariana SLAVIC,  
Coordinating Professor: Prof. Ph.D. Adriana DABIJA,  
Lecturer Ph.D. Amelia BUCULEI  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Fruit can be used as a fiber enrichment component in bakery products because of its improved hydration qualities, fermentability, phytochemical content, and balanced ratio of soluble and insoluble fiber. Plums have been characterized as foods having health-promoting qualities in recent years. Studies on the health benefits of plums continue to yield encouraging findings about their anti-inflammatory, antioxidant, and memory-enhancing properties. The high phenolic content of plums, particularly the anthocyanins, which are known to be natural antioxidants, has sparked an increase in interest in plum studies. People have known and used plum fruits as food since ancient times. At present there are more than 2000 different kinds of natural items that are plum foods. They can be eaten fresh or dried, or they can be processed to make jams, compotes, jellies, candied fruits, and baked goods. The use of *Prunus domestica* fruits in the food industry has been widely mentioned in the literature, for obtaining dough for bakery and pastry products, creams, puddings, ice cream, and extruded foods. The paper presents the significance, production, nutritional profile, availability of bioactive substances, phenolic and flavonoid compounds of plums. Additionally, it discusses the advantages of plum bioactive substances for heart, lung, and cardiovascular conditions. This is followed by the use of plum fruit in bakery products.

**Key words:** *bioactive compounds, health-promoting qualities, high phenolic content, plum fruits*

## ***FROM FIELD TO FORK: EXPLORING THE POTENTIAL OF RAPESEED PROTEIN IN INNOVATIVE PASTA FORMULATIONS***

Ph.D. Student: Marina AXENTII,  
Coordinating Professor: Prof. Ph. D. Eng. Georgiana CODINĂ  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Pasta is one of the most widely consumed and cost-effective food products globally. In 2023, the global pasta market was valued at USD 68.35 billion, with projections indicating a growth to USD 71.42 billion by 2024. Manufacturers are continuously innovating pasta formulations by incorporating diverse raw materials, creating new product varieties, therefore driving market expansion. Key factors contributing to the growth of the pasta market include the adoption of Western eating habits, contemporary food trends, and the rising demand for convenient, ready-to-cook meal options. By reinventing traditional shapes and textures, manufacturers are transforming a staple of Italian cuisine into a product that appeals to modern consumers.

This study explores the enhancement of the nutritional value of traditional pasta by incorporating different levels (5%, 10%, 15%, and 20%) of rapeseed protein concentrate (RPC) and rapeseed protein isolate (RPI) sourced from the leading Polish company NapiFeryn BioTech. The technological, textural, rheological, sensory, and digestibility properties of the resulting products were evaluated. To optimize the pasta formulation for a potential future industrial-scale production, a comparative analysis was conducted.

**Key words:** *innovation, new food product development, market growth, optimization, pasta formulations, rapeseed protein*

## ***ASSESSMENT OF THE IMPACT OF THE ADDITION OF POTATOES ON THE PHYSICOCHEMICAL AND SENSORY CHARACTERISTICS OF BREAD***

Students: Victoria FIODOR (HUDIȚ), Andreea-Sabina AVASILOAIE, Doina TIMOFICIUC, Iustin AMIHĂESA, Sergiu BOGHIU

Coordinating Professor: Amelia BUCULEI, Ancuța PRISACARU, Ancuța PETRARU  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

In the context of the current trend of seeking healthy and innovative alternatives in food, this paper explores the potential of using potato as an ingredient in bakery. The study contributes to a better understanding of the interactions between ingredients in the baking process and provides useful information for optimizing recipes and bread making technologies. This paper aims to evaluate the impact of adding potatoes, in the form of baked potato or puree, on the physico-chemical and sensory properties of bread. By means of detailed analysis, the changes in bread volume, core texture, shell color, humidity, porosity and sensory profile (taste, flavors, texture) were investigated. The results obtained revealed that the addition of potatoes in various forms of processing, in bread, significantly influenced the characteristics of bread, improving in some cases certain aspects, such as volume and texture, and, but negatively affecting others, such as the color of the shell. Changes in physico-chemical parameters such as humidity and starch content have also been observed.

This research provides valuable insights for the food industry, opening new perspectives for the development of innovative bakery products with enriched nutritional content and sensory characteristics tailored to consumer preferences.

**Key words:** *bakery products, impact, optimization, quality, safety, technology,*



## ***INFLUENCE OF RAW MATERIALS ON FAST-FOOD QUALITY***

Students: Andreea PRICOB, Claudiu IAȚCU, Florin LUNCAȘU, Simon GAFINCU,  
Luminița HÎNȚAR, Lorena AGAFIȚEI

Coordinating Professor: Associate prof. Gabriela CONSTANTINESCU, Violeta  
MANGALAGIU, Ancuța CHETRARIU

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Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The fast-food industry has experienced significant growth in recent decades, becoming an important segment of the global food market. The quality of fast-food products is influenced by a multitude of factors, among which the raw materials used play a crucial role. The purpose of this study was to evaluate the impact of raw material quality on the sensory and nutritional characteristics of fast-food products, and to propose measures to improve the quality of fast-food products by optimizing the selection and use of materials premiums. The analysis of the physico-chemical and microbiological characteristics of the main raw materials used in the fast-food industry, finished products and the monitoring of processing processes, was carried out, cooking and packaging of fast-food products. Critical quality parameters were identified for each raw material, such as moisture content, fat, protein, fiber, as well as the presence of microbiological contaminants. Measures have been proposed to improve the selection, storage and use of raw materials, as well as to optimize processing and cooking processes. Quality variations of raw materials can lead to fluctuations in the production process, affecting yield and costs. Consumers are sensitive to variations in the quality of fast-food products, which can affect satisfaction and brand loyalty. Through rigorous selection, proper storage and optimum use of raw materials, it can significantly improve the quality of finished products and consumer satisfaction.

