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IN LIFE SCIENCES (Series - Food Engineering)",**

BOOK OF ABSTRACT

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**INTERNATIONAL SCIENTIFIC SYMPOSIUM “Young
Researchers and Scientific Research in Life Sciences” for
Bachelor, Master and Ph.D. Students
17-18 November 2022, Timisoara**



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BOOK OF ABSTRACT

**INTERNATIONAL SCIENTIFIC SYMPOSIUM
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17-18 November 2022 Timisoara

Section: “Young researchers in food engineering”





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General Programme

Thursday, November 17, 2022

“Iulius Mall” Conference Center, Timișoara

09⁰⁰ – 10⁰⁰	Participant admission
10⁰⁰ – 10¹⁰	Welcoming words Prof. univ. dr. Cosmin Alin Popescu USVT Rector
10¹⁰ – 10¹⁵	Symposium opening Prof. univ. dr. Isidora Radulov USVT Vicerector
10¹⁵ – 10⁴⁰	Laszlo Borbely State Counselor Government of Romania, Department of Sustainable Development
10⁴⁰ – 11⁰⁰	Thierry Siteny Randrianasoloniaiko President of JU Africa
11⁰⁰ – 12³⁰	Ceremony of awarding the <i>Honoris Causa</i> title to Ioan Cosmescu
12³⁰ – 13⁰⁰	Questions and discussions
13⁰⁰ – 14⁰⁰	Lunch
14⁰⁰ – 15⁴⁵	Presentation of scientific papers by section
15⁴⁵ – 16⁰⁰	Coffee break
16⁰⁰ – 17⁰⁰	Presentation of scientific papers by section



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Friday 18, 2022

09⁰⁰ – 12⁰⁰

Poster presentation

12⁰⁰ – 14⁰⁰

Thematic excursion



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OC₁

The influence of tillage systems on nutrients supply in soil on corn crop at the
Ezareni Farm, Iasi County

Gabriel Dumitru Mihui, Ana Ursu, Manuela Filip, Denis Ţopa

University of Life Sciences Iaşi, Romania

OC₂

Potential of biofuels in the European transition to sustainable energy

Aryan Ahmadi-Khoie

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Studies on the use of new technologies to improve the technological process
of grain sorting

Elena Iulia Lazăr, Ovidiu Tița,

“Lucian Blaga” University of Sibiu

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The technological operations of preparing the wheat for the grinding performed at the reception and storage in the silo, continue in the cleaning with the elimination of impurities and the conditioning of the wheat. For the study we used the SORTEX B MultiVision Optical Sorter that recognizes many color defects and foreign materials and has a size detection software to eliminate nonconformities. The device features RGB cameras of high front and rear resolution that can be configured to identify up to five color defects eliminating the need for repeated springing for each color defect. With the help of high-resolution cameras, you can scan an amount of 8 to / h from which are removed the elements that are not in the color range of the category of healthy wheat from light brown - reddish brown - slightly dark brown. Numerous tests were performed in the laboratory, on different wheat mixtures, with different proportions of impurities / grains with defects and the efficiency was high. Wheat can be selected grain by grain, and the possibility of grinding non-compliant wheat clean is very low.

Keywords: sorting, color defect, conditioning, impurities, efficiency.



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OC₄

The influence of soil and climate factors on *Plumbago Auriculata*

**Cristina Elena Toța, Cristina Anamaria Cîmpeanu, Aurelia Mihuț,
Cristian Berar, Casiana Mihuț**

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OC₅

Access analysis of Submeasure 6.1 Young farmer installation related to
NRDP 2014-2020. Case study - Mountain area, Bihor County

**Natalia Cuc, Magdalena Mihaela Dan, Lorena Ligia Satmari,
Aurelia Ioana Chereji**

University of Oradea

OC₆

Using the serotonin and cortisol values as a tool for well-being assessment in
dogs

**Timea Andrea Bochiș, Alexandra Grigoreanu, Sorin Octavian Voia,
Viorel Herman, Narcisa Mederle, Ioan Țibru**

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OC₇

Organic agriculture, biodynamic agriculture, quantum agriculture and
permaculture - differences and similarities

Luka Turalija, Juraj Perković, Alka Turalija

Josip Juraj Strossmayer University of Osijek, Croatia

OC₈

Conducting a transient-state anaerobic digestion process at start-up phase of
an on-farm biogas plant

Teodora Toader, Dana-Iuliana Neață, Teodor Vintilă

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Interactions between endospore forming bacteria and other species in soil and
human gastrointestinal tract

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A lot of scientific studies emphasize the paramount importance of the gut microbiota for the human health, as gut bacteria play a significant role in controlling digestion, preventing pathogenic colonization and controlling innate and adaptive immune cell growth, homeostasis and function. As much as 50% of the bacteria in the human gut are endospore-forming bacteria, sporobiota playing a significant role, not just as pathogens but also as commensal and beneficial/therapeutic species that support gut homeostasis. *Firmicutes*, *Bacteroidetes*, *Actinobacteria*, *Proteobacteria*, *Fusobacteria*, and *Verrucomicrobia* are the key phyla in the huge and diverse microbial community of the human gastrointestinal system; *Firmicutes* and *Bacteroidetes* make up 90% of the gut microbiota. With *Clostridium* genera representing 95% of the *Firmicutes* phylum in the adult human gut, the importance of those endospore-formers became clear. Gut microbiota is constantly impacted quantitatively and qualitatively by a variety of factors, including dietary practices, seasonality, lifestyle, stress, the use of antibiotics, and diseases.



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Also, a lot of structural and functional similarities link the soil rhizosphere and the human gut microbiome, viewed as functional ecosystems that interact with one another. In order to understand such complex systems more effectively this work approach systems mapping and causal loop diagrams.

Keywords: endospore forming bacteria, soil sporobiota, human gut sporobiota, systems mapping, causal loop diagrams.

OC₁₀

Cultivation technological features of grapevine in a vineyard holding in Arad County, Romania

**Mihaela Mălăescu, Alina Dobrei, Narcisa Strugari, Talita Heler,
Alin Dobrei**

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OC₁₁

Antalya province in tourism of Turkey

Mehmet Ulusal, Iasmina Iosim, Cosmina Toader,

Isparta University of Applied Sciences, Turkey



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OC₁₂

The survey of the isolation frequency of Foodborne Pathogen *Campylobacter* spp. in poultry origin samples

**Sebastian Alexandru Popa, Adriana Morar, Viorel Herman,
Narcisa Mederle, Alexandra Ban-Cucerzan, Bianca Gabriela Vânătoriu,
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Poster presentation – Food Engineering

P₁

Aspects regarding the importance of using mushrooms in food and possibilities of their introduction in basic food products

Oana Maria Popa, Ovidiu Țița

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The aim of the study is to investigate the impact of the introduction of mushrooms into basic food products such as sour dairy products to highlight the importance they bring and the very great benefits for improving the organoleptic characteristics of the products, increasing the intake of nutrients and an important source of vitamin D that helps fixation of calcium and phosphorus in the body.

For the proposed research the attention was focused on developing two sour dairy products enriched with mushrooms from the species *Chantarelus cibariu* for the first sample and *Boletus edulis* representing the second sample. The developed assortments together with a blank sample represented by a simple lactic acid assortment were subjected to a series of sensory and physico-chemical analyzes that took place over 14 days to determine the changes that occurs.

The obtained results showed that the addition of mushrooms added to the dairy assortments brings significant modifications both from an organoleptic and physico-chemical point of view. Sensory, the tasters responded positively to



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the developed assortments, and from the physico-chemical analyzes compared to the blank sample. The results were quite significant, especially in the case of acidity where, according to the graphs were recorded the largest increases.

The results support the idea of using mushrooms to enrich different products that constitute the basis of consumers' nutrition while presenting additional benefits.

Keywords: dairy products, mushrooms, organoleptic analysis, benefits.



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P₂

Improving the quality of natural fruit juice

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Natural fruit juice is the unfermented product obtained from ripe and healthy fruit. Natural fruit juices are obtained by pressing and have a short shelf life. To extend the shelf life, they can be kept at refrigeration temperature (maximum 24 hours), they can be frozen or pasteurized, but through pasteurization they lose their nutritional value and change their taste compared to freshly squeezed juice. We take into account the possibility of adding some natural preservatives to the apple juice under certain conditions and a gentler heat treatment. The idea is to increase the shelf life of the juice while maintaining a high quality both in terms of composition and sensory qualities. Different doses of honey and pollen were used to increase nutritional quality and improve shelf life. The following apple varieties were used: Starkrimson, Golden, Ionatan, ReD Topaz, Rozela and Sirius. The juice was extracted using a centrifugal juicer.

Pollen is a protein food, it contains very large amounts of vitamin P, vitamins from the B complex, as well as vitamins A, D, E, C and mineral salts, it contains proteins, free amino acids, various carbohydrates, mucilages, fatty substances.



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In addition, biological anabolic, antibacterial, antidepressant, anti-inflammatory, anti-parasitic, antipyretic, anti-toxic, dietary biostimulator, anti-anemic, reduces bleeding, lowers cholesterol, euphoric, improves brain functions, etc.

Keywords: apple juice, preservation, pollen, honey, nutritional value.



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P₃

The influence of external factors on the microbiological quality bakery products

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The purpose of this work is to identify the external factors that influence the microbiological quality of bakery products and to analyze the fungal load of all products present during the technological process, from the raw material - flour and ending with the finished product - bakery products - buns and croissants. The microbiological methods used for these determinations are specific to each type of analysis. With these laboratory tests it is possible to identify the problems encountered, these being necessary to reduce the economic losses resulting from the contamination with fungi and possibly mycotoxins of the raw material and implicitly of the finished product. In order to obtain quality finished products, it is necessary to use raw materials whose microbiological and physicochemical parameters fall within the limits allowed by legislation, and to prevent further contamination, hygiene rules and product storage conditions must be respected strictness. The obtained results represent the average of two inseminations, from the same dilution, each sample being made in duplicate. The results obtained at 72 and 120 hours were the following: for buns 37 and 115 colonies of fungi, and for croissants 60 and 270 colonies.



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The mycological spectrum of contaminating germs consisted of the following filamentous fungi: *Mucor sp.*, *Fusarium sp.*, *Rhizopus sp.* Considering the ability of some of the identified genera to synthesize mycotoxins, the need to carry out constant microbiological control of raw materials and finished products must be emphasized, because fungal contamination could also affect the health of the consumer, along with potential economic losses. It must also be taken into account that the storage areas for flour and all raw materials comply with sanitation conditions, rodents and other animals must not be allowed to enter the warehouse premises, in order not to allow contamination of the flour with coliform germs or other types pathogenic microorganisms.

Keywords: bun, wheat flour, fungi, bakery



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P₄

Functional products – importance for human health

**Cristina Zhîrneă, Camelia Moldovan, Mirela-Viorica Popa, Delia-
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Approaching the proposed theme represents an attempt to emphasize the need to consume functional foods, especially for the benefits they can bring to the gastrointestinal tract. Probiotic strains for incorporation into food intended for human consumption must have demonstrable benefits to human health and be safe. Furthermore, from a food processing perspective, it is desirable that such strains are suitable for large-scale industrial production, being able to withstand processing under appropriate conditions, such as freeze-drying or spray-drying, as well as to be able to survive in food throughout the shelf life. The use of probiotics in fermentation has numerous advantages. Fermentation acts to maintain and optimize microbial viability and productivity while retaining probiotic properties. The high cell density of probiotics grown in a suitable medium is an essential prerequisite for its incorporation into food. Some strains of probiotics have demonstrated the ability to grow in the food product after manufacture, for example *Lactobacillus* sp. In this work, 14 varieties of yogurt from the domestic market with different fat categories were analyzed from an organoleptic, physico-chemical and microbiological point of view, all of them being probiotic yogurts.



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For the correct performance of the organoleptic and physico-chemical analyses, reference was made to the standard SR 3665:1999 Yoghurt. Technical quality conditions. The organoleptic properties were determined according to SR 6345:1995 Milk and dairy products. The microbiological examination according to EC Regulation 2073/2005, which is strictly mandatory for the finished dairy product, consists in determining the total number of bacteria belonging to the Family *Enterobacteriaceae* and *Lysteria monocytogenes*. We only performed the detection and enumeration of *Enterobacteriaceae* by the colony enumeration method according to SR ISO 21528-2/ 2007. The results of the physico-chemical analysis of the analyzed yogurts reveal that all the yogurt samples presented a firm clot, only four of them slightly curdled, the color white, yellowish in some samples, in 13 samples, pleasant, characteristic smell, but in only one sample the smell was non-specific. The taste in four of the samples was distorted, bitter - drug-like, in one sample, bitter, foreign, non-specific, and in two of the analyzed samples the taste was floury. The results of microbiological analyzes show the absence of *Enterobacteriaceae* colonies in all analyzed samples. From a microbiological point of view, the samples fall within the maximum limits allowed according to EC Regulation 2073/2005 (maximum 10 colonies of *Enterobacteriaceae* /ml sample). Considering the studies carried out, we conclude that it is extremely important that the milk processing sector is supported by stimulating investments in modern equipment and technologies. It is absolutely necessary to invest in research and technological development by creating consortia between manufacturing plants and specialized faculties in order to find optimal solutions for survival in an ultra competitive market.



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Therefore, we prove that probiotic dairy products have many beneficial effects for human health, especially for the gastrointestinal tract, a part of the human body that becomes very vulnerable over the years and that must be helped for optimal functioning, with such food products.

Keywords: milk, probiotic, yogurt, *Enterobacteriaceae*

P₄

Nutritional and organoleptic aspects of some cheese assortments

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The origin of cheeses is unknown, but it is known that the manufacture of these products became a very popular and appreciated process in the territory of Europe and the Middle East until the time of the Roman Empire. In contrast, in North and South America cheeses were introduced by European immigrants



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much later, evidence of cheese dating back to around 4,000 BC has been found in Egyptian tombs on paintings illustrating the ways of making cheese. [1, 2]

In our country, the oldest attested form of milk processing is curd, which can be consumed as such or is used as a "semi-finished product" to obtain “cașcaval” cheese, bellows cheese, kneaded cheese and melted cheeses [1, 3, 4].

For this work, I chose “cașcaval” cheese from the category of cheese assortments. We obtained and characterized the homemade “cașcaval” cheese. And for the case study we characterized different “cașcaval” cheese varieties bought in supermarkets and the products we have obtained.

The name “cașcaval” of cheese, in our country, is attributed to scalded cheeses, (cheeses obtained by scalding). The “cașcaval” cheese is manufactured according to a special technology, which is based on scalding in water at a temperature between 72 and 80°C the matured curd that was previously obtained from cow's milk, sheep's milk, or a mixture. [3, 4] After salting, the “cașcaval” cheese is salted, it is aged under certain conditions to give it its characteristic organoleptic properties.

Through the process of scalding the curd, the casein (the main protein) will become plastic, and will give the cheese plastic properties (the property of stretching into threads) under certain conditions of temperature and pH. Casein plasticity occurs when calcium phosphocaseinate removes part of the combined calcium. [4, 6]

The aim of this study is to highlight the positive role that the food product has in the diet, due to its nutritional characteristics.



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There are many types of cheeses. In the classification of cheeses, several criteria are taken into account, namely the type of milk from which it is prepared and respectively the mammal from which it originates, the concentration of fat, the manufacturing process, the consistency of the sorts, the age, but also the additives used.[3,5]

The purpose of this paper was to highlight the special importance of cheeses, which the specialists and researchers in the field have demonstrated, as well as the close relationship between the quality of the raw material (milk) and the final product obtained (cheese).

