book of abstracts

3rd North and East European

NEEFOOD

Congress on Food

Global and Local Challenges in

Food Science and Technology

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Foreword

The quality of each person's life, as well as the entire evolution of a society, depends on the nutrition and psychical health of the human being. The world is nowadays confronted with a demographic explosion, concomitantly with a planet-wide accentuation of agricultural and food deterioration. This is the reason why we have to be prepared, ***in the XXI-th century****, to face the Global and Local Challenges in Food Science and Technology, generated by the the quantitative and qualitative food-related needs.*

Under this thema, more than 200 papers were received on the topics of food production, food processing, food quality and safety, nutrition, engineering and design, innovative technologies.

The ***3rd NEEFOOD Congress*** *aims to keep the quality of an integrated, multidisciplinary and interconnected international conference on the topic of agri-food fields and it also drawn the interest of numerous specialists who continuously attempt to identify solutions to difficult contemporary problems.*

The impressive international participation encourages us to believe that the ***3rd NEEFOOD Congress*** *may have positive echoes emerged from the experience and contribution brought by all* ***international participants*** *from Austria, Belgium, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Poland, Republic of Moldova, Serbia, Switzerland, Russia, Ukraine and United Kingdom together with researchers from Romania.*

This book of abstracts contains selected abstracts of papers presented during the ***3rd NEEFOOD Congress.***

A number of selected papers presented at ***3rd NEEFOOD Congress*** *will be published by Elsevier. This selection will be done by the Congress Chairs, among the papers actually presented at the conference, based on a rigorous review by the Scientific Committee members.*

The program for this conference required the dedicated effort of many people. Firstly, we must thank the authors, whose research efforts are herewith recorded. Secondly, we thank the members of the Scientific Committee and the additional reviewers for their diligent and professional reviewing. Last but not least, we thank the invited speakers for their invaluable contribution and for taking the time to prepare their talks.

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Content

FOOD SAFETY REGULATIONS BASED ON REAL SCIENCE

Hubertus Lelieveld[1]

Differences in regulations result in needless destruction of safe food and hampers food trade.

The differences are not just the result of the history of food safety regulations, often developed in times before global cooperation, but are also built in new regulations. It may be responses to media hypes or for other reasons, but in most cases the differences cannot be justified scientifically.

A major difficulty is that, due to the developments in analytical techniquesthe number of chemicals that are found in food is increasing rapidly and chemicals are always suspected to be a safety risk.

By far most chemicalsare of natural origin but could not be detected in the past becausethe methods available in the past were not sensitive enough.

Demanding the absence of chemicals because the risk they present is unknown, however, would eventually make all food unacceptable.

For this reason the Global Harmonization Initiative is developing a model approach, based on existing scientific data that would apply to all chemicals and would not result in absurd food safety regulations.

[1] *EFFoSTT and EHEDG Executive Committee, GHI President, Netherlands*

IUFOST ROLE IN FOOD SAFETY, EDUCATION AND FOOD SECURITY

Geoffrey Campbell-Platt[1]

The International Union of Food Science and Technology, IUFoST, is the professional body representing some 300,000 Food Scientists and Technologists in 75 countries, worldwide. Its mission, Strengthening Global Food Science and Technology for Humanity, is delivered through three key areas: Food Safety, Education, and Food Security.

IUFoST is delivering a series of annual International Food Safety Forums in Beijing, China, through its International Expert Panel on Food Safety, in partnership with its member, the Chinese Institute of Food Science and Technology, CIFST, to help build a safe and healthy food industry chain, benefitting us all globally.

IUFoST brings together Food Safety and Education through its Global Food Safety Curricula Initiative, on behalf of the World Bank public-private Global Food Safety Partnership, to help deliver sustainable world-class education and training in food safety for the years ahead.

This builds upon IUFoST's successful, widely-used, 'Food Science and Technology' university textbook, available in English, Portuguese, and soon, Chinese, as well as running a Distance-Education program through regional tutors, for those beyond traditional university campuses.

Food Security, of great importance to many governments as world population continues to increase, is addressed by IUFoST through an International Expert Panel, while recognising that Food Safety and Education are essential ingredients of Food Security.