**Key words:** *consumer satisfaction, fast food, food safety, production process, quality, raw materials*

# ***INFLUENCE OF ARONIA POWDER ADDITION ON YOGURT QUALITY CHARACTERISTICS***

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Coordinating Professor: Prof. Ph. Georgiana-Gabriela CODINĂ  
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Stefan cel Mare University of Suceava, Romania*

## **Abstract:**

In recent years, due to their beneficial effects on health, dairy products have reached new dimensions, and the most representative product in this category is yogurt, which, due to its content of probiotic bacteria, supports the digestive and immune systems. Aronia powder is a valuable ingredient in the food industry due to its high content of vitamins, antioxidants and bioactive compounds, having the potential to improve the quality of dairy products. The aim of this study was to develop yogurt and to analyze the effects of aronia powder addition on the physicochemical, rheological, antioxidant and sensory yogurt characteristics. For this purpose, different aronia powder additions of 0.5%, 1.0% and 1.5% were used to obtain yogurt products. Sensory properties such as taste, smell, texture and color were evaluated through hedonic method, while different physicochemical properties such as pH, acidity, color were determined. Also, textural and rheological properties of the yogurt samples have been analyzed. In addition, antioxidant activity was evaluated by different methods such as DPPH (1,1-diphenyl-2-picrylhydrazyl) which also included the measurement of free radical scavenging capacity. The results obtained concluded that the addition of aronia powder positively influences both rheological and physicochemical characteristics. The incorporation of aronia powder gives the yogurt a distinctive purple color and reduces syneresis. The yogurt enriched with 1.0% aronia powder was the most appreciated from the sensory point of view, with the highest score for overall acceptability.

**Key words:** *antioxidant capacity, aronia powder, rheology, texture, yogurt*

## ***FROM TRADITION TO INNOVATION: ENHANCING CROISSANT QUALITY THROUGH SUSTAINABLE PRACTICES AND TECHNOLOGICAL ADVANCES***

Students: Andreea PRICOB, Claudia BURLACU, Eduard MURARIU, George DIVISEVICI,  
Fabian CIMPOIEȘ

Coordinating Professor: Anca-Mihaela GÂTLAN,  
Amelia BUCULEI,  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The croissant, an emblem of French pastry, has evolved over time from handcrafted preparation to industrial production. In recent years, the food industry has increasingly focused on sustainability. Croissant manufacturers are seeking solutions to reduce environmental impact by utilizing local and organic ingredients, eco-friendly packaging, and optimizing energy consumption. The aim of this study is to provide an in-depth understanding of how the quality of raw materials contributes to achieving a croissant with optimal structure and texture, offering producers creative solutions to meet the demands of an increasingly discerning public. Modern technology has significantly influenced the quality of croissants, both positively and negatively. On the one hand, advanced technologies enable more precise control over production parameters such as temperature, humidity, and fermentation time. It has been observed that monitoring temperature and humidity during fermentation impacts flavor development and dough volume, leading to improved consistency in the final product. On the other hand, excessive automation may result in a loss of flavor nuances and the diverse textures characteristic of handmade products. The findings of this study can be applied to establish raw material selection criteria and optimize recipes to produce high-quality pastry products. The research highlights that consumers are seeking unique experiences and are willing to pay a premium for artisanal products made with high-quality ingredients and original recipes.

**Key words:** *artisanal production, functional ingredients, pastry, quality, sustainability*

## ***INNOVATIONS IN EQUIPMENT FOR PACKAGING TABLETS IN BLISTER PACKS***

Students: Yevheniia BABENKO, Andrii GRYSCHUK  
Coordinating Professor: Oleksandr GAVVA  
*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

The following modern trends in the development of equipment for packing tablets into blisters are highlighted:

1. Non-standard types of tablets feeding systems.
2. Special design of blisters.
3. Use of pneumatic actuators.
4. Inspection control systems.

The following areas of work were successful in the complex solution of the needs of the pharmaceutical market in the field of blister packaging:

- Production of a Pick & Place tablet feeding system for large effervescent tablets and other non-standard types.
- Creation of blister layouts and production of format parts to solve packaging problems.
- The use of pneumatic actuators on blister machines for reliability, economic feasibility and increased equipment speed.
- Integration of inspection control systems into blister packaging to reduce the number of defects and complaints.

Let`s consider the layout of an ALU\ALU blister for packaging an effervescent tablet. To ensure long-term storage of the effervescent tablet, need to use silica gel to remove excess moisture. The blister is designed in such a way as to provide an air channel between a large tablet (effervescent) and a small tablet (silica gel). The Pick & Place system was developed to solve the continuous, automatic feeding of a large tablet into a blister. With the help of a vacuum suction cup and a movable mechanism, the tablet is fed at a rate of 35 pcs per hour.

**Key words:** *ALU\ALU, blister, packaging, pick & place, tablet*

## ***SIMULATION OF HYDRODYNAMIC PHENOMENA IN VALVE FEEDERS OF ADAPTRONIC MODULES FOR DOSING LIQUID PRODUCTS***

Ph.D. students: Anton KOKHAN, Oleksandr GAVVA

Coordinating Professor:

Lyudmyla KRYVOPLIAS-VOLODINA

*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

The study based on the simulation modeling of the feeder operation with liquid media (Newtonian liquids). A feeder with a conical valve and purified drinking water were used. Throughput was 500 cm<sup>3</sup>/s; the internal diameter of the drain nozzle was 20 mm.

To ensure the continuous flow, minimum overall dimensions of the feeder, and the possibility of regulation according to a given law, the angle at the base of the cone should be within 50–60°, and the length of the saddle base 20–25 mm.

During the movement of the liquid in the valve feeder, three negative factors affecting the parallel laminar movement of the liquid were found: (a) reverse movement of the liquid when it comes into contact with the surface of the base of the valve cone; (b) turbulence cells at the entrance of the liquid into the valve channel, and (c) the tubular form of the liquid flow in the nozzle. These negative factors can be eliminated by using a ball-conical valve with a truncated top.