Keywords: nutritional characteristics, cheese, “cașcaval”

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P₆

The use of various kinds of cheese in the preparation of cheese appetizer

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Cheese is a fresh or ripened, solid or semi-solid product, obtained by coagulation of whole milk, creamed milk, partially creamed milk, enzymes or other coagulation agents and by the partial or total loss of whey resulting from coagulation [1-4].

The multitude of cheese assortments, differing from each other by the nature of the raw material, and the manufacturing processes, but also by the characteristics of the finished product, allow their systematization into different groups, starting from several criteria. Cheeses are classified according to the origin of the raw material, the fat content relative to the percentage of



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dry matter of the finished product and the particularities of the manufacturing process [5,6]. In a world where food is predominantly invaded by additives, cheeses are very important foods and appreciated by consumers because they are without the addition of additives, but also for the important role they have in human nutrition, which leads these foods to be increasingly sought after by the general public [5-7].

For this work, from the category of cheese assortments, we use goat cheese and sweet cow's cheese (in cream form). We obtained and characterized cheese balls which we called "surprise balls of cheese". Finely chopped vegetables and green olives were added to these cheese balls. And for the case study, we characterized the obtained product as well as the assortments of cheeses that we used in the preparation of this innovative product. Both the cheeses and the products made were analyzed biochemically, nutritionally and organoleptically. The obtained data were graphically illustrated. The analyzed data fall within the area of interest of food engineering.

The purpose of this study is to highlight the positive role that cheese-based food products have in the diet, due to their nutritional characteristics. The central objective of this paper was to highlight the special importance of cheeses, which the specialists and researchers in the field have demonstrated, as well as the close relationship between the quality of the raw material, the milk, and the final products obtained.

Due to the nutritional values and organoleptic qualities, the choice of the appetizer "surprise ball of cheese" is a correct nutritional choice, the nutritional content being enriched with bioactive compounds existing in vegetables. The green olives and bell pepper that are part of the presented product have a high content of vitamins and antioxidants.



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Dairy products are products rich in calcium, therefore products derived from it are also products rich in biomineral compounds. Cheeses are an essential element of our diet that we should not omit.

Keywords: cheese, aperitif, biochemical analysis, protein content, fat content, organoleptic characteristics

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P₇

Comparison of blood parameters in pigs with confirmed African Swine
Fever from an outbreak in Constanta County versus healthy pigs

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The objective of our study was to emphasize the correlation between blood parameters and different clinical symptoms of African Swine Fever viral infection. In this purpose, blood on EDTA samples were taken for complete blood count. The first group of pigs analysed was represented by one saw, aged 18 months and 14 young feeder pigs, aged 6 months from a confirmed African Swine Fever outbreak a day before the test was conducted. The control group consisted of 15 normal pigs all aged 9 months. Our results show a corelation found between clinical signs and the blood parameters (WBC, PLT, RBC) measured using URIT-3000Plus Haematology Analyser.



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Of the 15 pigs confirmed with ASF, 3 were in critical condition presenting signs of fever and loss of appetite (WBC 6.3 – 7.2; PLT 16 -74; RBC 1.86 - 5.87), 5 pigs were moderately affected (WBC 8.0 – 11.9; PLT 36 - 263; RBC 5.29 – 6.48), , 3 pigs were slightly affected (WBC 13.4– 18.1; PLT 86 - 241; RBC 6.69 – 6.87) and 4 pigs were not showing any signs of disease (WBC 21.9 - 23.6; PLT 37 - 191; RBC 5.15 – 7.53). The study of the healthy group of animals that were not under known pathogen challenges showed that they had no significant differences for WBC - 22.0; PLT -373 and RBC -5.65. Our results showed a significant correlation between the clinical signs of the affected pigs and the haematological values compared to the healthy pigs tested.

Keywords: African Swine Fever, viremia, complete blood count



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P₈

Herbal formulas, as a nutrient supplement in the daily diet

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Herbal formulas are of particular interest in natural and alternative therapy. The therapeutic qualities of several preparations made from plants are influenced by the content rich in biologically active substances: plant mucilage's, phenols, tannins, coumarins, flavonoids, anthraquinones, anthocyanins, glucosinolates, essential oils, cardiac glycosides and cyanogen, vitamins, alkaloids and last but not least, mineral substances, present in the medicinal plants used to obtain them. The presence of essential nutrients, along with other compounds with biologically - active potential in the composition of various herbal preparations (oils, syrups, teas, etc.) has the effect of increasing the nutritional potential in case of systematic consumption of such formulas.



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The purpose of these investigations was to obtain a variety of syrups, from different species of plants originating in unpolluted area of Romania, and at the same time to characterize them by highlighting nutritional aspects of these types of food products.

In order to perform experimental part, we prepared syrups by using elderflowers (*Sambucus nigra*), bud of fir (*Abies Alba*), and also rose's petals (*Rosa centifolia*). Samples were analyzed from raw material used in preparing syrups and from syrups obtained thereafter. The raw material used in preparing syrups came from spontaneous flora from Caras – Severin County and forests in the area of the Semenice mountains.

From the processed samples we determined the content of vitamin C, Bx%, salinity, refractive index and humidity. For humidity content determination, samples were accurately weighed and kept by drying at 103 ± 2 °C until they reached constant weight. Vitamin C is extracted from syrup samples by means of weak acids (2% oxalic acid solution) in the presence of hydrochloric acid, followed by titration with 2,6 – dichlorophenolindophenol until a pink color appeared. Refractive index, salinity and brix degrees were also determined by using Abbe – type refractometer - (Model KRÜSS).

Experimental data shows that analyzed formulas used in herbal or alternative therapy, presents a nutritional interest by contributing to daily intake supplement of essential elements. Therefore, plants preparations should be regarded as in their double quality, as food and as drug.

Keywords: herbs, phytotherapy, unpolluted area, plants, syrups



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P₉

Honey – an ingredient with high nutritional value

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Honey is an ingredient with high nutritional value that is given by the quality of the biologically active substances from its composition: carbohydrates such as glucose, sucrose, fructose, maltose and other polysaccharides and oligosaccharides, as well as acids, flavonoids, vitamins, minerals, aromatic compounds, pigments and enzymes, etc.

Nowadays, people have become more and more concerned with having a healthy lifestyle. Replacing sugar with honey is a first step towards a much healthier life, because honey is a natural product, while sugar is manufactured by industrial methods. Honey can be used as a sweetener for tea, coffee, vegetable and fruit juices, etc. However, great care must be taken with the amount of honey used, as honey is much sweeter than sugar.



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Due to its special properties, honey is used as an additive to a variety of foods and beverages. Is also a good antibacterial and antioxidant compound, as it prevents food from oxidizing during storage. Honey is also an effective additive in preventing meat oxidation: due to its antioxidant activity, the addition of honey to various food preparations prevents the formation of heterocyclic aromatic amines. Thus, in the case of preparations to thermal frying processes, the addition of honey greatly improves the sensory quality of the product.

That is why we consider it important to evaluate from some quality parameters of honey.

For this study, we used 3 different types of unifloral honey samples, from Acacia flower (lat. *Robinia pseudoacacia*), Rape flower (lat. *Brassica rapa*) and Linden flower (lat. *Tilia cordata*), collected from beekeepers from Caraș – Severin County. Samples obtained were stored for 30 days at 22–25°C room temperatures.

From these samples, pH, refractive index, salinity and brix degrees were determined.

pH was measured by using a digital pH meter (Tester pH ExStick™ PH-100, Extech Instruments a FLIR Company) calibrated with pH 4 and 7 buffers.

Refractive index, salinity and brix degrees were also determined by using Abbe – type refractometer - (Model KRÜSS).

The physical properties of honey samples obtained from Banat area were determined and used to evaluate their behavior.



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Low pH values can be an important parameter used to access quality of honey samples, in terms of antimicrobial properties.

Although, the knowledge of physical features of samples from Caraş – Severin County is very important in order to set up certification marks and improve the local beekeeping.

Keywords: honey, pH, refractive index, acidity

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P₁₀

The nutritional potential of the pomegranate fruit

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Motivation in this case is the use of high nutritional value ingredients in order to obtain food products with superior taste and increased nutritional value.

Nowadays there is an increase in the consumer trend for fresh food - fruits, vegetables, and herbs. These predilection for consumption is worldwide and also in our country. In case of fresh fruits, not only good looks, nice color or taste and aromas are considered to be important, but especially their nutritional value, rich in sugars, vitamins and minerals needed in the diet of the human body. They also have the advantage that it can be consumed without any processing who could reduce the nutritional value.

Pomegranate (*Punica granatum* L.) is known to be one of the healthiest fruits, and its use in traditional medicine is supported by modern science.



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The motivation behind the choice of pomegranates is that these intensely colored fruits have antioxidant effects and can be used in almost all diets, including belts fattening or calorie diets. Pomegranate juices contain polyphenols that stimulate the activity of antioxidant enzymes, stimulate the proliferation of lymphocytes and the lytic action of natural killer cells. The beneficial health properties of the fruit are attributed to high levels of antioxidant compounds, especially hydrolysable tannins (HTS) and anthocyanins.

Pomegranates used in this study have been purchased from hypermarkets and specialized stores from Timisoara. Until the time of analysis, the fruits samples were kept in a dry and cool place, protected from sunlight and frost.

Some physico – chemical properties of pomegranate samples were determined and used to evaluate their behavior.

The results are conclusive and predictive, and come to emphasize once again that pomegranates are good sources of antioxidants and therefore may be used in the food industry in order to obtain fortifying food for consumers of all ages.

Keywords: pomegranate, fruits, physico-chemical characteristics, healthy food

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P₁₁

Improving bread quality by increasing the protein content

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The main goal of this work was to identify some possibilities for improving the protein content of bread.

The people's diet is usually based on a food that provides the daily requirement of carbohydrates. If the Asian diet has rice as its basic food, and the Western European one is represented by the potato, in the Eastern European diet (including the Romanian diet), this food is "our daily bread".

Bread is a staple food whose consumption is increasing in developing countries. It is characterized by its low protein content. These two elements, increased consumption (of bread) and low protein content, make bread an ideal food product for the protein fortification, which is one of the strategies in the protein-energy fight against malnutrition [4,5].

Several possibilities of increasing the protein content of bread were identified.

Replacing wheat flour in the breadmaking process with fresh curd cheese (20%) leading to a considerable increase in bread volume (73%), softness



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(65%). Also, an improvement in nutritional value in terms of proteins (80%) was obtained [1]. The wheat bread fortified with honey beans, soybeans and melon, had an increased protein contents of the breads by 9%, 16.5% and 26% respectively [6]. Using beef powder (*M. longissimus dorsi*) as additive (3%, 5%, 7% and 10%) to wheat flour, the protein content of the bread samples obtained increased with values between 14.41% and 20.33% [2]. Also, the chicken meat powder and chicken meat (levels: 10, 15, 20, 25, and 30%) were added to white and whole wheat bread. The protein contents of the fortified breads increased from 7.60% to 18.44% and 18.70% for white bread, and from 8.85% to 14.23% and 16.49% for whole wheat bread.

Other studies highlighted the possibility to use macro or microalgas to improve the proteic content of bread. The addition of *Spirulina* improved nutritional quality, with a significant increase of 39.04% in the protein content. Also, were noticed higher values for some essential amino acids (threonine, methionine, isoleucine and leucine) [3].

Keywords: nourishing value, curd cheese, Spirulina, powder

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P₁₂

The antioxidant activity of blackthorn fruits (*Prunus Spinosa* L.)

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In many developed countries, the interest of consumers for the nutritional quality of food, especially for healthy products is constantly growing [1]. *Prunus Spinosa* L. contains many biologically active polyphenolic compounds, such as: phenolic acids, flavonoids, anthocyanins, coumarins etc. [2] Blackthorn fruits have long been used in folk medicine and processed by people in households [3]. In order to prevent the negative effects resulting from



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the action of free radicals on the body, are used food antioxidants which can reduce the risk of diseases related to redox processes in the body.

Antioxidants are widely used in the food industry to extend the shelf life of foods. Several research groups have admitted blackthorn as a new source of antioxidants [4].

Keywords: antioxidant activity, chemical composition, *Prunus spinosa* L.

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P₁₃

Innovative gluten-free bread: obtaining and evaluating the protective quality

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Recently, it has been found that there are more and more people suffering from gluten intolerance, which can later lead to celiac disease and other health problems. Thus, this has become a worldwide problem, and as a result, interest in gluten-free products has increased among both researchers and consumers. The main problem, however, is the impossibility of producing gluten-free doughs, breads and bakery products with the same technological and sensory performance as wheat-based products. A first goal of this work was to obtain two varieties of gluten-free bread, one based on wholemeal rice flour and almond flour (P1), the second based on buckwheat flour (P2). When obtaining both products, psyllium bran and chia seeds were added to obtain a dough with similar characteristics to those conferred by gluten, but also a higher nutritional value for the finished products. The second purpose of the work was to analyze the obtained breads from the point of view of total polyphenol content (Folin-Ciocalteu method), antioxidant activity (DPPH assay), proximate composition,



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energy value and sensory characteristics (hedonic scoring method from 1 to 5). The P1 bread assortment with almond flour and wholemeal rice flour had the highest content of total polyphenols and the highest DPPH free radical scavenging activity. Moisture content analysis revealed that buckwheat bread (P2) has a higher water content, which makes this gluten-free bread variety more susceptible to mold spoilage than P1 bread. From a nutritional point of view, the P1 bread was richer in proteins, lipids, sugars, having a higher energy intake than the P2 bread, which was, however, richer in dietary fibers. The organoleptic analysis using the 5-point hedonic scale method, led to scores above 4 at all sensory characteristics analyzed, for both products. P1 bread was rated slightly better for appearance in the section, taste and smell, and P2 bread scored slightly higher for appearance and color.

Keywords: gluten – free bread, polyphenols, antioxidant activity



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P₁₄

Innovative cashew cheese - antioxidant, nutritional and sensory
evaluation

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Nowadays, producers are forced to adapt and produce food to satisfy all categories of consumers, especially for those who suffer from a deficiency, an intolerance to a certain product or a certain component of a product. For people with lactose intolerance and also for those who choose a vegan diet, a lot of plant-based products have been created that imitate milk and dairy products. A first aim of this work was to obtain vegan cashew cheese, in two versions: one with the addition of parsley and oregano (CVC1) and the second with the addition of paprika and curry (CVC2). A second objective of the work was to analyze the finished products from the point of view of total polyphenol content and antioxidant activity, compared to the raw and auxiliary materials, as well as to determine the proximate composition, energy value and sensory characteristics. Among the analyzed raw and auxiliary materials, dried oregano had the highest content of total polyphenols, followed by dried parsley. Of the



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two finished products, variant CVC1 had the highest content of total polyphenols (3.07 ± 0.04 mg gallic acid/g). The strongest DPPH free radical scavenging activity, among the raw and auxiliary materials, was shown by the extract obtained from dry parsley, followed by lemon juice, and the lowest value was obtained for the alcoholic extract from paprika. Among the finished products, the best antioxidant activity was recorded in the case of CVC1 (85.46 ± 0.08 %). The two varieties of vegan cheese obtained have a very close proximate composition, the CVC1 variant being slightly richer in proteins and total carbohydrates compared to the CVC2 variant. Cashew cheese with paprika and curry (CVC2) was slightly richer in sugars, dietary fiber and total lipids. Following the organoleptic analysis (hedonic scoring scale from 1 to 5), both finished products obtained scores between 4.1 and 4.5 (good) for all sensory characteristics.

Keywords: cashew nuts, vegan cheese, polyphenols, antioxidant activity.