Through biennial World Congresses, its International Academy of recognised global experts, and Scientific Information Bulletins, freely downloadable from its website, *iufost.org*, IUFoST plays an important world role in all our futures.

[1] *Past President, IUFoST, and Prof Emeritus, University Reading, U.K.*

THE FUTURE OF FOOD PROCESSING RESEARCH

Brian M McKenna[1]

Since 2004, the European food industry in conjunction with national and Europe wide research funding agencies have been developing research priority topics for food. Recently, the third iteration of this *Strategic Research and Innovation Agenda* has been published and among its many priorities are many in the food processing domain. It is expected that these will form the core of publically funded food processing research topics over the coming decade.

The general aims of the research are to:-

1. To generate information leading to an EU Food Industry capable of achieving optimum sustainability, optimum efficiency (on economic, technological and ecological levels) and extended delivery of food products with new properties and functionality aimed at fulfilling preference, acceptance and needs of consumers (by reverse engineering approach).
2. To have greater integration in research between processing, food quality and safety, nutrition/health and sustainability.
3. To update training of food science/-engineering students, in order to avoid exclusive specialization, and enable the initiation of research across the borders of scientific disciplines.
4. To strengthen an SME innovation platform. - Innovation is not just about new ideas, but how to use and combine process and material aspects in new ways. Innovation efficiency by SMEs can be improved based on infrastructural improvements reducing “time to market”.

However, the strategy does not stop at broad generalisations and seven processing themes have been outlined within which 57 very specific research priorities are listed. These seven themes are:-

1. Food structure and the PAN concept (Preference, Acceptance, Needs of consumers)
2. Processing for functionality and nutrient security
3. Modelling and ICT for improved processing and quality
4. Packaging innovation
5. Sustainable processing
6. Small scale processing
7. Processing for SMEs and use of technologies from other sectors

These will be expanded in detail in the conference presentation.

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FOODSTUFF – NOURISHMENT, ENERGY, INFORMATION, LIFE

D. Tucu[1], St. Duna

The paper presents an integrated approach of the concept of foodstuff, based on the results of current research in key technologies and food industries.

The scientific approach is based on an analysis of research results from exhaustive physic and chemical analysis of food, cell biology and physiology, metabolism studies and analyze of human morbidity.

It was proposed a methodology for complex analyzing of foods - processed or not - by reconsidering processing technology principles, so as to obtain minimally affect of the key elements on foodstuff in relation to its four functions identified (proposed): food (intake of chemicals and substances necessary for metabolic process in the body), energy (necessary energy for life processes), correlated with the package information generated by isotopes that give and allow the identification of the origin of the food (D, ^{18}O and ^{13}C), and the influence of consumed food on the quality of life. Given the crucial role of water - as part of the food or independent- the paper present also, as a separate part, an analysis by citing experimental results of the authors.

Key results are cataloged and appreciated by the mean of implications they may have on human health. Finally it was proposed a generalized mathematical model with four vectors variables: nutritional value (NV), energy (E), information (I) and effects on vital functions (VF), the theme remaining open to all professionals concerned. Conclusion of this paper is that optimum of the food must be designed based on the needs analyze after an integrated approach of the concept of food, with real possibilities for obtaining results applicable in practice of manufacturing technologies.

The base idea is to achieve also, a complex optimization of food consumption in correlation with consumption needs and with specific geographical areas, climate etc.

Keywords: *foodstuff, integrated approach, food energy, food information, food technology.*

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TRAFOON: IMPROVING KNOWLEDGE TRANSFER IN TRADITIONAL FOOD SECTOR

S. Braun[1]

European Small and Medium Sized Enterprises (SMEs) in the traditional food sector are increasingly under pressure due to different factors (e.g. large retailers, the governmental regulations), putting at risk many traditional foods as well as traditional processing techniques. To economically survive in these modern consumer markets, these SMEs must extend their skills (business development and production techniques).

Since November 2013, FP7 TRAFOON project is supporting EU´s traditional SMEs through a knowledge transfer network that interlinks researchers, knowledge transfer agents, and SME associations in 14 European countries to foster sustainable innovation and entrepreneurship in the sector of traditional foods for the benefit of the regions of Europe and the European consumer.