To eliminate turbulence cells in the valve feeder, counter-current movement of liquid, and tubular flow of liquid in the nozzle, it was proposed to make the valve in the form of a conical-spherical shape with a cut-off cone top, and also to extend the inner surface of the seat to the inner surface of the measuring cylinder of the feeder.

Under such conditions, a parallel flow of liquid is ensured, which contributes to the accuracy of dose formation and the duration of product storage.

**Key words:** *Adapter module, Dosage, Feeder, Hydrodynamics, Packaging, Valve*

**RESEARCH REGARDING CAMELICIOUS – INNOVATIVE, FUNCTIONAL FOOD:  
DETERMINATIONS, FABRICATION TECHNOLOGY AND QUALITY  
CHARACTERISTICS**

Student: Andrada Alice BERES (BACIU)

Coordinating Professor: Associate prof. Ph.D. Eng. Adrian-Vasile TIMAR  
*Faculty of Environmental Protection,  
University of Oradea, Romania*

**Abstract:**

The objective of the study was to create Camelicious – dark chocolate pralines filled with green tea ganache, an innovative functional food that satisfies the consumers need for sweets in a healthy way, using ingredients rich in antioxidants and bioactive compounds such as green tea (*Camellia sinensis*) and dark chocolate.

To conduct this study, two green tea extractions were obtained: a classical infusion and a cold extraction. Biochemical and physio-chemical determinations were made on the two extracts and then two types of ganache were obtained that were used to fill dark chocolate shells.

Two types of pralines were obtained: type 1 filled with ganache obtained from the classical infusion and type 2 filled with ganache obtained from the cold extraction. Both samples were analysed from a sensorial point of view and were considered excellent products.

**Key words:** *antioxidants, dark chocolate, functional food, green tea, innovation*

***PHYSICO-CHEMICAL AND CONSUMER ACCEPTANCE OF WHITE BREAD WITH  
DIFFERENT LEVELS OF GERMINATED BUCKWHEAT FLOUR ADDITION  
(FAGOPYRUM ESCULENTUM)***

Ph.D. Student: Olivia ATUDOREI,  
Coordinating Professor: Prof. Ph. Georgiana-Gabriela CODINĂ  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

**Abstract:**

Bread is a very important food product, being at the base of the food pyramid. Therefore, researchers in the field were always looking for the best alternatives to improve it from a nutritional and qualitative point of view. The aim of this study is 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 its physico-chemical characteristics and consumer acceptability. The germination process is of interest due to the fact that it leads to a decrease in the amount of antinutritive factors in the grains (decreases the amount of phytic acid that binds to minerals and results in phytates) and an increase of the enzymatic activity. Buckwheat grains, which are part of the *Fagopyrum* genus, *Polygonaceae* family, were used for this study. These grains were germinated for four days. For the buckwheat sprouts to be ground, they were subjected to the lyophilisation process to reduce their moisture content. For this study was used a non-additive wheat flour from a local company. The bread was obtained according to the production recipe, by using BGF in varying proportions (5%, 10%, 15% and 20%). To highlight the effect of the BGF addition on bread characteristics, the following determinations were performed: specific volume, porosity, elasticity, texture, crumb and crust color of the bread samples. The microstructure of the crumb was also analyzed. The textural characteristics analyzed in this study were: firmness, gumminess, cohesiveness and resilience. The microstructure of bread was analyzed with Motic SMZ-140 stereo microscope, with the 20x objective. The 9-point hedonic scale was used as a sensory method of analysis.

**Key words:** *bread, buckwheat, consumer acceptance, germination process, physico-chemical characteristics*

## ***ST. JOHN'S WORT EXTRACT IS A POWERFUL SOURCE OF NUTRIENTS IN VARIOUS INDUSTRIES***

Student: Yaroslav OHUI  
Coordinating Professors: Prof. Ph.D Olena PODOBII  
*National University of Food Technologies, Kyiv, Ukraine*

### **Abstract:**

St. John's wort extract is widely used as a source of nutrients in the food, cosmetic and pharmaceutical industries. In the world of medicinal herbs, St. John's wort occupies one of the most important positions due to its large number of beneficial properties, and in folk medicine it is valued as one of the strongest medicines that helps with diseases of the gastrointestinal tract, nervous system, headaches, and lung problems. One of its advantages is its availability, because it grows everywhere. But it is necessary to collect St. John's wort in ecologically clean areas, otherwise it will not be useful. St. John's wort extract can be obtained through several extraction methods, usually using different solvents and technologies. The trace element composition of the aqueous-alcoholic extract of St. John's wort was determined by the ICP/MS method. The microelement composition of St. John's wort extract illustrates that it contains the most elements such as Al, Ba, Zn, and in smaller quantities Cr, Sr, Mn, Cu, As, Pb. All microelements found in St. John's wort extract are important for ensuring the vital activity of the body and are contained in relatively small quantities. The identified trace elements can be classified according to their vital necessity: essential: Cr, Mn, Co, Cu, Zn, Se (among these elements, Zn is the most abundant; Co is almost not detected by the device); conditionally essential: Li, V, Ni, As, (mostly V and As); toxic: Be, Al, Cd, Ba, Tl, Pb, (mostly Ba and Al; Be, Cd, Tl –almost not detected by the device). The concentration of toxic elements is within acceptable limits and will not pose a threat to food and cosmetic products. Based on safety indicators, St. John's wort extract can be recommended for developing formulations for dietary supplements or cosmetic products.