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P₁₅

Obtaining an innovative product (pear jam with poppy seeds):
technology, description and beneficial effects on the human body

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The objective of the study was to obtain an innovative, functional product - pear jam with poppy seeds. Fruit jam is an important source of vitamins, minerals, simple sugars, soluble dietary fiber, many phytonutrients, phytoestrogens, anti-inflammatory agents and antioxidants. Antioxidant compounds such as polyphenolic flavonoids, vitamin C and anthocyanins help the human body to be protected from diseases, eliminate free radicals from the body and thus provide protection against cancers, aging, infections. In addition, poppy seeds are a rich source of fats and proteins, but also of manganese, calcium, linoleic acid and vitamin E.

The 2 types of jams obtained (pear jam and pear jam with poppy seeds) were analyzed from a sensory and physicochemical point of view, concluding the following:

- from the sensory point of view, the pear jam with poppy seeds stood out compared to the pear jam, due to the characteristics of taste,



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appearance and consistency, which were appreciated by the tasters with the maximum possible score of 5 points; also, the other 2 sensory characteristics (color and smell) obtained a high score of 4.8 points;

- the physicochemical analysis included the determination of sugar content, vitamin C content as well as the determination of the refractive index. Thus, pear jam with poppy seeds recorded a higher value of sugar content (61.2°Brix), but also of the refractive index (1.4501), compared to pear jam. Regarding the vitamin C content, a higher value was recorded in the case of pear jam than in the case of pear jam with poppy seeds (64.2 mg/100 g product, compared to 58.7 mg/100 g product).

Keywords: pear jam obtaining, poppy seeds, evaluation of jams.

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P₁₆

Pasta from durum wheat flour enriched with chestnut flour: beneficial effects on the human body

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The present study aimed to perform the sensory and physicochemical characterization of some pasta samples, obtained from durum wheat flour enriched with chestnut flour and to highlight the beneficial effects of this pasta on the human body. The recipe for obtaining this type of pastas was presented, creating a new product, as natural and healthy as possible.

Chestnut flour does not contain gluten, but unlike other gluten-free flours, which are sometimes low in nutrients, chestnut flour has a high nutritional value. It is rich in dietary fiber, essential amino acids (due to its protein



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content), fatty acids (omega 3 and 6), vitamins (C and B group) and also provides important minerals needed by the body (calcium, magnesium, potassium).

The sensory analysis of the pasta samples enriched with chestnut flour was carried out with the help of 10 tasters, who analyzed the appearance, consistency and preservation of the shape, taste and smell of the samples. Two types of samples were tested: samples purchased from the local markets and samples obtained at home, after an own recipe. The sensory analysis highlighted that artisanal pasta outperformed commercial pasta, with a total average score of 4.88 points, compared to 4.34 points. The physicochemical analysis of the pasta samples followed the determination of humidity, the increase in volume, as well as the determination of the sediment resulting after the cooking. Artisanal pasta showed higher values than commercial pasta, both for humidity (11,2%) and for the volume of sediment (15,7%). Regarding the increase in volume (after boiling) of the analyzed pasta samples, the highest value (225%) was recorded for commercial pasta, and for those obtained at home it was determined an increase of 202%.

Keywords: pasta, chestnut flour, physicochemical analysis.

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P₁₇

Dietary foods - qualitative assessment

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The image of cheese as a nutritious food is positive and highly appreciated, highlighted by the variety of cheeses available on the market, their compatibility with modern trends in convenience and consumption, which contributes to accentuating its popularity. Modern trends call for the creation of new varieties of low-fat cheeses and the creation of new types of artisanal cheeses. The dietary intake of cholesterol in cheese is beneficial to the human body, being established that its influence is small in relation to the intake of dietary saturated fats in blood cholesterol and is an indicator of the risk of developing coronary heart disease. The nutrient-rich content of the cheese and its precise nutritional composition is influenced by many multifactorial parameters including: the type of milk used by the species, breed, fat content, lactation stage and its manufacturing and maturation procedures.

Keywords: nutritious food, cheese

Introduction. Cheese is a milk product, being a nutritious, consistent food widely appreciated by consumers. The main purpose of this study was to



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present the technological process of obtaining fresh cheeses and highlighting the positive role of these dietary foods obtained only from fresh and natural ingredients, improving the consumer's health and quality of life. Cheesecake is a dessert that contains a topping of soft, fresh cheese, placed on a biscuit crust or on a pastry surface, it can be baked or obtained without baking.

Materials and methods. Fat content was determined by the acid-butyrometric method, sodium chloride content was determined, moisture content was determined with a digital moisture balance (Thermobalance MLB 50-3), protein and lactose were determined for cream cheese, full-fat cheese, medium-fat cheese and fat-free cheese.

Results and discussions. The analyzed cheese samples present nutrient values within the limits provided by the rules in force, according to which fresh cheese samples must have a fat/dry matter ratio of at least 18%, and the fat content must be between 1-5% - [2]. In the case of skimmed cheese, there are no standard values, but it is considered that the percentage of fat / 100 g of cheese should not exceed 0.5% - [4]. Naturally, the lactose content of the cheeses analyzed decreases directly proportional to the fat percentage, the activity of the starter culture being more pronounced in the case of cheese with low fat content.

Conclusions. Fresh cheese is an extremely versatile food product, due to its special sensory qualities (flavor, taste), but also due to its low nutritional values and high digestibility. Fresh cheese contains important amounts of proteins, lipids, fat-soluble vitamins, mineral salts, therefore fresh cheese is recommended for consumption, either as such, in a fresh state, or as an ingredient in various dishes: cheesecake, papanasi, pies, baked pasta dishes . [1, 3]



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P₁₈

Elderberry (*Sambucus nigra*) - functional foods

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Sambucus nigra L. or black elder is a woody perennial plant native to Europe [1]. This has been used as a medicinal plant for many years. Even if all parts have their role in treating various ailments, the ones that have been studied the longest by scientists and used by consumers have been the fruits and flowers [2]. The protein content in elderberry fruits is 2.7-2.9%, in flowers approximately 2.5%, and in leaves we have a value of 3.3%, making elderberry a good source of protein [3]. Both flowers and fruits of *Sambucus nigra* are used as a traditional remedy for various types of ailments and diseases. They have a wide range of uses, but in particular they can treat the common symptoms of colds, fevers, coughs, nasal congestion, mucous secretions and flu, as well as for improving the immune system [4].

Keywords: elderberry, chemical composition, medicinal uses, *Sambucus nigra*, functional product



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P₁₉

Comparative study of the quality of olive oil in the UE

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The European Union countries, produces approximative 67% of the world's olive oil. The aim of this study was to investigate some quality characteristics (sensory properties, the physico-chemical characteristics and antioxidant activity) of olive oil produced in UE country like: Greece, Italy, Spain and Portugal. The data was used for comparative analysis of experimental results. The following characteristics define the olive oil quality: sensory properties and physico-chemical characteristics (acidity level, peroxide index, fatty acid content) according to International Olive Oil Council methods (IOC, 2018). The oils possess a certain typicity of specific organoleptic profile in relation with a terroir and originality (conferred by varieties of olive). In Greece, olive oil plays an important role in the economic life of the country being well internationally known for its organoleptic qualities. The countries as Italy and Spain have chosen to promoting olive oil quality as regional produces for development of the oil production system. The organoleptic analyses, especially the taste add commercial value of olive oil. Consumers choose the best oils by their taste and needs.

Keywords: olive oil, sensory properties, physico-chemical characteristics



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Aspects concerning the formulation of some types of aromatized wines

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This study begins with a brief introduction to the aroma chemistry of wine by describing wine as a beautiful mixture of hundreds of chemical compounds: water, ethanol, glycerol, organic acids, carbohydrates, and, to a minor extent, terpenoids, pyrazines, higher alcohols, ethyl esters, fatty acids, nitrogenous, sulphur in different concentrations. The flavor of wine depends on parameters such as environmental factors, vineyard location, pre-fermentation biochemical phenomena, fermentation conditions, vinification techniques, storage as well as aging conditions. Aromatized wines are defined as wines with a high alcohol content (more than 16% v/v and less than 21% v/v), resulting from the addition of brandy and chosen botanicals, produced under oxidative conditions which determine the aromatized wines' typical flavor and aroma profile. Aromatized wine can be produced using fermented and unfermented grape must and flavored with botanical ingredients — such as pink peppercorn, bitter orange and grapefruit. What makes aromatized wines unique is the blend of botanical flavors steeped into the wine. Popular flavors include nutmeg, chinotto, quinine, gentian root, angelica, chamomile, cinchona, saffron, mistelle.



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EU regulation 251/2014 set the rules on the production and labelling of aromatized wine products and defines what aromatized wine products are, identifies the specific categories allowed in the EU and outlines detailed rules for their production, description, presentation and labelling. It also lays down the provisions for the registration and protection of geographical indications for aromatized wine products. EU delegated regulation 2017/670 sets out the authorized production processes for obtaining aromatized wine products. All of the above considerations will be used as a starting point for designing some types of aromatized wines with distinct sensory attributes.

Keywords: aromatized wines, aroma profile, chemical properties, sensory attributes



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P₂₁

The nutritional potential of some *Elaeagnus umbellata* biotypes selected in Romania

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Elaeagnus umbellata Thunb. a member of the *Elaeagnaceae* family is a deciduous shrub widely distributed in Asia and Southern Europe. The aim of the present study is to evaluate some bioactive compounds with nutraceutical properties of the fruit to promote potential applications as a food supplement and to strengthen the knowledge of this underestimated species. The research was conducted in the experimental field of the Research Institute for Fruit Growing, Pitesti-Maracineni (44°54'11"N 24°52'29"E, 287m elevation a.s.l.) on four biotypes of *Elaeagnus umbellata* following some physico-chemical indicators. These researches identified the selection Sel 1 and Sel 4 with the highest values of polyphenol content of 3439.13mg GAE/kg FW, respectively 2695.65mg GAE/kg FW, and Sel 1 and Sel 3 with a similar vitamin C content of approximately 17 mg/100g.

Keywords: nutritional potential, *Elaeagnus umbellata*, biotypes



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P₂₂

The study of the physical-chemical properties correlated to ascorbic acid
from fresh juices of fruits

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Fresh fruit juices are rich in vitamins, minerals, anthocyanins, polyphenols. Consumed fresh, they are considered a source of healthy energy for humans, for increasing the body's immunity.

This paper presents the results of the study carried out on lemon, lime, orange, tangerine, kiwi juices. The fresh fruit juices were obtained by pressing the fruits and then centrifuging them.

They were kept cold and analyzed to determine several physico-chemical properties: pH, TDS, acidity, redox potential, reducing character.

The amount of ascorbic acid was measured by redox volumetric method and by the UV spectrophotometric method. The results show a correlation between the total content of dissolved salts, acidity, pH and the amount of ascorbic acid present in the fruit.

The content of ascorbic acid in juices depends on the nature of the fruit, on the presence of other organic substances in the fruit, but also on the method of obtaining and storing the juice.



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The consumption of fresh juices is recommended because they bring an intake of ascorbic acid, a vitamin that our body needs, knowing that ascorbic acid cannot be produced by the human body

Ascorbic acid is an essential nutrient of life, involved in the production of certain substances that allow the transmission of nerve impulses, respectively in functions that facilitate the absorption of iron in the digestive tract.

Keywords: ascorbic acid, fresh fruits, physic-chemical properties, redox volumetric method, UV-VIS spectrophotometric method.



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P₂₃

Quantitative Analysis of Phenolic Acids using UHPLC–MS/MS from
vinification waste of Burgund Mare and Tămâioasă Românească

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It is known that there are polyphenolic compounds in the grape pomace, which are known as natural antioxidants. The purpose of this study was to evaluate the polyphenolic profile of grape pomace from the Tămâioasă Românească and Burgund Mare cultivars from the Stefanesti wine center. The polyphenolic profile was made both skins, seeds and pomace as a whole. Hydroethanolic extracts were obtained by maceration at room temperature of grape pomace and its elements, and extraction was done by microwave assisted extraction (MFA). Multivariate statistical analysis was performed and to differentiate between the components the analysis of the main components (PCA) was used. The polyphenolic compounds identified in the samples of grape pomace were: 3,4 dihydroxybenzoic acid, 4-hydroxybenziuc acid, catechin, epi-catechin, chlorogenic acid, syringic acid, naringin, rutin, elagic acid, caffeic acid, p-coumaric acid, ferulic acid, p-coumaric acid, resveratrol and quercetin. From



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the tests made to characterize the polyphenolic profile, it is noted that the seeds of Tămâioasă Românească have the highest content of gallic acid (11.22 mg/100g), catechin (175.31 404.81 mg/100g), epi-catechin (139.2mg/100g), p-coumaric acid (0.23 mg/100g) and lowest in resveratrol (0.35 mg/100g), querin. The highest amount of resveratrol is observed in the skin of the Burgund Mare cultivar (0.99 mg/100g).

Keywords: UHPLC–MS/MS, Phenolic Acids, Burgund Mare, Tămâioasă Românească

P₂₄

Studies on the attestation of the authenticity of wines and the tracking of their falsifications

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The present work proposes a deepening of the main research carried out at international level on the issue of traceability and authenticity of food products, with a special focus on grapes and products derived from grapes (e.g. juices, compote, wines, distillates), in order to identify potential quality and origin certification markers as well as contaminants that can affect the quality of the fruits as well as the products resulting from them.

On the other hand, the authentication of food products must be based on chemical markers that show great stability during the processing of the raw materials, until the finished product is obtained and consumed.



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Determining the natural composition in stable or radioactive isotopes of a wine is one of the high-performance applications of analytical chemistry, namely establishing the relationship between the finished product (wine) and the raw materials (water, CO₂) from their natural environment. The isotopic fingerprinting of wines involves several aspects, such as determining the geographical origin, the year of harvest, the wine grower and the quality. That is why it is necessary that the proof of authenticity of the wine is based on the specific parameters of the origin that do not undergo changes during the vinification or that are difficult to falsify. The isotopic analyzes related to water and alcohol in wine are part of a global European program for establishing the authenticity of wines.

Keywords: authentication, forgery, wine, isotopic fingerprinting, markers.



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P₂₅

Influence of proteolytic and amylolytic activity on the formation of doughs
used in bakery and pastry

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The experimental research aimed at the expertise of T480, T550, T650, T780, T1100, T1200 flours by determining the proteolytic index, the falling index and the maltose index. Through the experiment, the formation of the doughs and the quality of the flour were verified, determining their extensibility L (81-114 mm), the maximum resistance of the dough to stretching ($P = 64-98$ mm), the extensibility index ($G = 19-23.8$ mm), as well as the deformation ($W=167-207$ mm). The final result was the ratio of dough extensibility to deformation, which ranged from 0.56(56%) for T480 flour to 0.94(94%) for T650 flour used in pan bread dough. The porosity and volume characteristics of the bread assortments recorded values that are in line with the quality standards, sometimes the porosity exceeded 80%, implicitly also the volume, which means the addition of leavening agents in maximum limits outside the rules established by GMP.

Keyword: optimization of dough quality



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P₂₆

The nutritional influence of organic maple syrup on consumer health

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The experimental study looked at the nutritional properties of maple syrup assortments. The physico-chemical analysis determined the content of soluble dry matter, reducing sugar, PH, acidity of the types of maple syrup. The aroma of the different varieties was highlighted by comparison with the standard scale by comparing the natural aroma by association with fruity, floral, caramel aromas. The antioxidant potential of maple syrup, the PH, the acidity were also highlighted. Soluble dry matter varied between the limits of 42.5-63% indicating a high concentration in sucrose. However, maple syrup is recommended to be consumed like bee honey, having a significant amount of polyphenols, being a good natural syrup for preserving fresh fruit, sea buckthorn or in sugar-free diets. Maple syrup contains zinc, manganese, iron, calcium and potassium. Maple syrup contains 15 times more calcium than honey, another favorite sweetener. Compared to the same food, maple syrup also has a lower salt content. Among vitamins, maple syrup contains decent amounts of niacin, vitamin B2, vitamin B5, folic acid, vitamin B6, biotin and vitamin A.

Keyword: the beneficial effects of maple syrup



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P₂₇

The effects of glucose from natural apple juices versus industrial on diabetic diets

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This experiment aimed to highlight the nutritional characteristics of apple juices obtained from organic apple varieties - the apple variety Auriu de Bistrita, Pionier, Starkinson, Romus I, Idared, Florina, as well as the characteristics of industrially obtained apple juices Santal, Ana are , Hortex, Mellow Drinks, Fresco Jugo. Through this comparative study, it was found that the apple juice obtained by pressing apples had a soluble dry matter content of 10-14.2%, as follows: Auriu de Bistrita apple juice -14.1%, Pionier apple juice 14.2%, Starkinson apple juice 13.4%, Romus I apple juice 12.4%, and Idared apple juice 10%. In the apple juices obtained by manufacturing, the dry substance content was: 15.2% for Ana are apple juice, 14.1% for Santal juice, 11.6% for Ana are juice, 9.7% for Hortex juice, 11% for Mellow juice Drinks, 11.6% at Fresco Jungo. Through the comparative analysis of natural apple juices compared to industrial ones, it was found that natural apple juices obtained from apple varieties had a high glucose level of 23.3-30.5 mg/100 g, which recommends them to be consumed as juices with slow metabolism of glucose.



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In the case of juices obtained by reconstitution of concentrated juice, i.e. industrial juices, it is observed that two of them, Santal -1.6 mg/100 g and Ana are -5.76 mg/100 g had an unexpectedly low level of glucose, their sweetening being done with sweeteners, i.e. a falsification of the sweet taste. The glucose level of natural juices was the highest, even higher than the glucose level of industrially obtained juices. So it the research tracked the glycemic index of natural juices versus the GI glycemic index of industrial juices to recommend juices for their nutritional effects.

Key words: organic vs industrial apple juices

P₂₈

Digestibility of innovated tortillas sticks and quesadeilla preparation

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The study carried out looked at the production and preservation of Tortilla sheets, made from wheat flour or corn flour, as well as the analysis of their nutritional qualities by comparison, especially when using them in association with other ingredients. Shawarma, dessert-type Quesadilla and Mexican Quesadellia culinary preparations use Tortilla sheets, but also an addition of ingredients that increase their nutritional value. Thus, the wheat flour tortilla sheets contain 236 kcal/100 g, and the corn flour tortilla contains 310 kcal/100 g. The addition of Shawarma ingredients considerably increases the nutritional value, as well as in the case of Quesadellia preparations. Thus, the experiment followed the dynamics of macronutrients in Tortilla, which have 47.9-52 g/100



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g carbohydrates, 2.7-6.9 g/100 g lipids and 5-8.5 g/100 g protein. An important role is also played by the fiber content 1.8-2.5g/100g.

Also, the vitamin content of the B complex makes these Mexican-type products increase their nutritional value, along with the mineral content that varied from 0.65 to 1.8 g/100 g mineral substances. As an experimental result, Tortilla sheets have a moderate caloric value, having a caloric or energy content that is more easily digestible compared to other types of bread or flour. The low glucose content of Tortilla sheets has also generated the recommendation to be consumed by people with digestive problems.

Key words: innovation techniques for tortilla sheets



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Quality evaluation of noodles base on black bean flour and wheat flour

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This study aims to obtain and present the effects on the sensory and physico-chemical properties of noodles made from wheat flour with additions of black bean flour in different proportions, as well as research the health benefits of black bean consumption. According to the studies carried out, it was found that black beans are a source of nutrients with multiple health benefits, such as iron, calcium, magnesium, selenium, phosphorus, folates, dietary fibres, quercetin, saponins, etc., the consumption of black beans being beneficial in reducing the risk of obesity, diabetes, heart disease, cancer, as well as in lowering blood pressure and maintaining bone health. To analyze the effects on the physico-chemical and sensory properties of the noodles caused by the addition of black bean flour, four samples of noodles were made from mixtures of wheat flour with black bean flour in proportions of 0%, 5%, 10% and 15%. Noodle samples were analyzed in order to obtain information regarding the proximate composition, cooking properties and sensory evaluation. Regarding the proximate composition, significant changes were observed in the amount of fat, protein, ash and fiber with the increase in the percentage of black bean flour in the noodle sample.



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Thus, the noodle sample with 15% black bean flour presented amounts of $1.44 \pm 0.11\%$ fat, $7.93 \pm 0.33\%$ protein, $0.98 \pm 0.05\%$ ash and $0.97 \pm 0.59\%$ fibre compared to $0.76 \pm 0.04\%$ fat, $6.28 \pm 0.27\%$ protein, $0.46 \pm 0.22\%$ ash and $0.36 \pm 0.33\%$ fibre present in the noodle sample made from 100% wheat flour. An increase in cooking time and cooking losses was also observed in the case of noodle samples with larger amounts of black bean flour. Regarding the sensory evaluation, a decrease in the overall acceptability of the noodles was observed with the increase in the percentage of black bean flour in the samples, the most appreciated noodle sample, both from a nutritional and sensory point of view, being the noodle sample with 10% black bean flour.

Keywords: black bean flour, noodles, sensory evaluation, physico-chemical properties



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Studies on the physico-chemical properties of buffalo milk as raw material
for telemea cheese

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Buffalo milk is more suitable for obtaining telemea cheese due to the high yield, specific aroma and physical properties. Regarding buffalo milk production, the information is more limited compared to the production obtained from other species of animals. The FAO statistical data highlight the increase in the production of buffalo milk from total milk worldwide. On a global level, the production of buffalo milk is the second most important source in obtaining this product. It is worth noting the growth dynamics of total milk production, which in the last decades of the last century achieved an average annual rate of 10.38%, of which 8.17% in the last decade, a level which, in addition to the numerical increase of the livestock, is also determined by the evolution of its productive performance. [1]. Compared to cow's milk, buffalo milk has a high content of S.U. (over 18%) fat and casein. For buffalo milk,



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the protein/fat ratio is lower (0.547) compared to cow milk (0.850-0.900), the proportion of casein to total proteins is higher (77.84% compared to max. 75%). Telemea cheese is a product that enjoys a wide "popularity" thanks to its positive and healthy image, appreciated by consumers as having beneficial effects on health. At the same time, this image is also supported by its relative availability, its compatibility with products that they contain it with the modern trends regarding the greater consumption of foods that ensure food comfort and preparation facilities. In many aspects, Telemea cheese is an ideal food: nutritious, flexible in use and application, sensory, being appreciated by a large number of consumers. Also, due to the reduced risk of illness following consumption, it is considered a relatively safe food and appreciated as a result [2-5].

This study aim was to determine the physico- chemical and sensorial characteristics of buffalo milk sampled from farm TNP Mesendorf, Salaj County during year 2021. The study of the chemical composition of buffalo milk was necessary for scientific and technological reasons, considering our goal for using it as raw material for the obtaining of telemea cheese. To perform the physical-chemical examination, the Lactoscan device was used in the Laboratory of Technologies in the Dairy Industry of the Faculty of Food Engineering from USV Timișoara, as well as Ekomilk within the study farm. The measured variables were fat, protein, lactose, total solids (SUT), relative density, pH, and titratable acidity. The average values for the main physico-chemical parameters for buffalo milk at the TNP Mesendorf farm differ depending on the season: % fat in the winter season was 7.58 ± 0.02 , spring 7.34 ± 0.06 , summer 6.56 ± 0.02 , autumn 7.34 ± 0.04 ; the protein content (%) was 4.44 ± 0.03 in winter, 4.35 ± 0.02 in spring, 4.46 ± 0.02 in summer and 4.50 ± 0.08 in autumn. The average value for lactose (%) was 4.60 ± 0.02 in winter,



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4.63±0.02 in spring, 4.79±0.03 in summer, 4.80±0.02 in autumn. Regarding the average content of SUT (%), it varied between 17.54±0.05 and 18.48±0.03.

The average density was maintained around 1.03±0.01 and 1.04±0.01. The experimental data were in agreement with those obtained by other Romanian and foreign researchers' [2, 4, 5]. The pH and titrable acidity values of buffalo milk from TNP Mesendorf farm range from 5.8 - 6.55, respectively from 0.49% - 0.57%.

Keywords: buffalo milk, telemea cheese, chemical analysis, protein content, fat content

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Studies on the production and nutritional properties of soy yogurt

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Soy milk is a drink made from soybeans. Soy milk contains almost the same proportion of proteins as cow's milk: about 3.5%; also 2% fat and 2.9% carbohydrates. One of the greatest qualities of soy milk is that it lowers cholesterol and protects cardiovascular health. It contains those healthy fats that are known to lower triglycerides and the density of bad lipoproteins in the blood. Unlike milk of animal origin, rich in cholesterol and saturated fats, the fats in soy milk are mostly unsaturated and cholesterol-free. The polyunsaturated and monounsaturated fatty acids in soy milk inhibit the transport of cholesterol in the bloodstream. This combined effect transforms soy milk into an ideal source of raw material for obtaining. Unlike milk of animal origin, rich in cholesterol and saturated fats, the fats in soy milk are mostly unsaturated and cholesterol-free. The polyunsaturated and



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monounsaturated fatty acids in soy inhibit the transport of cholesterol in the bloodstream.

This combined effect transforms soy milk into an ideal source of raw material for obtaining plant-based dairy products [1-3]. Soy yogurt could represent an alternative to classic yogurt due to its unique nutritional values [4]. It has been scientific proved that soy yogurt showed health benefits related to high antioxidant activity, reduction in the risk of diabetic diseases, and prevention against chronic inflammation [5].

The aim of this study was to evaluated nutrient composition and sensory characteristics of soy yoghurt obtained in laboratory. Using half a kilogram of soybeans, water and a little salt, we managed to obtain 4 L of soy milk by soaking the dry soybeans in 2L water in an open vessel for 18 hours, then, with the help of a meat grinder, the soybeans were crushed obtaining a paste. The slurry was sieved with added water through muslin cloth, and the residue squeezed to get all the milk. The milk was heated to boil for 20 minutes with continuous stirring to minimize coagulation. The soy yogurt production was done in triplicate by using approximatively 1000 mL of pasteurised (85°C, 15 mins), cooled 40 – 44°C soy milk. Each sample were then inoculated with 0.5% of a 1:1 mixture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* starter culture. Fruit flavour and stabiliser were added to all sample but lactose and sodium caseinate were added only to the third sample. The inoculated soy milk samples were fermented at 42-44°C for 6 h, cooled at 18°C gradually to set the texture and flavour. The yoghurts were analyzed for nutrient composition, microbial and sensory quality. The sensory evaluation scores for colour, flavour, texture, mouth feel and overall acceptability ranged from 5.56. to 8.35, all above the mean score of 5 for the 9-points hedonic scale



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Keywords: soy milk, soy yogurt, nutritional value, sensory properties

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P₃₂

Evaluation of Chemical Analyses of Experimentally Prepared Fermented and Heat-Treated Sausages

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Sausages are very open to adulteration because of their preparation procedures. The purpose of this study was to examine the chemical composition of fermented and heat-treated sausages prepared experimentally with the addition of tissues and organs that are likely to be used in adulterated meat products and to determine whether the chemical analyses provided adequate information about sausage composition. The experimental fermented or heat-treated sausages were prepared with the addition of tissues and organs (seven tissue/organ combinations were studied; head meat-lung, tongue-liver, trachea-rumen, spleen-intestine, mammary gland-brain, heart-testis and kidney-oesophagus) that are likely to be used to adulterate sausage meat products. Appropriate control sausages not containing any organ additions were prepared according to the Food Codex. The most remarkable result is that contents of moisture, fat, ash and total protein are not sufficient criteria to determine the quality of the sausages. However, hydroxy-proline content is an important criterion for the detection of collagen tissue, and this chemical analysis must be supplemented by histological analysis in future studies.



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Keywords: chemical analysis, fermented sausages, heat-treated sausages, hydroxyproline.

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P₃₃

Risk assessment of the use of alternative animal and plant raw material
resources in aquaculture feeds

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A wide range of raw materials are now used routinely in aquaculture feeds throughout the world, primarily to supply protein and energy in the form of lipid from edible oils. Protein meals and oils used can generally be divided into those of plant or animal origin and many have considerable potential to supply the required dietary nutrients required by aquaculture species. However, the use of any raw material introduces a suite of risks that need to be considered to enable the production of safe, sustainable and functional feeds to underpin this sector. A lack of understanding of some of those risks can result in failure of dietary specifications being met and/or negative nutritional elements being introduced (e.g. antinutritional factors). Importantly, it is this feed that when fed to food-producing animals is such an important element of food safety, and as such any undesirable aspects relating to feed production can also have a negative impact on the rest of the food chain. However, there is some disparity internationally among raw materials that are used and the perceptions surrounding the risk of their use. It is the scientific assessment of these risks that is the basis of this review.



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Keywords: antinutritional, contaminant, diets, fishmeal, nutrition, pathogen, risk.

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P₃₄

Byproducts From Beef and Pork Production

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Animal byproducts contribute to the bottom line of the meat industry. Byproducts (edible offal (including variety meats), inedible offal, hides and skins, blood, fats, and tallow) include all parts of a live animal that are not part of the dressed carcass and constitute about 30 percent of the liveweight of hogs and about 44 percent of the live- weight of cattle. Byproducts from animal slaughter provide raw materials used in pharmaceutical, cosmetic, household, and industrial products. Exports of edible offal also contribute to the value and profitability of the meat processing industry in a way that leads to higher prices for livestock producers, as byproducts account for more than 23 and 35 percent of the volume of beef/veal and pork exports, respectively. Regression analysis indicates that a 10-percent increase in the steer byproduct drop value adds a 1-percent increase in the five-area weighted average price for all grades of steers. Exports of beef/veal and pork edible offal have increased in recent years, mostly due to population growth, income growth, and consumer preferences for variety meats. Income growth in the global marketplace, however, may have varied effects on the consumption and trade of variety meats.



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Keywords: animal byproducts, offal, edible, inedible, variety meats, hogs, cattle, trade

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P₃₅

Technologies for the Production of Meat Products with a Low Sodium Chloride Content and Improved Quality Characteristics

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In recent years, consumer concerns regarding high levels of sodium chloride (NaCl) intake have increased, given the associated risk of cardiovascular disease. This has led food industries to consider lowering the use of sodium in food products. However, it is well known that the addition of NaCl to meat products enhances their quality, including water-holding capacity, emulsification capacity, juiciness, and texture. Thus, it is difficult to completely remove salt from meat products; however, it is possible to reduce the salt content using salt substitutes, flavor enhancers, textural enhancers, or other processing technologies.

Several recent studies have also suggested that processing technologies, including hot-boning, high pressure, radiation, and pulsed electric fields, can be used to manufacture meat products with reduced salt content. In conclusion, as the complete removal of NaCl from food products is not possible, combined technologies can be used to reduce the NaCl content of meat products, and the appropriate technology should be chosen and studied according to its effects on the quality of the specific meat product.



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Keywords: salt; shelf life; water-holding capacity; emulsion stability; salt reduction

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P₃₆

Implementation of the concept of sustainable development by obtaining categories of food products with high nutritional intake by using by-products from the wine industry

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Humanity is facing an important crisis of material and energy resources, a context in which the food crisis is in the foreground. In this situation, it is necessary to capitalize as much as possible of the resulting secondary materials in the food industry. the processing of grapes results in significant quantities of secondary products or by-products with a diverse and very valuable chemical composition.