**Key words:** *mass spectrometry, safety, St. John's wort extract, toxic elements*



## ***QUALITY CHARACTERISTICS OF BREAD OBTAINED FROM DIFFERENT WHEAT VARIETIES***

Student: Viorica-Trandafira-Georgiana ILEȘOI,  
Coordinating Professor: Prof. Ph. Eng. Georgiana CODINĂ  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Five wheat samples (Flavor, Glosa, Sofru, Solindo, and Amicus) cultivated in the northeastern region of Romania with different origins and kept in the active collection of the “Mihai Cristea” Suceava Plant Genetic Resources Bank have been analyzed from its physico-chemical point of view. These wheat varieties are representative for Romania, and in particular, for the intensive wheat cultures in the northeast region, which resulted from applying breeding programs that aimed to develop wheat with certain characteristics such as higher yield, superior quality for bread-making, and resistance to biotic and abiotic stress. The moisture, protein, wet gluten and color characteristics have been determined. According to the data obtained the highest protein content has been obtained for Amicus followed by Glosa, Sofru, Solindo and Flavor. The highest wet gluten content has been obtained for Glosa and the lowest one for Solindo and Flavor. The bread from these varieties have been determined. The bread porosity, elasticity, textural characteristics, color parameters and sensory characteristics have been determined. According to the data obtained it seems all bread samples were well appreciated by the consumers.

**Key words:** *bread, color characteristics, sensory analysis, textural parameters, wheat*

## ***STUDIES REGARDING THE USE OF BEETROOT POWDER ON PASTA QUALITY***

Ph.D. Student: Vitalie BULAT,  
Coordinating Professor: Prof. Ph. Georgiana-Gabriela CODINĂ  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Beetroot is known for its high fiber, vitamin, and antioxidant content, which can improve the nutritional value of foods. The study aims to develop and test optimal proportions of waste red beet flour in a powder form (SF) and wheat flour to obtain pasta with improved nutritional characteristics and acceptable organoleptic and technological properties. The mix of beetroot powder-wheat flour has been analyzed from the ash, protein, ash and falling number index have been determined. The moisture and falling number content decreased whereas the protein and ash content increased. From a technological point of view, the addition of SF has influenced the process of manufacturing plants. The texture analysis showed that the SF group had a significant increase in the textural properties of the trees. The pasta fracturability initially decreased with the addition of SF, but returned to the similar values with those obtained for control sample at an addition level of 20% SF in the wheat flour. This indicates the need to adjust levels and processing parameters to achieve the right balance between nutritional benefits and desired textural characteristics. Contributing to the diversification and improvement of the modern diet by introducing a new pasta variant that is both nutritious and attractive to consumers is another important objective of the research. By achieving these objectives, the work aims to demonstrate that red beet flour can be a valuable ingredient in pasta production, providing additional health benefits and contributing to innovation in the food industry.

**Key words:** *pasta, technological characteristics, waste from betroot, wheat flour*

## ***UMAMI: THE FITFTH BASIC TASTE AND ITS IMPACT ON OVERALL HEALTH***

Student: Iulian CEBOTARU

Coordinating Professor: Prof. Ph. D. Eng. Georgiana CODINĂ

*Faculty of Food Engineering,*

*Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Umami, recognized as the fifth basic taste alongside sweet, salty, sour, and bitter, has gain the attention of researchers and chefs alike due to its unique ability to enrich and intensify the flavor of foods. This taste, initially discovered in marine algae by Japanese chemist Kikunae Ikeda in 1908, mainly comes from glutamic acid and ribonucleotides such as inosinate and guanylate, which are found in foods like tomatoes, parmesan cheese, mushrooms, and many fermented products. Recent research has shown that umami effect on hyman body is a contradictory one. As positive ones, umami enhances taste and appetite. In the context of digestive health, umami stimulates the production of saliva and gastric juices, thereby facilitating food digestion. Additionally, it helps regulate appetite and the sensation of satiety, which can play an important role in weight management and the prevention of obesity. Moreover, umami is believed to positively influence brain functions by modulating taste receptors and neurotransmitters associated with pleasure and reward. Thus, integrating umami taste into daily diets not only enriches culinary experiences but can also support balanced nutrition and long-term health. Umami taste is provided by different compunds the most used one being monosodium glutamate (MSG). The risks of using monosodium glutamate as an additive: CRS-chinese restaurant syndrome also called MSG symptoms complex represents a group of symptoms that can include headaches, redness, sweating, a feeling of pressure in the mouth, and can even lead to a feeling of suffocation. Also in severe cases, it causeschest pain, palpitations, asthma, etc. This paper explores the multiple mechanisms through which umami impacts health and suggests incorporating this taste into modern diets and its effect on human health.

**Key words:** *appetite, brain function, food, human health, umami.*

## ***STUDY OF THE MANUFACTURING TECHNOLOGY OF FREEZE-DRIED FRUIT CAKES***

Students: Andreea-Sabina AVASILOAIE, Doina TIMOFICIUC and Emanuela PUȘCAȘU  
Sorina ROPCIUC, Florin URSACHI and Ionuț AVRĂMIA

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Stefan cel Mare University of Suceava, Romania*

**Abstract:** The VEGAN SWEET product provides numerous benefits, including the absence of sugar, allergens, and animal-derived ingredients. In addition to these advantages, the use of freeze-dried fruits adds nutritive value to this product. Through the freeze-drying process, approximately 90-95% of the water content is removed from the fruit without compromising its nutritional qualities, taste, or aroma. Moreover, a key benefit of freeze-dried fruits is that their fibers, antioxidants, and phytonutrients retain their full nutritional properties. The freeze-drying process ensures that the fruits maintain their original shape, volume, and structure. Therefore, this product can be enjoyed by all age groups, from children to the elderly, regardless of any specific health concerns. The raw materials used for VEGAN SWEET maintain their natural characteristics, with no need for added colorants or preservatives.

The following raw materials were used for VEGAN SWEET: biscuits (coconut flour, oat flour, starch, coconut butter, baking soda, xylitol, water), coconut butter, vanilla paste, xylitol, freeze-dried fruits (kiwi, orange and strawberry), and vegan chocolate.