The rational processing of the resulting by-products in the wine industry offers the possibility to obtain products with high added value with applications in the food, cosmetic and pharmaceutical industries. Therefore, the correct management of the by-products of the wine industry will have a significant impact both on the environment and from an economic and social point of view through the possibility of creating additional jobs. The nutraceutical potential of many of these compounds, especially polyphenols, have been associated with remarkable benefits to human health, particularly in the prevention and treatment of several chronic diseases.

Key words: nutritional intake, by-products, sustainable development, tesvovine, wine.



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P₃₇

Valorisation of extracts and essential oil from *Tetraclinis articulata* (vahl) masters as antioxidant and antibacterial agents and their application in gummy and hard candies

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Many new drugs derived from secondary plant metabolites have been applied for the treatment and prevention of various diseases. Essential oils and extracts of plant are widely used as antibiotics to treat infectious diseases due to bacterial contamination; they are also used as antioxidants to treat neurodegenerative disorders. The development of new food products incorporated with natural ingredients containing antioxidants has shown to be an interesting marketing strategy for industry, mainly for products requiring



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incorporation of healthiness appeal, such as confectionery products (gummy candies).

The objectives of this work were therefore to analyse the chemical compositions and to evaluate the antioxidant and antimicrobial activities of the extracts and essential oil of *Tetraclinis articulata* and Jelly candies made from extracts of this plant. The essential oil was extracted by the hydrodistillation technique using a Clevenger type apparatus and their chemical composition was determined by GC-FID and GC-MS. Hexane, Chloroform, Acetone, Methanol and water extracts were obtained by Ultrasound-assisted extraction and were characterized by HPLC. The gummy candies formula consisted of sugar, glucose syrup, water, citric acid, agar and extracts of the plant. The ability of essential oil and gummy candies to inhibit microorganisms was tested using three different methods: the disk diffusion method, the liquid macrodilution method and the solid state dilution method. The antimicrobial activity result was variable depending on the nature of the strain. The colorimetric evaluation of the antioxidant activity was carried out with the methods of DPPH and ABTS. While the electrochemical behavior was studied using cyclic voltammetry (CV), this assay was based on the reduction in the limiting current value of the oxygen electroreduction. Cyclic voltammetry experiments confirmed the interaction between the electrode surface and the active compounds present in the essential oil and extracts.

Key words: *Tetraclinis articulata* (Vahl) Masters, gummy candies, DPPH, ABTS, cyclic voltammetry.



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P₃₈

Sensory and microbiological analysis of the innovative product "trusty biscuits"

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The aim of the paper is to highlight the sensory and microbiological properties of the innovative product "TRUSTY BISCUITS", i.e. biscuits in the composition of which wheat flour is replaced by flour from dry bean pods, glazed with cherry jam. The motivation for choosing this theme is to identify the benefits that this product brings to consumers, especially targeting those people who have gluten intolerance, and the goal was to create a product for them. So, from this idea, the product "TRUSTY BISCUITS" was born. When making it, we wanted to come up with something new, something unusual in everyday food, this consisting in the utilization of dry bean pods to obtain flour. Knowing the low energy intake of these dry sheaths, but also the high fiber content, we thought it would be useful to identify a food product that uses this raw material, which is not used in the food market. The only use being only for pharmaceutical purposes, in the form of tea. The product was designed especially for people with gluten intolerance, people with diabetes, overweight people, but also for people who choose a healthy lifestyle.



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"TRUSTY BISCUITS" addresses a wide range of consumers, from children to the elderly, from healthy people, to those with certain health problems - obesity, diabetes, celiac disease - due to the beneficial influence on consumers through therapeutic effects, being hypoglycemic, purifying, remineralizing and not only that. Biscuits, since ancient times, have been a food that can be consumed on a daily basis by the elderly, children and not only. Among the elderly, the biscuit is the basic dessert, whether eaten in the morning, at breakfast, or even in the evening, after dinner. Through the biscuits obtained by us, we offer these categories of consumers the opportunity to feed themselves with a quality product, which can bring health benefits, given the fact that the gluten in wheat flour is not always very well tolerated by the entire population, while the fiber from bean pod flour provides long-term satiety and helps with intestinal transit. In the case of overweight people, it has the role of determining the extension of the interval between meals, as a consequence of the feeling of satiety it generates, due to the very high fiber content, which hydrates after ingestion. Among the beneficial effects of bean pods we can list: improving rheumatic conditions, they are hypoglycemic ensuring the reduction of the amount of sugar in the blood, adjuvant in the treatment of diabetes, recommended in convalescent states, antirheumatic and mineralizing - remineralize the body, they are diuretic, purifying, due to the content of salicylic acid, detoxifying helping the kidneys and urinary tract, fights the accumulation of water in the tissues - dropsy, calms spasms in bladder disorders, normalizes urination, fights acne, treats eczema, skin rashes, being beneficial also in pulmonary tuberculosis, treats chronic pancreatitis and gout."TRUSTY BISCUITS" biscuits were awarded the first prize at the Student Fest student contest in 2022, June.



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From a microbiological point of view, the biscuits obtained by us are safe and healthy, the contamination indicators - coliform bacteria being absent from the finished product. At 72 hours fungi were absent from the analyzed samples.

Keywords: biscuits, gluten, beans pods, diabetics

P₃₉

Evaluation of mycological parameters along the bakery technological flow

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The purpose of the work is to isolate and identify the fungal genera that are found in the raw material and in the bakery products that reach the consumer's table. An important aspect is the fungal load, i.e. the number of colony-forming units and the evolution of this parameter from the raw material to the ready-to-eat products. The bakery and panification products industry is at the top of the ranking in the production of consumer goods, and together with other food products, they provide the human body with a fairly consistent portion of useful substances for vital activity, maintaining the state of health and preserving a good capacity for work. That is why, through the nutritional properties they possess, bakery and panification products are represented as useful forms of valorization of the flour obtained from wheat processing. The mycological examination provides useful information about the quality and sanitation of the analyzed product.



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In order to determine the fungal load and establish the mycological spectrum, we analyzed a number of four samples represented by wheat flour and respectively four samples of bread obtained from this flour, all from Timiș county. The quantitative mycological examination highlighted a differentiated contamination, the average number of fungi varying depending on the wheat used.

In the analyzed flour samples, the values of the mycological load varied between 540 germs/gram, up to 1 100 germs/gram of flour. It is found, referring to the legislation in force, that for bakery products, three of the four flour samples analyzed fall within the legislative limits, having values below 1000 UFC/g, and the last sample indicates that the number of forming units has been exceeded of colonies/gram of product, allowed by law. It should be noted that the humidity in the three flour samples where the mycological parameters fall within the legal limits is 11%, while the humidity in the sample where the fungal load exceeds the maximum limit allowed by the legislation is 13%. Bread was obtained from the four flour samples analyzed, and following the microbiological analysis, it was found that all four breads microbiologically analyzed in terms of fungal contamination fell within the legislative limits. Thus, the mycological load values for the four bread samples were between 30 UFC/g and 90 UFC/g, It is found following the analyzes carried out, that from a microbiological point of view, the fungal load following thermal processing has undergone a considerable decrease, so that, although the raw material - flour, has a mycological contamination above the allowed limit, with 100 CFU/gram of flour, the thermal processing process was able to degrade the cells of filamentous fungi, and the finished product could be accepted for consumption.



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Thermal processing is very important in terms of the microbiological quality of ready-to-eat products, so from a flour with mycological qualities below the accepted quality standard, a finished product, good for consumption, was obtained. In order to obtain valuable food products, the raw material must comply with the legislative regulations in force both from a physico-chemical and microbiological point of view, and the processing must be carried out according to the quality standards of the product.

Keywords: bun, wheat flour, fungi, bakery

P₄₀

Obtaining and characterizing a natural alcoholic beverage. Apricot liqueur

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The main types of commercially produced alcoholic beverages are beer, wine and spirits. The basic ingredients of beer are barley malt, water, hops and yeast. Wheat is also allowed.



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Almost all wine is made from grapes, although wine can also be made from other fruits and berries. Spirits are usually made from grains (eg corn, wheat), beet or molasses, grapes or other fruit, sugar cane or potatoes. Locally produced alcoholic beverages are produced by fermenting seeds, grains, fruits, vegetables or palm parts through a fairly simple production process [1,2].

The percent by volume (% vol) is used to express the ethanol content of a beverage, also known as the French or Gay-Lussac system. Alcohol content varies by the main type of drink and may vary by country. Typically 4-5% vol is found in beer, about 12% vol in wine and about 40% vol in distilled spirits. However, lower or higher ethanol content is also possible in alcoholic beverages [2,3].

Alcohol content ranges from 2.3% to over 10% for beer (for homemade or locally produced spirits such as sorghum beer), 8% to 15% for wine, and 20% vol (aperitif) to at over 40% vol (eg 80% vol in some types of absinthe). In recent years, the alcohol content of wine consumed has been increasing (13.5-14.5%) as technological advances and wines produced outside of traditional European wine-producing regions account for an increasing proportion of global consumption [2,4,5-7].

The main ingredients of most alcoholic beverages are ethanol and water. In addition to ethanol and water, wine, beer and spirits contain volatile and non-volatile compounds. Volatile compounds include aliphatic carbonyl compounds, alcohols, monocarboxylic acids and their esters, nitrogen- and sulfur-containing compounds, hydrocarbons, terpenes and heterocyclic compounds, and aromatic compounds [2,3,6].



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This work aims to obtain and characterize apricot liqueur, a natural alcoholic beverage. In this sense, we have drawn up the technological scheme for obtaining apricot liqueur and the necessary technological operations have been described. We prepared the liqueur in small quantities using a proprietary recipe. The liqueur was made with fruit alcohol. To solve the calculation of the material balance, the following elements were taken into account: the inputs of raw materials that are provided in the manufacturing recipes; outputs at each technological phase and technological losses.

The liqueur was originally made in Italian monasteries in the Middle Ages. Liquid medicines, such as liqueurs, are alcoholic extracts from portions of medicinal plants, such as herbs, roots, seeds, and fruits, that are sweetened with honey or sugar. The first beet sugar factories appeared in the 18th century, and sugar was gradually transformed from an expensive luxury item into a common commodity, and the production of liquor became a popular practice [1,3,6].

The quality and content of liqueurs vary substantially depending on the raw material used and the processing methods used. Due to the high concentration of alcohols and esters, they are particularly rich in volatile compounds compared to other types of spirits [4].

Alcohol not only has a preservation function but also has the ability to dissolve the active components and aromas of medicinal plants, which it ennobles from a taste point of view, together with sugar.

Alcohol acts as a preservative in liqueurs, preserving the flavour of the fruit for years. A correctly prepared liqueur does not spoil; in fact, it gets better with age.



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Keywords: apricot, liqueur, alcoholic beverage, technological operations

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P₄₁

Pearl onions jam – a functional and savory product

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Vegetables are generally preserved by dehydration, acidification or salting, but through this study, it was tried to preserve a vegetable (yellow and red onion pearl onion) by concentrating with sugar. This process is not a common one in the canning industry, but consumers are tempted today to try new, innovative products with high nutritional properties. Recently, new recipes, processes and obtaining technologies have been created, in order to maximize the use of vegetable products and reduce food waste at the global and national level.

Jams with pearl onions (red and yellow) were obtained in the *Preservation Laboratory of Faculty of Food Engineering* and analysed from sensory point of view, using the 9 points hedonic scale, obtaining scores between 8 (very pleasant) and 9 (extremely pleasant) in the *Overall acceptability* criterion. The physical-chemical analyses were carried out within Interdisciplinary Research Platform of *University of Life Sciences "King Mihai I" from Timisoara*. Following the analyses, higher water content is highlighted in the yellow pearl onion sample (21%) compared to the red pearl onion jam sample (20%); a vitamin C content between 6.25 mg/100 g in the yellow onion pearl jam and



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7.88 mg/100 g in the red onion pearl jam samples, the results being similar with the studies in the literature.

The values obtained regarding titratable acidity (% malic acid), in the studied jam samples, were 0.46 (% malic acid - red onion jam) and 0.47 (% malic acid – yellow onion jam), values that fall within the limit established by STAS 5952-71, of a maximum of 0.5%, which leads to the inhibition of the development of pathogenic microorganisms populations.

In conclusion, pearl onion jam was highly appreciated by consumers; it has special nutritional properties and meets the quality requirements, being able to be successfully obtained in food industry.

Keywords: pearl, onions, jam, functional foods



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P₄₂

Formulated lipids

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The bases of natural lipids (fats/oils) can be modified, formulated, and adapted, from the perspective of physicochemical and rheological properties, to correspond to technological functions or with specificity ("target attack") in food, subsequently, the body, obtained by "manipulation" the structural composition and/or the crystal lattice [1]. The term "**formulated lipid**" (**FL**) differentiates this category of products from strictly natural products. We find: **1. components modified and formulated** with bioactive substances (vitamins, mineral elements and trace elements, with the addition of fibre, pre-, pro- and symbiotics, as well as polyunsaturated fatty acids (ω -3, ω -6)); **2. synthesized food ingredients** (carbohydrates with special properties as nutritional support for various microorganisms in the intestinal tract) [2]. The main feature of this class of lipids is the length of the fatty acid chain and their position in the structure of glycerides. These characteristics influence the absorption speed in the digestive tract. Forms involve accessing their various *modification techniques* (chemical, enzymatic, physical). The widespread use of their lipid



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formulation technologies (*hydrogenation, interesterification, wet/dry fractionation*) has expanded the range of technological and nutritional-dietary applications. *From the perspective of environmental footprint, dry fractionation* is considered “green”, “friendly” technology with the environment – which does not involve polluting chemical compounds. The *dry fractionation* operation is based on hydrodynamic principles, corroborated by different melting/solidification intervals of lipid components. Thus, we encounter: **1. mixing** – mixing two or more fats of different types and sources, without separating the solid components from the liquid ones; **2. winterization** – separation/decantation of a lipid mixture under the action of the gravitational force collaborated with monitoring of the solidification melting interval, accompanied or not by mixing; **3. pressure** – separation employing *press filters*, in conjunction with temperature; **4. centrifugal force**, corroborated with temperature [3]. The result is quantified by obtaining two fractions: **1. stearin** (solid = crystallized fraction); **2. olein** (liquid = fluid fraction). Thus, **FL** is the main, bioavailable source of medium-chain and essential fatty acids (mono-, di- and medium-chain triglycerides (*TCM*)), energetic carriers in various treatments. It has a low caloric content (kcal/kg), determined by the presence of short-chain fatty acids, having a low energy density compared to the unchanged natural fats (e.g. acetic acid, propionic, butyric acid ($C_{6:0}$), caprylic ($C_{8:0}$), capric ($C_{10:0}$), including mixtures thereof)). Studies have shown that metabolizing these products can provide up to 4.3 cal/g, 50% of the energy value of unformed lipids, used as *lipid substitutes* in various dietary formulas [4, 5].

Any modification that imprints the functionality and adaptability of fat can be classified as a *formulated lipid*. The knowledge of nutritional, therapeutic and technological effects has increased demand in a dynamic food market.



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Thus, functional lipids "*customized*" can be "*designed*" with "*target*" applications in the diet and treatment of various conditions. The advances in the design of ***FL*** were based on *their stereospecific orientation in the glycerides molecule*.

Keywords: formulated lipids, fractionation techniques, dry fractionation, olein, stearin, medium-chain fatty acids.

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P₄₃

Studies on the use of essential oils in processing food products

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Essential oils are complex mixtures of natural compounds, carotenoids, especially monoterpenes and sesquiterpenes, different chemical groups of terpenes, aromatic hydrocarbons and their oxidized derivatives such as aldehydes, ketones, alcohols and esters obtained from aromatic plants. They are used in industries such as: pharmaceutical, food, cosmetics-perfume, detergents, flavors, drinks, etc. Natural extracts are safe alternative sources for replacing synthetic products with antimicrobial, antiviral and antifungal activity. Recent studies have proven that essential oils have antibacterial and antifungal properties in vitro. In vivo, essential oils have shown positive effects of reducing mycotic infections, in the case of different plant species. The characterization of oils through chemical analysis is a mandatory step both in the production flow and in the quality control laboratories. Among the most used methods for the analysis of essential oils is gas chromatography using a flame ionization detector (GC-FID). It appears that the use of these essential oils in food production presents a good opportunity for food value enhancement and food safety reasons.

Keywords: essential oils, food, plants, quality, food safety.



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P₄₄

Study on the obtaining and characterisation of the beef mortadella

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Mortadella is a type of salami of Italian origin, with a large diameter obtained from pork, beef or finely chopped poultry, which contains about 15% pork fat (mainly hard fat from the neck of the pig). It is traditionally seasoned with black peppercorns, but modern versions may also contain pistachios or, more rarely, myrtle berries [1].

Traditionally, pork is finely ground until it acquires a paste appearance with the help of a cutter or a colloidal mill. The best-known version of mortadella is Mortadella Bologna, but other types are found in Italy, including some obtained from other meats.

In Italy, mortadella di Bologna has the status of a protected geographical indication (PGI) product under European Union legislation and is the best known worldwide.

Mortadella is also very popular in Spain and Portugal, where a variety with pepper and olives is widely consumed, especially in sandwiches. In eastern Spain, the standard mortadella is often referred to as the Italian mortadella (Italian mortadella), to differentiate it from a local variant called Catalan [2].



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Mortadella is also very popular in Argentina, Bolivia, Peru, Brazil, Ecuador, Chile, Colombia, Uruguay and Venezuela, thanks to the Italian immigrants who settled in these countries at the beginning of the 20th century. In these countries, the spelt mortadela is found, and its recipe is quite similar to the traditional Italian one, with additional peppercorns. In Peru it is known as jamonada.

In Brazil, São Paulo is prepared a very popular mortadela sandwich sold in the Mercado Municipal [3].

In Puerto Rico, "smoked mortadella" is sometimes confused with commercial salami or cooked salami, since canteens, bakeries, pizzerias and restaurants most often buy smoked mortadella [4].

In Romania, a similar product is also known as a hairdresser. In Hungary, a similar product is called mortadella and a simple variety called a punter, parser or párizsi. The term parser is also often used in Bosnia-Herzegovina, while the parisian is used in other territories of the Balkans. The classic Italian mortadella is widely sold in supermarkets along the entire Adriatic coast.

In Greece, a variant of mortadella is manufactured with a smaller diameter than the usual one, this variety being called parizaki or mortadelaki, and in Bulgaria, Slovenia, Croatia, Serbia and North Macedonia, the product known as mortadella is also widely consumed.

In Poland, slices of mortadela are sometimes soaked in dough, fried and served with potatoes and salads as a faster (and cheaper) alternative to traditional pork chops [5].



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The paper's main purpose was to study the production of a specific mortadella product from Syria. Its low-fat content is intended especially for people suffering from cardiovascular diseases, hypertension and obesity.

The product (beef mortadella) was analyzed from a sensory and physicochemical point of view in the laboratory of Physico-chemical analysis within the Interdisciplinary Research Platform, U.S.V. TIMIȘOARA.

From a sensory point of view, the appearance, consistency and taste were followed.

From the physicochemical point of view, it was monitored: the content of water, dry matter, ash, fat, NaCl and the determination of oxidation of animal fats. The results were compared to a mortadella purchased from the supermarket.

The results were compared with a similar product purchased in the supermarket according to a similar recipe and technology. In terms of water content, the values recorded for the laboratory mortadella sample were 53.72 %, and for the mortadella sample purchased in the supermarket, 56.50 %. The values were below the permissible limit of 70%. The fat content established by Order 210/2006 is 26% for sausage products cooked without structure. The samples studied are within this limit, respectively 23.00% for the laboratory-obtained mortadella sample and 19.00% for the mortadella sample purchased in the supermarket. The fat content of 23.00% for the laboratory-obtained mortadella sample and 19.00% for the mortadella sample purchased in the supermarket is inversely proportional to that of the water content of 53.72% for the laboratory-obtained mortadella sample and 56.50% for the mortadella sample purchased in the supermarket. The NaCl content (%) of the samples studied was as



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follows: for the laboratory-obtained mortadella was 1 %, and for the mortadella sample purchased in the supermarket of, 2.75 %, the maximum limit of 3 % set by Order 210/2006 on the conditions of admissibility of the physicochemical properties of sausage-type meat products, not exceeding. The content of mineral substances in the laboratory mortadella sample was 1.88%, and for the mortadella sample purchased in the supermarket, 1.75%, a maximum limit was not legislated by the legislation. The energy values determined for the studied samples were: for the laboratory-obtained mortadella sample, it was 200 kcal/100 g, and for the mortadella sample purchased in the supermarket of, 251 kcal/100 g. Following the determinations made, The Kreiss reaction for the studied mortadella samples had a negative reaction. Following the sensory analysis performed for the two mortadella samples, the highest total and individual score for each characteristic was obtained for the mortadella obtained in the laboratory.

Keywords: mortadella, physical-chemical composition, organoleptic analysis

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P₄₅

Study on the obtaining and characterisation of fresh meat products

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For a very long time processors of meat and meat preparations have relied on the use of synthetic antioxidants such as butylhydroxynisol, butylhydroxytoluene, third-butylhydroquinone and propyl gallate, as well as tocopherols to prevent oxidation of lipids and proteins.

One of the most important challenges faced by processors of meat and meat products is the reduction of oxidation. Products with a high fat content, such as processed meat products, are more sensitive to reactions in the oxidative



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chain, which can lead to unwanted odours and flavours, as well as loss of nutrients [1].

Lipid oxidation is influenced by light, temperature, degree of unsaturation, pH and pro-oxidation/ antioxidant balance [2].

Proteins in meat are also susceptible to oxidative degradation [3]. Pro-oxidants that can be found in meat products include reactive oxygen species (ROS), reactive nitrogen species (RNS), byproducts of oxidative processes and transitional metal ions [1, 4].

Lipid autoxidation is initiated and propagated by a chain reaction of free radicals. In general, free radicals occur due to the presence of reactive compounds, cell disruption, exposure to oxygen and ultraviolet light, the presence of pro-oxidant metal ions and gamma irradiation [1]. Lipid oxidation of meat products has harmful effects on the organoleptic properties of these foods, as well as on the digestibility of key nutrients [5, 6].

Protein oxidation, on the other hand, occurs on the lateral chain of amino acids, especially residues that have a high electron density (e.g. cysteine, methionine, tryptophan, tyrosine and histidine), as well as the backbone of the protein [1]. Muscle foods can be much more sensitive to protein oxidation due to low post-rigor of pH, which intensifies the autoxidation of heme proteins. Protein oxidation reduces digestibility and can produce genotoxic and cytotoxic derivatives of amino acids [1, 4, 7].

Over time the vast majority of antioxidants used for meat and meat products have been chemically synthesized. Thus, lately consumers have become increasingly attentive to the random choices they make, choosing products with clean labels containing only "natural" ingredients [8].



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According to Nimse and Pal (2015) [9], antioxidant compounds that can contribute to the antioxidant protection of meat products include carotenoids, hydroxycinnamic acids, flavonoids, terpenes and antioxidant vitamins.

Fennel belongs to the category of aromatic plants but also of medicinal plants. The fennel plant has green and white color, with leaves similar in appearance to those of dill and yellow flowers. Both the crunchy bulb and the seeds of the fennel plant have a light aroma, resembling licorice. However, the aroma of the seeds is stronger due to the strong essential oils contained in it.

Apart from its many culinary uses, fennel and its seeds offer a wide range of health benefits and can provide antioxidant, anti-inflammatory and antibacterial effects.

The present work aimed at obtaining a meat product without adding additives, which are replaced by seasoning plants (fennel) with antioxidant effects on the lipid oxidation process and prolonging the shelf life [10]. Also, using fennel was aimed at improving the nutritional value of the products obtained. The analysed product (fresh pork sausages with fennel) was obtained in the meat laboratory of the Faculty of Food Engineering, being analysed physico-chemically at the Interdisciplinary Research Platform of the USVT.

The products obtained were characterised organoleptically and physico-chemically by determining the water content %, fat %, sodium chloride %, protein %, nitrites (mg/100 g), Kriess reaction and assessing oxidative capacity. The results obtained led to the following conclusions: the addition of fennel has led to a lower and higher moisture content of protein, fat, carbohydrates and mineral substances; the NaCl content (%) of the studied samples was 1.97% for the sample with the addition of fennel and 2.14% for



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the sample without fennel, the maximum limit of 3% established by Order 210/2006 not being exceeded; the nitrite content in the samples studied was 0 mg/kg, the maximum permissible limit being 7 mg/kg; the energy value determined for the sausage sample with fennel analysed was 305.37 Kcal/100 g, and for the sausage sample without fennel, 289.41kcal/100g; the reference consumption was 15.27% for the fennel sausage sample and 14.47% for the fennel-free sausage sample. Following the determinations made, the Kreiss reaction for the studied sausage samples had a negative reaction. The evaluation of oxidative capacity, it can be concluded that the lipid oxidation process that occurs over time can be reduced by adding fennel. As a result, it can be used as an antioxidant to improve the oxidative stability of fats over time.

Keywords: sausages, chemical composition, fennel, antioxidant

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P₄₆

Study on the influence of *Aloe vera* gel in yoghurt

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In this work, the influence of the addition (2-14%) of *Aloe vera* gel (AVG) in yogurt was investigated. Several sensory, physicochemical and microbiological characteristics were studied. The results of the sensory examination ranked the yogurt as having very good acceptability. The taste and smell of the samples with the addition of AVG were not influenced. Acidity (between 75-83°T) was directly correlated with the addition of AVG, but was within the acceptable conditions for yogurt. The addition of AVG contributed substantially to the inhibition of the DPPH radical (proving good antioxidant capacity - in samples with 6% addition of AVG this percentage doubled, and at 14% the inhibition percentage was 4 times higher than in yogurt without addition) and increasing the content of polyphenols in direct correlation with the level of supplementation. All microbiological indicators analyzed (coliform bacteria, coagulase-positive staphylococci and fungi, respectively) were below the legally allowed maximum limits for yogurt.

Keywords: yogurt, *Aloe vera* gel, sensorial, acidity, DPPH inhibition, polyphenols, microbiological indicators.



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A DPPH \cdot kinetic approach on the *Vitis vinifera* L. var. *Rosé* extracts and their natural cyclodextrin complexes

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The goal of the study was to evaluate the influence of natural cyclodextrins on the antioxidant capacity of autochthonous grape (*Vitis vinifera* L. var. *Rosé*) extracts through DPPH \cdot (2,2-diphenyl-1-picrylhydrazyl) kinetics. Various parts of fresh grape samples (pulp and shell) were extracted by solid-liquid Soxhlet method using ethanol 96%. Extracts were filtered and analyzed as raw extracts [1] or were complexed by kneading using α - and β -cyclodextrin (α - and β -CD) [2-5]. Kinetics of both raw extracts and aqueous solutions of α - and β -CD/pulp and skin grape extract complexes was spectrophotometrically evaluated [6,7].



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Solutions of the raw grape extract or CD/grape extract complexes, DPPH· 1 mM and ethanol (1:1:4 v/v/v) were monitored for 15 min at 517 nm and the antioxidant activity (expressed as radical scavenging activity, RSA) and DPPH· reaction rates on specific time ranges ($< \frac{1}{2}$ min, $\frac{1}{2}$ to 3 min and 3 to 15 min) were determined. On the other hand, α - and β -CD/grape extract complexes were analyzed by ATR-FTIR (attenuated total reflectance – Fourier transform infrared spectroscopy) and simultaneously thermal analysis (STA providing TG-DTG – thermogravimetry-differential thermogravimetry and DSC – differential scanning calorimetry) for evaluating the formation of the molecular inclusion complexes.

The mean DPPH· reaction rates of the antioxidant compounds in the grape extracts showed different values for the two types of extracts (pulp and skin). The highest difference was observed at longer reaction times, where the values for the skin extracts were ten times higher than that of the pulp extracts (0.037 $\mu\text{M/s}$ for the raw skin extract and only 0.0037 $\mu\text{M/s}$ for the pulp extracts). The corresponding α - and β -CD/grape extract complexes reveal higher values for the DPPH· rates during these longer reaction time ranges, which demonstrate the controlled release of the antioxidant compounds encapsulated into CD cavities. Moreover, skin grape based samples reveal higher antioxidant activity even after the considered time range (RSA values of 47.3% for the skin extracts). Regarding the CD/grape extract complexes, which were obtained with high recovering yields of 87.3-90.6%, TG-DTG and especially DSC analyzes indicated the formation of molecular inclusion compounds by the modification/disappearance of the specific calorimetric peak of the CD hydrates in the region of $\sim 210^\circ\text{C}$ (transition from crystalline to amorphous form).



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Finally, the presence of the FTIR characteristic bands at 2923-2925, 1075-1077, and 1022-1025 cm^{-1} for CDs ($\nu^{\text{as}}_{\text{C-H}}$, $\nu_{\text{C-C}}$ and $\nu_{\text{C-O}}$ stretching vibrations of CDs), as well as 1363-1366 and 946-951 cm^{-1} ($\nu_{\text{C-O}}$ and $\nu_{\text{transC=C}}$ stretching vibrations of resveratrol and other polyphenols in grape extracts) for antioxidant compounds confirm the presence of the starting compounds (grape (*Rosé* variety) extract antioxidants, α -CD and β -CD) in all complexes.

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Keywords: DPPH· kinetic, *Vitis vinifera* L., cyclodextrin complexes

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P₄₈

Influence of drying parameters on the antioxidant activity and anthocyanin composition of some autochthonous strawberries (*Fragaria* × *ananassa*)

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Strawberry is a valuable fruit (berry) of *Fragaria* species. Among over 20 species, *F. Ananassa* Duch. (the garden strawberry) is widely grown all over the world. Strawberry contains various antioxidant compounds, the anthocyanins being the most important [1-4]. The goal of the study deals with the influence of drying parameters (temperature, time and presence of cyclodextrins, CDs, as natural drying additives) on the contents of cyanidin 3-*O*-glucopyranoside, the most important anthocyanins in autochthonous strawberries.