**Keywords:** *freeze-dried, fruits, manufacturing, sweets, technology, vegan*

## ***COMPARATIVE STUDY BETWEEN HONEYDEW HONEY AND MANUKA HONEY BASED ON THE PHYSICOCHEMICAL PARAMETERS***

Students: Daria URSACHI, Iustina STRAT, Lavinia TARNIȚĂ  
Coordinating Professor: Prof. Ph.D. Mircea-Adrian OROIAN, Florina DRANCA, Daniela-  
Oana PAULIUC, Mariana SPINEI  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Honey is the naturally sweet substance produced by *Apis mellifera* bees that gather plant nectar, secretions from living plant parts, or excretions from insects that feed by sucking on plants. The aim of this study was to conduct a comparison between honeydew honey from Bucovina area and manuka honey. To be able to compare the honeydew honey samples from Bucovina with manuka honey, the samples were characterized from a physical, and chemical view. The following physicochemical parameters were determined: moisture, electrical conductivity, pH, free acidity, total polyphenols content, DPPH radical scavenging activity, hydroxymethylfurfural (HMF) content, and color. The moisture content varied between 17.60 – 19.1% and was not exceeded the moisture content set by Codex Alimentarius (20%). The pH varied between 4.11 (honeydew), and 3.61 (Manuka honey) and the free acidity between 23.9 and 38.1%. The results obtained for honeydew honey sample indicated a high electrical conductivity (1064  $\mu\text{S}/\text{cm}$ ), and for Manuka honey, the electrical conductivity was below 500  $\mu\text{S}/\text{cm}$ , which is specific for monofloral honey. Electrical conductivity is an integrated factor in the new international standards regarding the differentiation between honeydew and flower honey. The limit set for HMF content was not exceeded by any sample honey evaluated in this study (9.28 mg HMF/kg, and 22.45 mg HMF/kg).

**Key words:** *honey, honeydew, Manuka, physicochemical parameters*

***THE STUDY ON THE INFLUENCE OF FAT CONTENT ON THE  
PHYSICOCHEMICAL AND ORGANOLEPTIC CHARACTERISTICS OF FROZEN  
DESSERTS MADE FROM COCONUT AND FOREST FRUITS***

Students: Andreea SCHIPOR, Emilia CEOMEICĂ

Coordinating Professor: Sorina ROPCIUC, Ana LEAHU, Daniela-Oana PAULIUC, Vasile-  
Florin URSACHI

*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

**Abstract:**

In recent times, there has been a growing trend among consumers towards choosing ice cream characterized by a low-fat content and made exclusively from plant-based ingredients. This paradigm shift in gastronomic preferences is motivated by health concerns and an increased interest in a holistic and sustainable lifestyle. As a result, new products have been developed, including coconut-based frozen desserts. Coconut milk can serve as a source of fat and protein that are necessary in the formation of the emulsion and provide stability to the mixture. The aim of this study is to investigate how variations in fat content (0, 6, 10, and 14% coconut oil) influence the physicochemical and organoleptic characteristics of frozen desserts made from coconut, and to evaluate consumer preferences based on these characteristics. Following the physicochemical analyses, it was found that the variation of fat influenced the acidity and pH in a very limited, almost insignificant way. Regarding the color, no obvious change in color was visibly observed. The amounts of coconut oil added were not sufficient to radically change the color of the desserts. According to the sensory analysis, the frozen dessert with the highest percentage of added coconut oil (14%) was the most appreciated by the tasters.

**Key words:** *coconut beverage, fat, forest fruits, plant-based beverage, plant-based frozen dessert*

## ***EVALUATION OF THE QUALITY OF VARIOUS VARIETIES OF PEARS MARKETED IN SUPERMARKETS***

Students: Maria ALUPULUI, Ioana GROSARIU, Mihail MARTIN, Alexandra-Elena SPETCU, Andreea-Florentina PENCIUC, Mariana-Valentina CHISALIȚĂ

Coordinating Professor: Associate prof. Ioan GONTARIU, Cristina HREȚCANU,  
Amelia BUCULEI

*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

Food quality is a major concern in the context of contemporary consumption. The study aims to provide consumers with a clear picture of the quality of the various varieties of pears available on the local market. Through a sensory and physico-chemical evaluation, significant differences between products were identified, in terms of both organoleptic characteristics and physico-chemical parameters. Thus, they were determined: acidity, pectin content, ash content, as well as for electrolytes and minerals present in the following pear types: Williams, Untoasa Bosc, Cure and Napoca. These analyses were carried out to evaluate and compare the essential characteristics of these pear varieties, thus providing a clear and complete insight into their quality and potential impact on consumer health. According to the research, the four types of pears analyzed bring a significant intake of calcium (Ca) and potassium (K), elements increasingly sought by consumers. They also have a high pectin content; the largest amount being found in Napoca pears. The results obtained highlight the variability in the quality of the products available on the market and underline the importance of objective criteria for the evaluation of fresh fruit. The results obtained revealed significant differences between varieties in terms of consumer preferences. The study contributes to improving knowledge on the quality of fresh fruit and provides useful information for optimizing production, marketing and consumption processes.

**Key words:** *analysis, consumer, pears, physico-chemical standards, quality, supermarket*

***MAKING MUFFINS BY REPLACING SOLID FAT WITH CURRENT  
ALTERNATIVES.  
RHEOLOGICAL CHARACTERIZATION, TEXTURE PROFILE AND SENSORY  
ANALYSIS***

Ph.D. Student: Otilia FORTUNA

Student: Eusebiu DRĂGOI

Coordinating Professors: Sorina ROPCIUC<sup>1</sup>, Mariana SPINEI<sup>1</sup> and Silvia MIRONEASA<sup>1</sup>

*Faculty of Food Engineering,*

*Stefan cel Mare University of Suceava, Romania*

**Abstract:**

The use of margarine remains indispensable in the food industry, and particularly in the bakery and pastry industry, as it ensures that the sensory qualities already loved and appreciated by consumers are preserved. The health effects of the consumption of hydrogenated fats are a vast subject that is the subject of ongoing research. Replacing it with a healthy and chemically safe alternative and preserving its organoleptic properties is the aim of research worldwide. In this study oleogels are presented as a healthy alternative to saturated fats, replacing margarine in popular bakery products - muffins. Oleogels were made with five types of oil and seven types of oleogelators, including a control sample with margarine. The muffins were then subjected to experimental studies in which they were analyzed organoleptic, rheological and textural. The results obtained were analyzed in comparison with data from multiple studies on the same subject, noting very little difference between the control sample and those made with oleogel.