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Slices of fresh strawberries (*F. ananassa* Duch., Peciu Nou, Arad county, Romania) were dried using a SilverCrest drier of 350 W. The temperature was set at 70 °C and the drying time was up to 24 h. Strawberry samples were dried without or with the addition of β -CD hydrate on the slice surface. A strawberry: β -CD mass ratio of ~70:1 was used. The cyanidin 3-*O*-glucopyranoside content was determined after the Soxhlet multiple extraction of the dried strawberry samples by HPLC-UV-Vis, using a Nucleosil C18 column, a gradient elution solvent system (85:15 water with 0.4% TFA : acetonitrile with 0.4% TFA for 6 min, increasing the second solvent to 78:22 during 6-20 min, and further to 65:35 during 20-35 min, and decreasing to the starting ratio during 35-40 min). The detection of cyanidin 3-*O*-glucopyranoside was performed at 525 nm using a calibration curve. The antioxidant activity of the raw and dried strawberry extracts was evaluated using the DPPH \cdot method, at a volume ratio for the strawberry extract : DPPH \cdot 1mM solution : ethanol of 1:1:4 and the monitoring wavelength of 517 nm. The cyanidin 3-*O*-glucopyranoside content of the fresh autochthonous strawberries was 7.20(\pm 0.57) mg/100 g. On the other hand, this content was higher in the dried strawberry without β -CD addition (20.2 mg/100 g, in comparison with 11.1 mg/100 g for the β -CD assisted drying). This is probably due to the partial encapsulation of anthocyanins and other antioxidants by β -CD, which was not completely extracted. This affirmation is supported by the antioxidant activity determinations, expressed as the radical scavenging activity of DPPH \cdot (RSA). These values are relatively close for both types of drying conditions (RSA of 82.5-84.4 % after 15 min). The difference was observed from the kinetics of the DPPH \cdot reaction in the presence of antioxidants from the dried strawberries.



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The mean reaction rate during the last time range of monitoring was significantly higher for the β -CD assisted dried strawberry ($0.03 \mu\text{M/s}$ for the time range of 3-15 min, in comparison with $0.024 \mu\text{M/s}$ for the case of classical drying and $0.01 \mu\text{M/s}$ for the fresh strawberry). This finding demonstrate the prolonged antioxidant activity of β -CD assisted dried strawberries.

Keywords: autochthonous, strawberries, *Fragaria \times ananassa*

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P₄₉

Antioxidant activity, kinetics and principal component analysis on the
autochthonous plum species (*Prunus domestica* L.)

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Plums (*Prunus domestica* L.) are fruits commonly consumed in Romania, both fresh and processed fruits (dried plums or prunes, jams, stewed plums, or schnapps). The main antioxidant compounds of plums consist of chlorogenic acids (*p*-coumaroyl, caffeoyl, and feruloylquinic acids), flavonols (rutin, quercetin glucoside, galactoside, and rhamnoside), as well as anthocyanins (e.g., cyanidin 3-glucoside, cyanidin 3-rutinoside, or peonidin 3-glucoside) [1,2]. The goal of this research was to evaluate the antioxidant activity and antioxidant behavior of some autochthonous plums (*Prunus domestica* L. var “*Bistrița*”) through the DPPH· kinetics [3-7].



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Plum samples were collected from the west side of Romania (Măgulicea, Arad county and Giroc, Timiș county). Both skin and pulp were extracted at room temperature for five days at a sample mass/solvent volume ratio of ~1/10 for skin and 1/4 for pulp. The final extracts (codes “GS”, “GP”, “MS” and “MP” for Giroc and Măgulicea skin and pulp extracts, respectively) were filtered and analyzed by DPPH· method. The absorbance monitoring was performed at 517 nm for 15 min at a plum extract/DPPH· 1 mM solution/ethanol volume ratio of 1/1/4. A $Conc_{DPPH\cdot}$ vs. $Abs_{(517\text{ nm})}$ standard curve was used for determination of the actual DPPH· concentration during reaction with the antioxidant compounds from plum extracts. The kinetics was evaluated as the mean DPPH· reaction rates for the representative time ranges of 0-½ min, ½-3 min and 3-15 min. Moreover, the antioxidant activity (as the radical scavenging capacity, *RSC*) of the plum extracts were determined at 1, 3, 5 and 15 min by the equation: $RSC(\%) = 100 \cdot [1 - Abs_{t}/Abs_{t=0}]$, where Abs_{t} or $t=0$ means the absorbance of the mixture at the moment *t* or the starting of monitoring, respectively. In all cases, the final antioxidant activity of the skin extracts was higher in comparison with the pulp ones. On the other hand, “MS” and “MP” extracts revealed higher *RSC* values after 15 min of monitoring (*RSC* of 78.72(±0.96) and 66.08(±1.02)% for the “GS” and “GP” samples; 94.36(±0.09) and 91.52(±0.66)% for the “MS” and “MP” samples). Regarding the kinetics of the DPPH· during the reaction with the antioxidant compounds from the plum extracts, the main difference was observed for the reaction rate from the first time range. This parameter was 4-5 times higher for the “MS” and “MP” samples (4.83(±0.06) and 4.87(±0.06) μM/s for the “MS” and “MP” samples, and only 1.27(±0.40) and 0.90(±0.17) μM/s for the corresponding “GS” and “GP” plum extracts).



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On the contrary, these values were reversed for the third time range ($\sim 0.098 \mu\text{M/s}$ for the “GS” and “GP” samples and $< 0.012 \mu\text{M/s}$ for the “MS” and “MP” samples), while for the second time range, the mean reaction rate values were quite close ($0.040\text{--}0.059 \mu\text{M/s}$). As a conclusion, there are significant differences between the overall antioxidant profiles for these autochthonous plum variety, which were grown at significant different relief conditions, such as altitude 2.5 times higher for the plums with the highest antioxidant activity.

Keywords: *Prunus domestica* L., antioxidant activity, kinetics, principal component analysis, autochthonous

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P₅₀

Fluidisation. Initiation

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Gel dart (1986) stated that: “the time will come when the prediction of the journey of a space probe to Saturn can be predicted more accurately than the behaviour of the fluidised bed in a reactor!”. The statement is supported by the complexity of the process generated by the multitude of intervention elements [1]. Even if the quote is ≈36 years old, it is currently in the new millennium



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and includes interdisciplinary studies of interest in food engineering. The main objective of this introduction is to bring to attention, constrained by time and space, “*the fascinating world of fluid mechanics/continuous fluid media*”, phenomena, and principles underlying the initiation of the *fluidised bed*, also studied by food engineering, imposed by the behavior/the nature of the food media (raw/semi-processed/processed). Aspects that compete to identify techniques that can support fluidisation. Later, the process parameters' influence on the operation's quality will be discussed. The application of the physical-mechanical principles underlying the phenomenon of fluid flow in contact with a solid is relatively recent. The records in the specialised literature can provide practical, useful guidelines for mixtures of solid mass (powdery and/or granular), for which a series of physical reference indicators (granulometry, density, viscosity, form factor, mass, etc.) form determining ratios in the balance of the phenomenon [2, 3].

The origin of the operation is not well defined. Applications of the *fluidisation* operation have been mentioned since the 16th century. It is assumed that liquid agent *fluidisation* preceded gas fluidisation, described by *Agricola* (1556) in his book “*De Re Metallica*” [4]. Thus, it is assumed that the first empirical applications of “*fluidised beds*” were in ore processing with water as a fluidising agent, with the aim of fractional separation, by size and/or density class, of ore particles [5]. The process was patented in 1910 [6]. Since the 20s of the last century, in Germany, the gas fluidisation operation has been applied industrially through the patenting by *Winkler* (1922) of a new type of gasifier [7]. However, the terms “*fluidisation*” and/or “*fluidised bed*” were circulated in 1940, when heavy hydrocarbon catalytic cracking reactors were developed in the United States, in which the granular bed of determined thickness is maintained by the flow of gas [8]. So, the development of the process and its



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implementation on an industrial scale is attributed to the petrochemical industry starting from the first decade of the **1940s (1942)** of the 20th century to identify an efficient method of fluidised bed catalytic cracking (*FCCU*), for obtaining gasoline with a high octane number and phthalic anhydride [9, 10]. In food engineering, *fluidisation* was also used to modify *the structure of food materials*, associated with the quick freezing of food (*Englund, 1950*) [11].

The term “*circulating fluidised bed*” (*CFB*) has been used since the **80s** to define, in particular, the phenomenon that takes place in gas-solid separators, as well as in recirculation pipes found in calcination operations and processes metallurgical [12]. Technically, fluidisation is a process by which a layer of solid particles “*mimics*” the appearance and characteristics of a *boiling liquid*. Phenomenon generated by the passage of a fluid (gas/liquid), through a solid granular layer, at speed high enough to generate a force to compensate/cancel the weight of the particles. Thus, from an initially rigid structure held in position by contact forces as an effect of gravity, *fluid-like flow and deformation properties are imprinted on the structure*. Particles can move relatively freely relative to each other in a reciprocal relationship. As in other fields, specialised terms are used attached to the fluidisation operation, of which we list: **1. agglomeration** (particles that adhere to form assemblies (agglomerates/conglomerates); **2. attrition** (breaking of particles due to collisions or other interactions and/or stresses); **3. layer expansion** (layer height at minimum fluidisation); **4. bubbles** (voids containing particles that show an upward trajectory concerning the particles above them and behave analogously to bubbles in liquids); **5. collapse** (collapse of gas-solid suspension when gas velocity is reduced); **6. moving fluidised bed** (fluid and particles are in relative motion, there is no distinct top surface of the bed, and entrained particles are continuously separated); **7. cluster** (group of particles that move



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simultaneously due to some hydrodynamic factors; **8. *dense phase*** (gas-solid medium in which the concentration of particles is high enough so that interactions and contacts between particles are present); **9. *the dilute phase*** (a region in which the concentration of particles is sufficiently reduced so that the contacts between the particles are relative); **10. *diffuser/distributor*** (horizontal plate with perforations, nozzles or other means of introducing a fluid to support the weight of the particles and initiate motion/displacement, also supporting the weight of the particles when the fluid flow is interrupted); **11. *elutriation*** (selective, progressive removal by entrainment of fine particles (diameter > 44 μm); **12. *free surface/volume*** (the region from the fluidised bed's upper surface to the vessel's upper part); **13. *Geldart classification*** (difference diagram of solid-fluid density in relation to particle size); **14. *segregation*** (the tendency of particles having different physical characteristics (e.g., size, density, shape, etc.) to concentrate in certain areas of the layer)); **15. *superficial velocity*** (volumetric flow rate of the fluid in relation to the total cross-sectional area of the device).

From the class of food solids, *defined powders* and *granular* ones are of major importance for a wide field of applicability: **1.** loading/unloading of bunkers, storage containers and vehicles for bulk transport; **2.** automatic dispensers; **3.** dosing, portioning, packing, mixing, compacting (agglomeration); **4.** pneumatic transport; **5. *fluidisation***. The fluidisation operation presents *three major advantages* compared to similar processes (e.g., packed columns): **1.** superior heat transfer; **2.** the ability to impress the characteristics of fluid on the solid mass; **3.** the possibility to process materials with a wide distribution of particle sizes. It has been demonstrated that the heat transfer rate in the fluidised bed can be 5÷10 times higher than that in packed columns.



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Moving particles are much more efficient heat carriers compared to gas. Even for the most extreme exothermic reactions, the fluidised bed can maintain a thermal profile within a few degrees. *Advantages* that compensate for *disadvantages*, such as: **1.** a part of the gas volume has a downward trajectory attached to the particles following the same direction, which initiates and maintains the “retro-mixing” phenomenon, with *Peclet* similarity values in the limit of 5÷10; **2.** axial dispersion of solids (some particles remain in the fluidised bed for a relatively short time, compared to the retention time for the majority of the solid mass); **3.** gas bypass (phases of reduced gas densities form bubbles characterised by increasing upward velocity resulting in a reduced contact time with the solid particle); **4.** limits depending on the characteristics of the particles (it is difficult to fluidise particles of extreme shapes (e.g., needle or flat disc), or with an average diameter smaller than 30 μm)) [13].

However, obtaining advantages involves interdisciplinarity for a good understanding of the phenomenon. The versatility of the process demonstrates its use in various applications: **1.** *physical operations* (dehydration/drying; agglomeration/dispersion; vapour coating; separation/sedimentation; mixing; filtration; freezing; preheating/heating;); **2.** *catalytic reactions* (catalytic fluidised bed cracking; ethanol dehydration; ethylene synthesis; oxidative dehydrogenation; catalytic reforming; Fischer-Tropsch synthesis; conversion of methanol to olefins); **3.** *gas-solid reactions* (combustion/incineration; gasification; pyrolysis; torrefaction; roasting; iron oxide reduction; fermentation; obtaining melamine) [13, 14].

Keywords: fluidisation, granular layer, bed/fluidised layer, fluid, flow, terminology, advantages, disadvantages.



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P₅₁

Studies on the sensory and physico-chemical characteristics of a dietetic
coconut milk ice cream

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This paper presents the sensory and physico-chemical characteristics of two types of coconut milk ice cream with the addition of plums and cherries. The sensory characteristics of the coconut milk ice creams were generally well appreciated by the evaluators, the most downgraded indicator being the consistency, which suffered due to avoiding the addition of fat in the ice cream, with the aim of obtaining diet ice cream. The most valued characteristics were taste and smell. For the taste, the reviewers appreciated the simple version the best (obtained only with coconut milk, without fruit additions). The addition of fruit determined the improvement of the taste and aroma of the ice creams, but also the increase of the content of soluble substances and the reduction of the pH value, which recorded values between 5.5 and 8.77. The dry substance content of the analyzed samples varied between 10 and 12.3%, below the admissibility level imposed by the legislation in force.



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The content of soluble substances, expressed in degrees Brix, varied between 5.6 for the plain ice cream sample, up to 10.3 for the one with added cherries. The highest melting speed was noted for the ice cream sample without addition.

Keywords: dietetic ice cream, sensorial, pH, dry/soluble substances, melting speed.

P₅₂

Studies on obtaining, characterization and oxidative stability of pumpkin
seed oil

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The purpose of this work is to obtain and characterize from a physico-chemical point of view the oil extracted from pumpkin seeds. It was also determined the changes in the peroxide value (PV), as a measure of primary oxidation, by keeping the oil in ambient conditions, exposed to natural light, at a temperature of 20-22°C, for up to 60 days, respectively by thermal processing of pumpkin oil in a household convective oven for 2, 4, 6 and 8 hours at 180°C and 200°C,



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respectively. The following findings emerge from the study: for the seeds taken in the study, a crude oil content of 43.71% was obtained, dark brown due to carotenoids and chlorophyll, which supports their use as a valuable source of edible oil. The evaluated physico-chemical characteristics were close to those of other edible oils widely used in the diet, such as sunflower oil, soybean, corn germ. The peroxide value of raw pumpkin oil was below 2 milliequivalents O_2/kg , characteristic of a fresh vegetable oil. Exposure of pumpkin seed oil to natural light at ambient temperature for up to 60 days induces an increase in the peroxide value, but the PV value at the end of the evaluated period is still below the legal limit of 20 milliequivalents O_2/kg oil. High temperature thermal processing of $180^\circ C$ and $200^\circ C$, respectively, causes a significant increase in the peroxide value. In order to not exceed the legal limit for PV, it is recommended that the exposure of the oil at a temperature of $180^\circ C$ does not exceed 6 hours, and at $200^\circ C$ the treatment should be limited to 4 hours.

Keywords: pumpkin seed oil, physico-chemical characterisation, primary lipid oxidation, oxidative stability



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P₅₃

Exploiting the antioxidant potential of cranberries by obtaining nectar and clear juice

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The purpose of this paper is to present data on the bioactive properties of cranberries (*Vaccinium macrocarpon* L.), as well as their directions for use in the form of natural juices, clear and nectar. Several varieties of clear cranberry juice and nectars, sold on the Romanian market, were identified and characterized. Also, a cranberry juice was obtained under home conditions, whose characteristics were compared with those of the existing juices on the market. Based on the analysis of the physico-chemical characteristics of the investigated cranberry juices, it is observed that the values obtained for total acidity, total dry extract and sugar differ both from one assortment to another and depending on the category of cranberry juice (clear or nectars). It is well known that in the case of clear natural juices, the juice contains a content of at least 5-10% fruit, while in the case of natural juices with pulp, this content is at least 35-50%. When determining the content of total polyphenols, ascorbic acid and total antioxidant capacity, it is observed that nectars have higher values than in the case of clear juices.



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Within the same type of juice, there are visible differences from one assortment to another. Cranberry juice prepared under home conditions has slightly higher values of investigated antioxidant parameters than nectars. These values were significantly higher than those recorded for industrially produced clear juices. In conclusion, we appreciate that the nectars and cranberry juice prepared at home have superior antioxidant properties compared to the case of clear cranberry juices.

Keywords: cranberries, clear cranberry juice, cranberry nectar, antioxidant properties



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P₅₄

Aspects of rosé wine production and quality assessment

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The purpose of this study was to present the technology for obtaining rosé wines, as well as the characteristics obtained from the preliminary and physico-chemical analysis of some types of rosé wines. In this purpose four types of rosé wines were investigated such as Rosé - Schwaben Wein (Recas), Rosé - Recas Domaines, Rosé - Huniade Castle (Recas) and Rosé - Dor (Recas). Rosé wines, from an olfactory point of view, are close to white wines, having to a satisfactory extent characters of freshness and fruitiness, and from a colour point of view they are very similar to red wines because they have certain proportions of anthocyanins. The wines tested have good air resistance, retain their original brightness and colour characteristics. In the case of the cold resistance test, there were no deposits, defects or other visible defects and the organoleptic qualities remained unaltered. With regard to the behaviour of wines exposed to heat, it was observed that the wines do not show deposits or disturbances, remain clear and are not prone to the formation of sediment. It was noted the high alcoholic strength of 13% vol. for rose wine belonging to the Recas Domains range. These wines have residual sugar, falling into the



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class of semi-dry wines. Rosé wines belonging to the Huniade Castle and Rosé Dor range have an alcoholic strength of 12.5% vol. but contain residual sugar and belong to the class of semi-dry wines. The Rosé Scwaben Wein has an alcoholic strength of 12%, it contains residual sugar, and it falls into the class of semi-sweet wines. Based on the investigated characteristics it can be said that these types of rosé wines are sensory and physico-chemically balanced, which recommends them as appetizer wines highly appreciated by consumers.

Keywords: rosé wines, sensory properties, preliminary analysis, physico-chemical properties



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P₅₅

Research on the manufacture and characterization of some halva formulas

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The purpose of this paper is to present the technology of obtaining halva as well as to identify possibilities to improve the quality of this product. From the data reported so far, it can be stated that the quality of halva products is affected by the following problems during the technological process: separation of oil from products and rancidity of the lipid fraction during storage. It is necessary to solve these two shortcomings if we consider the expansion of the production of sunflower halva and the diversification of the assortment range. Thus, improving the stability of the emulsion by adding different mixtures is one of the main objectives of research in the field. The food industry is constantly evolving, which leads to a desire to improve or bring something new in this field. More and more buyers tend to look for products with improved nutritional value. In order to meet consumer requirements, large companies are looking for solutions in this regard, using low-cost products. By adding different products to the classic recipe, over the years, the taste of halva has been improved.



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Thus, it will be considered to obtain halva formulas with superior nutritional and sensory properties by using materials that have not been sufficiently exploited so far. Halva is a food with low production costs, it is one of the most nutritious foods, being at the same time one of the oldest traditional desserts, which recommends it as a food with high nutritional value.

Keywords: halva, factors affecting quality, improved nutritional value, sensory properties



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P₅₆

Fluidization. Process constraints

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The analysis of solids flow (powders/granules) involves interdisciplinary knowledge. For the interpretation of the phenomenon, the volume of the studied material is considered a *continuous solid* to which *concepts, analysis methods* from the *solids mechanics* are applied. Most of the constraints of the phenomenon are related to the indirectly estimated physical properties (size, shape, density, etc.) as parameters in the prediction of the operation course. The fluid responsible for the dynamics of the phenomenon will imprint new properties of the solid system, with influence in directing/choosing the use processes.

At low fluid movement rate, the position of the particles in the layer does not change, a phenomenon analogous to the flow of a fluid through fixed granular environments. At intermediate velocities, individual particles are suspended in the fluid current, the bed expands easily, and a contact between particles with a certain degree of freedom (vibration) is easily expanded. It can be said that *the bed is fluidized* [1].



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The minimum velocity necessary to support the bed is known as *the minimum fluidization velocity* (v_{mf}) [2]. If the velocity of the fluid does not exceed the minimum velocity necessary to initiate the process, the “expanded” layer is uniform, stable, a stage known as *particular fluidization = state of balance*. If the fluid passes through the granular layer in the form of large bubbles, the layer takes the appearance of a *boiling liquid = aggregative fluidization* (turbulent, heterogeneous, i.e., at the exit of the layers the bubbles break, and their content diffuses in the upper layers). When increasing the velocity, the layer disintegrates, and some of the particles are trained in the direction of traveling the fluid. The fluid velocity exceeds the sedimentation velocity of the particles, v_s . *Pneumatic transport* is initiated. Aggregative fluidization is mainly a two-phase system consisting of: **1.** dense, continuous phase (emulsion behaviour); **2.** discontinuous, diluted or bubble phase [3].

The size of the resistance to movement is determined by the increase of the concentration, as a result of the cohesion forces: **1.** van der Waals forces; **2.** the effect of capillarity generated by liquid bridges; **3.** electrostatic forces. In the case of dehydrated food solids, van der Waals forces are the main cause of cohesion, dependent mainly on the distance between bodies, being a factor of influence when it is below 100 nm. The forces generated by the liquid bridges are involved in the adhesion of the particles as much as the van der Waals forces [4].

On a *macro* scale, the interaction of the particles is analysed from the perspective of frictional forces. In solids mechanics, the expression of tension (force/surface unit) replaces the frictional force F . Thus, there is: **1.** normal or *compression* tension, σ ($\sigma = N/A$); **2.** tangential or *shear* tension, τ . The dependence of τ on σ is known as *solid flow plan*.



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The experimental determination of the flow plan is one of the *cases of defining the flowing properties* of the powdery/granular solids, the case of the *Jenike shear cell*. Two hypothetical flow models have been identified: **1.** the case of *non-cohesive* materials flow (e.g., salt crystals, dehydrated sugar), which observe *Coulomb's* law; **2.** the case of *cohesive* materials flow (most of the powdery/granular food solids, for which the size τ_0 (similar to the limit of Newtonian fluids flow) is the measure of cohesion)) [5, 6]. A factor of importance is *the geometric point of initiation of the movement* that provides information on the flow properties, on the cohesion of the particles, and that allows to identify the amplitude of the parameters in the design/sizing of the devices/machines/installations [7].

Depending on the amplitude of the parameter *fluidity* (f), *Jenike (1964)*, proposed the following classification of powders: **1.** $f: 1 \div 2 \Rightarrow$ reduced fluidity (= cohesion); **2.** $f: 2 \div 4 \Rightarrow$ mean fluidity; **3.** $f: 4 \div 10 \Rightarrow$ fluidity; **4.** $f: >10 \Rightarrow$ free flow [8]. One of the equations frequently accessed for the tension drop when passing the fluid through a porous environment is *Ergun's* equation, which rewrites *Reynold's* criterion equation attributed to a *layer of equal spherical particles*, conditioned by the amplitude of the shear friction fluid/particle and by the changes of direction. *Wilhelm and Kwauk (1948)* showed that *Froude's* number (Fr), written for the minimum fluidization condition, could be used for the prediction of the predominant behaviour of the fluidization operation. For the case of applications in food engineering, solid particles are small and light, to determine the minimum velocity necessary to initiate the fluidization process, the *Kozeny-Carman* equation is used [9, 10, 11].



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In the food industry, the processes based on fluidization are of increasing interest due to the large fluid-solid contact surface, speeded agitation, unordered movement of the particles. All this supports the idea that fluidization is an ideal process for a rapid heat and mass transfer, generating uniformity in the material mass. Thus, from the perspective of the food processes, the following applications can be mentioned: 1. drying in fluidized bed; 2. individual quick freezing (IQF - individual quick freezing); 3. agglomeration; 4. coverage; 5. quick heating or cooling.

Keywords: fluidization, constraints, prediction, particular forms, flow, flow plan, cohesion, fluidity.

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P₅₇

Monitoring the technological process of manufacturing some salami,
evaluating their quality indicators

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The objectives of this work were to monitor the technological flow of salami obtaining as well as to evaluate quality indicators: moisture, free fat, protein, nitrites and sodium chloride. The main operations in the technological flow were: Qualitative and quantitative reception of pork and beef, storage of raw material at a temperature between 0-4 °C for a period of maximum 72h, cutting, boning and choice, pork, beef as well as bacon resulting from the previous operation is salted, stored after which it is minced, during the operation to the cutter are added the spices after which the operation of filling into membranes follows, the technological flow is continued with the operation of hot smoking at a temperature in the range of 75-95 °C for 35-45min after which follows the heat treatment in steam at a temperature in the range of 72-75 °C for 1-1.5h, cold smoking at a temperature of 15-40 °C for 4-8h, storage at a temperature in the range of 10-12 °C for a period of maximum 5 days, the technological flow ends with the delivery of the finished product. As a result of the physico-chemical analyses, the results obtained were as



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follows: the humidity was below the limit provided by the Standard, maximum 66%, the free fat recorded a value lower than that provided by the Standard – maximum 30%, in the case of protein substances the obtained value was above the limit provided by the Standard – minimum 11%, for nitrites the obtained value was located well below the limit provided by the Standard – maximum 100mg/Kg, the result obtained in the case of sodium chloride was below the maximum limit - 3% provided by the Standard.

Keywords: Salami, pork, beef, physico - chemical indicators

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P₅₈

Monitoring the technological process of biscuit manufacturing, evaluating
their quality indicators

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The objectives of this work were, the monitoring of the technological flow of obtaining biscuits as well as the evaluation of quality indicators: Protein, humidity, fat content and sugar content. The main operations in the technological flow of biscuit production were: reception of raw materials, flour (sifting and weighing), sugar, glucose, honey (weighing and dissolving), fat (weighing and dissolving), fat (weighing), milk (weighing or measuring), chemical smokers and salt (weighing and dissolving) all the ingredients listed above enter the operation of kneading the dough followed by re-hearing the dough, whitewashing, shaping, baking the biscuits in three phases (phase 1 – 160 – 170°C for 1 min, phase 2 – 300 – 350° C and phase 3 – 180 – 200° C, the pre-baking operation is the cooling of the biscuits followed by packaging and storage, the technological flow ends with the delivery of the biscuits. As a result of the physico-chemical analyses carried out, the results obtained were as follows: the analysis of the water content showed a value below the maximum limit of 7 % provided by the Standard, in the case of protein



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substances the value obtained was above the limit of at least 6,2 % provided by the Standard, the analysis of the fat content recorded a value above the limit of 23 % in relation to the dry matter, provided for in the Standard, in the case of sugar content, the result obtained was above the minimum limit of 32 % in relation to the dry matter laid down in the Standard.

Keywords: Biscuits, technological process, physico- chemical indicators

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P₅₉

Monitoring the technological process of manufacture of liver pate, evaluating its quality indicators

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The objectives of this work were to monitor the technological flow of liver pate obtaining as well as to evaluate the quality indicators: humidity, fatty substances, NaCl, total proteins, easily hydrolysis nitrogen as well as the collagen/protein ratio. The main operations in the technological flow of obtaining the pate from the liver were: qualitative and quantitative reception of the liver raw material and bacon, washing, boiling, shredding followed by processing at the cutter, mixing the obtained paste with spice and salt mixture, filling the natural membranes, pasteurization of the product followed by its cooling, labeling, storage, the technological process ends with the delivery of the products. As a result of the physico-chemical analyses carried out, the results obtained were as follows: in the case of the water content a value below the maximum limit of 74 % laid down by the Standard was obtained, in terms of the fat content, the resulting value was below the maximum limit of 30 % provided by the Standard, the NaCl content was below the maximum limit of



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2 % provided by the Standard, in the case of total protein, the value obtained was above the limit of at least 9 % provided by the Standard, the analyses carried out to evaluate the collagen/protein ratio recorded a value below the maximum limit of 30 laid down by the Standard.

Keywords: Liver pate, technological process, physico-chemical indicators

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P₆₀

Comparisons regarding the heavy metal load of some dehydrated fruits taken
from the western part of Romania

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Fruits are an important component of the human diet, since they are major sources of different nutrients, such as vitamins, fiber, sugars, carbohydrates and essential minerals that are reflected in human health. Previously conducted research has shown that fruit consumption has the effect of significantly reducing the risk of chronic diseases such as cancer, heart disease and strokes. [1] Fruits and vegetables are processed into a variety of products such as juices and concentrates, pulp, canned food and dehydrated products, jams and jellies, pickles, etc. The way of processing the fruit is different from one country to another. Preservation technology also varies depending on the type of products and market demand. [2] The oldest method of preserving food is drying. It is still widely used for the preservation of food for domestic consumption and marketing. Dried fruits are one of the most popular products made by processing on a small scale. Drying removes water from food, so the increase in the number of microorganisms is limited. It also reduces the weight and volume of food, which reduces transport and storage costs. [3] Numerous



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drying techniques have been developed and used for the dehydration of plant products. The most important drying technologies that have been developed are convective drying (CD), spray drying (SD), lyophilization (FD) and osmotic dehydration (OD) [4]. The most commonly used method for drying fruits is convective drying [5]. The purpose of this work was to investigate trace elements (Cu, Mn, Fe, Cd, Pb, Zn, Co) from several fruit species: Sour Cherries (*Prunus cerasus*), Apples (*Malus domestica*), Grapes (*Vitis vinifera*), Cherries (*Prunus avium*), Peaches (*Prunus persica*), Plums (*Prunus domestica*), taken from the western part of Romania from local producers. The fruit samples were dehydrated using a Fruit Jerky Plus 6 dehydrated appliance. After dehydration the fruit samples were subjected to dry mineralization in a calcining furnace. After dry calcination the resulting ash was subjected to wet mineralization with sulfuric acid and nitric acid. The resulting extract was transposed into volumetric flasks and brought up to the mark with distilled water. The amount of trace elements in the resulting solutions was evaluated using the Atomic Absorption Spectrometer – Varian 280 FS SpectrAA equipment. The analyzed fruit samples showed a trace element content that followed the following order: $\text{Fe} > \text{Mn} > \text{Cu} > \text{Zn} > \text{Co}$. In the case of elements Cd and Pb, no recorded results were recorded above the calibration limit of the apparatus.

Keywords: Fruits, dehydrated, trace elements

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Researchers and Scientific Research in Life Sciences” for Bachelor,
Master and Ph.D. Students**

17-18 November 2022, Timisoara

119.Rochian Andreea

120.Roşoiu Natalia

S

121.Sadiki Fatima Zahra

122.Sbiti Mohammed

123.Simescu Mihaela

124.Simescu Roxanda

125.Spafiu Maria Ioana

126.Spataro Elisabeth

127.Stanciugelu Mihaela-Maria

128.Stoianovici Camelia Elena

129.Stoica Sebastian

130.Stoin Daniela

131.Sumedrea Dorin Ioan

Ş

132.Ştef Ducu Sandu

133.Ştef Lavinia

134.Ştefan Iulia Donatela

T

135.Tanasa (Acretei) Maria-Virginia

136.Țița Ovidiu

137.Trașcă Teodor Ioan

138.Turtoi Ana-Maria

U

139.Ungureanu Irina

140.Urucu Laurentiu-Adrian

V

141.Vaipan B.

142.Velciov Ariana-Bianca

143.Vîrsta Diana-Lenuța

144.Vlădescu Nicolae

145.Voilă Raul

146.Voin Nicoleta

W

147.Wilhelmine Sas Claudia Nicoleta

Z

148.Zbîrnea Cristina