**Key words:** *alternative fats, muffins, oleogel, oleogelator, saturated fat*



## ***H2grOw***

Students: Estera DUCA, Iona-Andreea BACIU, Georgiana-Raluca CRAINIC, Andrada-Alice BACIU

Coordinating Professor: Associate prof. Ph.D. Eng. Adrian-Vasile TIMAR  
*Faculty of Environmental Protection,  
University of Oradea, Romania*

### **Abstract:**

Water scarcity and climate change pose significant challenges to sustainable agriculture, particularly thorough droughts that harm crop yields and farmer livelihoods. The H2grOw project proposes an innovative solution to address these challenges by repurposing treated wastewater for irrigation, integrating advanced IoT-enabled systems for monitoring, and promoting circular economic practices. Our research targets medium to large-scale farms and eco-conscious farmers, offering sustainable irrigation solutions and organic fertilizers at competitive rates. A SWOT analysis reveals strengths in scientific validation and sustainability, with opportunities in growing demand for advanced agricultural technologies. Despite challenges like reliance on local water facilities and established competitors, H2grOw presents a compelling and viable approach to mitigating water management issues in agriculture. By harnessing water to grow crops sustainably, H2grOw aims to transform agricultural irrigation while fostering economic and environmental resilience. We invite stakeholders to join us in making a meaningful impact on the future of farming.

# ***THE INFLUENCE OF PROTEIN AND FIBER ADDITION ON THE NUTRITIONAL VALUES OF CHOCOLATE***

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Stefan cel Mare University of Suceava, Romania*

## **Abstract:**

The aim of this study is to develop the optimal recipe for a chocolate variety based on cocoa powder, cocoa butter, natural stevia sweetener, milk powder, cinnamon powder, enriched with whey protein isolate and apple fiber. The decision to create a chocolate variety enriched with whey protein and apple fiber was based on their numerous health benefits for consumers. Whey protein isolate, a milk-derived supplement, contains up to 90% protein and essential amino acids, making it ideal for muscle recovery after exercise. With low fat and lactose content, it supports muscle growth, aids in weight management, and provides additional immune-boosting benefits. Apple fibers, particularly pectin, promote digestion, lower cholesterol levels, and help stabilize blood sugar levels. These functional foods highlight the positive impact of a balanced diet on overall health. Different concentrations of whey protein isolate (10%, 20%, 30%) and apple fiber (10%, 15%, 20%) were used. An experimental plan was designed and carried out, varying the concentration of whey protein isolate and apple fiber, keeping the other ingredients constant. After preparing three chocolate samples, they were sensory analyzed. Sensory analysis of chocolate samples was performed using the scoring method. Based on the results obtained, it can be concluded that all chocolate varieties are distinguished by a pleasant and mildly spicy taste.

**Key words:** *apple fiber, antioxidants, amino acids, chocolate, flavonoids, nutritional values, whey protein isolate*

***CHARACTERIZATION OF SUNFLOWER OIL AND RAPESEED OIL ENRICHED WITH EXTRACTS FROM OXHEART TOMATO (LYCOPERSICON ESCULENTUM L.) POMACE***

Ph.D. Student: Dumitrița FLAIȘ,  
Coordinating Professor: Prof. Ph.D. Eng. Mircea-Adrian OROIAN  
*Faculty of Food Engineering,  
Stefan cel Mare University of Suceava, Romania*

**Abstract:**

This study aims to summarize and provide an overview of the available methods for the extraction of carotenoids, especially lycopene, from the tomato processing by-products. In this aspect, the tomato pomace was extracted using two types of vegetable oils (sunflower oil and rapeseed oil), by two methods: stirring and ultrasonic study using variable temperature (40–80 °C), using different parameters such as: the stirring speed (200–400 rpm) and the ratios of tomato peel to sunflower oil and rapeseed oil (2.5–5.5 %, g/v). According to the results, the brightness of the different native oils showed that the sample extracted with the sunflower oil was lighter ( $L^* = 97.01$ ) than those extracted with rapeseed oil. The  $a^*$  parameter values indicated the degree of coloring of the native oil sample, in the case of oils enriched with carotenoids, it was found that the samples approaching the red color were those extracted with rapeseed oil while the ones extracted with sunflower oil had a negative sign approaching to the green color. The FTIR spectroscopy was used to detect the transformation which appears during the extraction in the mid-infrared region, with an emphasis on the 1500–1000  $\text{cm}^{-1}$  spectral region which is referring to the "informative" region of edible oils. This region represents the data on the different functional groups present in fatty acids. This research indicates that the extractions with the 2 types of oil can increase significantly their biological value, sensorial characteristics, and they are also rich in many carotenes.

**Key words:** *pomace, powder, rapeseed oil, sunflower oil, tomatoes*

## ***IMPACT OF THERMAL EXPOSURE OF SUNFLOWER AND PUMPKIN OILS ON THEIR QUALITY AND STABILITY***

Students: Bianca-Ramona ASOLTANEI, Cătălina COJOCARU, Lavinia-Vasilica DORNESCU, Ana-Maria-Claudia NICORIUC

Coordinating Professor: Prof. Ph.D. Eng. Mircea-Adrian OROIAN,

Lecturer Ph.D. Dan HOFFMAN

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Stefan cel Mare University of Suceava, Romania*

### **Abstract:**

The purpose of this study was to investigate the evolution of color and physicochemical parameters of two types of oils subjected to a controlled thermal treatment over varying periods of time. A comparative study was conducted between refined sunflower oil and cold pressed pumpkin oil obtained, under laboratory conditions. By monitoring color changes and essential indicators such as acidity, refractive index, peroxide value, and viscosity, the research sought to highlight the impact of the thermal process on the stability and quality of the oils. The results showed that with the increase in exposure time, the refractive index of both oils showed a slight decrease, the acidity index of sunflower oil remained constant due to its stability, while the acidity index of pumpkin oil increased as a result of thermal and oxidative degradation of triglycerides. The peroxide value of pumpkin oil decreased due to the breakdown of peroxides at high temperatures, while sunflower oil showed an increase, indicating faster oxidation at higher temperatures. According to the color indices, pumpkin oil shows greater stability to temperature.

**Key words:** *Pumpkin oil, sunflower oil, temperature, time, stability*

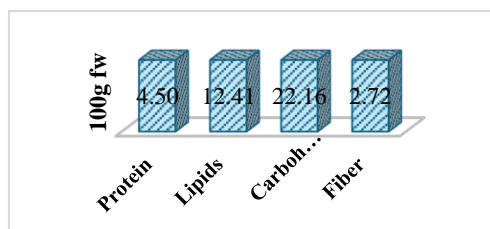
## *APHRODITE*

Students: George OPRIS, Lacrimioara SANDRO,  
Alin PANTI, Ioana IOVA  
Coordinating Professor: Associate prof. Ph.D. Eng. Adrian-Vasile TIMAR,  
*Faculty of Environmental Protection,  
University of Oradea, Romania*

### **Abstract:**

In a world where change is found in any environment, notably in the food industry, several ways to introduce alternative sources of protein have been analyzed thoroughly. Plant-based nutrition has gained attention in the last decade. The growing demand for foods naturally rich in protein is part of an ecological dispute around whether more sustainable sources should be encouraged <sup>1</sup>.

Aphrodite, an innovative cheesecake developed by the team Foods4Future, delivers equitable amounts of nutrients to support the health of human beings (Figure1). Furthermore, the product may be incorporated in the nutrition of health-conscious consumers, vegans, individuals who are exposed to lactose intolerance, and diabetes.



**Figure 1.** Nutritional composition of Aphrodite

The major source of protein and lipid content of the product is represented by almonds. They are known to possess essential nutrients with an increasing popularity for the general population and producers. Almonds are a good source of protein, lipids, dietary fiber, vitamin E, riboflavin and essential minerals (Mn, Mg, Cu, K). Regular consumption of almonds has been associated with health effects, especially against cardiometabolic diseases <sup>2</sup>.

**Key words:** almonds, *cheesecake*, *environment*, *health benefits*, *innovative*, *protein*.

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# **CASHEW APPLE POMACE AS A SOURCE OF NUTRIENTS AND BIOLOGICALLY ACTIVE COMPOUNDS FOR FOOD APPLICATIONS**

Students: Emmanuel Duah OSEI, Anthony AMOTOE-BONDZIE,  
Coordinating Professor: Ing. Eva IVANIŠOVÁ, Ph.D.  
*Faculty of Biotechnology and Food Science,  
Slovak University of Agriculture in Nitra, Slovakia*

## **Abstract:**

This study aimed to valorize and characterize cashew apple bagasse, a by-product of cashew apple juice processing, for functional food applications. Cashew apple bagasse from red, yellow, and orange varieties was subjected to freeze and solar drying, then milled into flour. Standard protocols were used to determine nutritional, microelements, risk elements, phytochemical composition, DPPH antioxidant activity, physico-functional properties, and antimicrobial potency against the selected Gram-negative, Gram-positive bacteria, and yeasts. The samples showed high protein content (10.31-14.61 %), fat (5.58-7.34 %), carbohydrates (26.92-34.62 %), dietary fiber (41.03-46.28 %), and caloric value (228.62-224.08 kcal/100g). Iron (95.60-146.20 mg/kg) and zinc (8.06-10.57 mg/kg) levels varied between freeze and solar-dried samples, whereas copper (25.57-37.78 mg/kg) and manganese (10.70-12.50 mg/kg) levels were the same. Nickel (1.57-1.77 mg/kg) and mercury (0.0027-0.0038 mg/kg) levels were similar, while lead (0.03-1.20 mg/kg), chromium (0.18-0.30 mg/kg), and cadmium (0.04-0.15 mg/kg) levels varied significantly. The phytochemical and antioxidant activity were higher in freeze-dried samples. The samples showed higher polyphenol (585 to 716 mg GAE/100g), flavonoids (80.95233.57 mg QE/100g), phenolic acids (150.53 to 303.87), carotenoids (19.86 to 33.89 mg/100g), antioxidant activity (342.20 to 485.36 mg TEAC/100 g) and ascorbic acid (256.93 to 352.80 mg AAE.100g). All the samples demonstrated antimicrobial activity (2.33-10.60 mm inhibition zones) against tested microorganisms, with notable inhibitions against *Listeria monocytogenes* CCM 4699, *Enterococcus faecalis* CCM 4224, *Candida parapsilosis* CCM 8260, *Salmonella enterica subsp. enterica* CCM 3807, and *Candida krusei* CCM 8271. The samples recorded a higher water absorption index (3.06-4.46 g/g), oil absorption index (2.08-3.68 g/g), and low bulk density (0.41-0.46 g/mL). Compared to raw cashew apple bagasse, the processed flours showed significantly increased lightness (L\*). The study reveals the significant potential of cashew apple bagasse in the food industry. By leveraging the highlighted biochemical and physical-functional profile, the food industry can create healthier, more sustainable, and innovative products that meet the increasing demands of health-focused consumers while also promoting the circular economy.

**Keywords:** *antioxidants, cashew apple bagasse, nutritional, phytochemicals, valorization*

## ***FOOD QUALITY MANAGEMENT-IFS STANDARDS AND IMPLEMENTATION FOR ENTERPRISES***

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### **Abstract:**

Food safety is the assurance that food available for consumption is safe and does not represent a health risk. It involves controlling the entire food chain from primary production and processing to distribution and consumption. The main aim is to prevent contamination of food with pathogens, harmful chemicals or other hazards that could affect the health of consumers. Ensuring the entire food chain requires compliance with parameters including food hygiene, contaminants control, regulations and standards in vigor, traceability of raw and auxiliary materials as well as finished products ("from farm to fork" principle), correct labeling and last but not least consumer education. IFS Food is a Standard for auditing retailer and wholesaler branded food product suppliers and also other food product manufacturers and only concerns food processing companies or companies that pack loose food products. IFS Food can only be used when a product is "processed" or when there is a hazard for product contamination during the primary packing. These figures reflect how globalisation is changing the context, in which governments, institutions, and the business world in developing countries have to operate as well. Companies and their products increasingly have to compete with imports on their domestic markets and for export shares in the world market. Aspiring to benefit from globalisation and to play a role in regional and European markets, export countries need to adjust the structures of agro-industrial production and processing and in particular their food quality and risk management systems to the requirements of their target markets. Assuring food safety and quality as an industry self-obligation alongside risk-based public controls is a must in nowadays' globalised food market. The assisted display case, in general, presents a risk of contamination, both physical and chemical, especially where self-service is available. The rigorous implementation of quality and food safety management systems, such as HACCP and IFS Food, in the retail stores underlines a deep commitment to operational excellence and protecting consumer health. These international standards not only ensure compliance with stringent legal regulations, but also set a benchmark in the food industry for quality and safety. The present study focuses on the comparative identification of quality standards implemented in Romanian supermarkets and their changeover. Implementing a quality system in supermarkets can be both a challenge and an opportunity. In this paper, an operational procedure for quality assurance at the level of assisted showcases for the commercialization of bulk products was chosen as a reference.

**Key words:** *food risk, food safety, IFS Standards, quality management, retailers*

# ***BIOECONOMY AND CIRCULAR ECONOMY PATHWAYS TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS IN ROMANIA***

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## **Abstract:**

The transition to bioeconomy and circular economy frameworks is crucial for sustainable development, addressing challenges like resource depletion, climate change, and biodiversity loss. The bioeconomy emphasizes sustainable use of biological resources and biotechnology innovation, while the circular economy focuses on closed-loop systems to reduce waste and maximize resource utilization. Both frameworks aim to enhance environmental sustainability alongside economic and social progress, contributing significantly to the United Nations Sustainable Development Goals (SDGs). The bioeconomy supports goals such as clean energy, responsible consumption, and climate action, whereas the circular economy promotes resource efficiency and sustainable production. Despite their potential, only 17% of SDG targets have shown substantial advancement. A significant challenge is the lack of standardized economic indicators reflecting the broader economic and social impacts of these models. Current metrics focus on environmental factors but often overlook contributions to Gross Domestic Product (GDP), employment, and innovation. In Romania, bioeconomy and circular economy practices are in early stages, lagging behind EU leaders like Sweden, Denmark, and Finland, which have effectively integrated these principles into their industries and policies. Romania can accelerate its progress by adopting best practices from leading nations in bioeconomy and circular economy initiatives.

**Key words:** *biological resources, biotechnology innovation, environmental factors, environmental sustainability, Sustainable Development Goals*



## ***IMPACT OF SPROUTED WHEAT GRAIN ON DOUGH RHEOLOGICAL PROPERTIES***

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### **Abstract:**

Sprouted wheat infused with sourdough (SWS) may be a valuable ingredient for bread-making due to its easily digestible sugars, dietary fiber and essential amino acids which may increase digestibility and enzymatic activity. The use of this raw material for bread-making will contribute for the obtaining of bakery products healthier for the population. The aim of this study is to analyze the possibility of using SWS in bread-making. For this purpose, the impact of SWS in an addition level of 5, 10, 15, 20% in a refined wheat flour on dough rheological properties during mixing, pasting and fermentation using Mixolab and Rheofermentometer devices have been analyzed. As base raw material a wheat flour of 650 type with no additives and low  $\alpha$  amylase activity have been used. According to the data obtained the SWS addition decreased water absorption value and Mixolab torques values C2, C3 and C4 whereas the Mixolab torque C5 presented fluctuations. This behavior may be related to a higher proteolytic and amylolytic activity from the dough system. Regarding the dough rheological properties during fermentation SWS addition in low amount in dough recipe increased the maximum height of gaseous production and total CO<sub>2</sub> volume production whereas at high amount the values of these parameters decreased.

**Key words:** *sprouted wheat, sourdough, dough rheological properties, Mixolab, Rheofermentometer*

## ***TEXTURE PARAMETERS OF VEGETABLE MAYONNAISE***

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### **Abstract:**

In the context of the food industry trends to obtain sustainable, healthy food products that can satisfy the needs of different consumer groups, vegetable mayonnaise is of major interest. The purpose of this work was to analyze the texture parameters of vegetable mayonnaise from chickpea aquafaba and the use of other vegetable ingredients. 5 vegetable mayonnaise samples were developed where instead of egg yolk, chickpea aquafaba was added - 10, 15, 20, 25, 30 g / 100g product. In the analysis of texture parameters, a texture analyzer (*Stable Micro Systems TA.HD plus C, United Kingdom*) was used to evaluate the mechanical properties of vegetable mayonnaise. The mayonnaise samples with 10, 15 and 20 g / 100g of aquafaba presented the most outstanding characteristics for the texture parameter, due to the properties of chickpea aquafaba which is a viable alternative emulsifier, with excellent emulsion stabilizing properties, but also to the oil / aquafaba ratio in the product. The firmness, adhesiveness, elasticity, resilience and chewiness of the vegetable mayonnaise samples of 10, 15, and 20 g aquafaba / 100 g product presented higher values compared to the control sample, with insignificant differences between the values of the obtained results. These results may be due to the balance between the oil / aquafaba ratio, which coincides with this ratio in the case of making classic mayonnaise using egg yolk. Through the obtained results, aquafaba demonstrates that it is a vegetable raw material that allows for the diversification of fasting food products, including mayonnaise, with appreciable texture indices.

**Key words:** aquafaba, chickpea, emulsion, fasting food products, texture parameters, vegetable mayonnaise,