TRAFOON is aimed at the knowledge transfer of technical innovations and existing research results from past and current EU projects, EU-SME initiatives, as well as national and regional projects in the processing and production of traditional foods. Thanks to a close information flow (questionnaires, Multi-stakeholder Workshops) between R&D and SMEs, TRAFOON has already identified the most limiting current knowledge gaps (e.g. processing, marketing, legal issues) and problems in the implementation of innovations in four traditional food products categories (grains, fish, fruits, and vegetables & mushrooms).

Based on these results, the knowledge will be transferred to SMEs in countries where the respective traditional food product plays an important economical and traditional role through different Training Workshops, by establishment of a web-based Information Shop and dissemination during meetings, conferences, trade fairs, etc. Additionally, TRAFOON will develop and formulate a strategic research agenda related to innovations in the sector of European traditional foods, delivering considerable input for further research on a European, national and regional level and will be communicated on a national and EU level.

Keywords: *Knowledge transfer, innovation, SMEs, traditional food sector, network.*

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FRESHWATER AQUACULTURE IN CENTRAL AND EASTERN EUROPE: CHALLENGES AND POTENTIALS

J. Pucher[1]

Introduction Freshwater aquaculture plays an important role in the stabilization of biodiversity, groundwater resources, regional climate and food supply in Central and Eastern Europe. The strong price competition on international markets for fish and changes in dietary habits enhance pressure on fish producing SMEs in Central and Eastern Europe and threaten the existence of the local pond aquaculture landscape. To strengthen the entire value chain of the fresh water fish, common challenges and potentials were identified and agreed on.

Materials and methods To assess the potentials and challenges of the freshwater aquaculture sector in Central and Eastern Europe, semi-structured interviews with aquaculture producers, processors and associations were performed and workshops with aquaculture researcher from Central and Eastern Europe were held within the SIAD-project and within the FP7 EU project TRAFOON.

Results Aquaculture development requires a harmonized framework of regulations. Sharing knowledge would be beneficial to develop uniform standards for sustainability, and facilitate the legal procedures for permits and licences.An economic valuation of the ecosystem services of pond aquaculture is highly needed. Improved environmentally-friendly technology and quality management systems in production and processing are needed to ensure a steadier supply of high quality fish. Consumers need to be informed about the environmental function of freshwater aquaculture and its products. For sustainable development of the aquaculture sector and build public confidence, it is important to encourage the use of sector and territorial specific social innovations.

Conclusions The sustainable development of the freshwater aquaculture sector requires macro-regional development strategies that are tailored to specific markets, environmental factors, consumer behaviour, culture and traditions and offer the potential for cross-border development. This development and adaptation of key technologies is needed to stabilise a competitive, sustainable and resource-efficient fish production and processing.

Keywords: *freshwater aquaculture, future research topics, strategic research and innovation agenda.*

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FACILITATING INNOVATION, KNOWLEDGE AND TECHNOLOGY TRANSFER WITH TRADITIONAL FOOD PRODUCING ENTERPRISES

H. McMahon, J. Lockyer, C. Halbert, B. O'Dwyer, P. Coughlan, J. Knol[1], B. McKenna

Traditional foods represent a growing segment of the European food market, providing significant opportunities for enterprises to expand market share and increase productivity.

To meet growing consumer demand significant innovation is required to generate authentic traditional, craft and artisan products that meet 21st century standards in food safety, nutritional content, sensory value, convenience, traceability and sustainability. This is a particularly challenging task for SMEs as few have the resources or capability needed to engage in innovation or collaborative research.

TRADEIT is addressing this piloting with of 9 Knowledge Transfer Hubs across Europe, supporting and network of traditional Agri-food stakeholders via delivery of an ambitious program of supports tailored to the needs of SMEs in the Bakery, Meat and Dairy sectors.

The activities will to facilitate collaboration, entrepreneurship, knowledge and technology transfer to deliver innovation led activities contributing to the competiveness and inter-regional advantage of the participating SMEs.

Keywords: *Traditional Foods, Knowledge Transfer, Technology Transfer, Innovation, Entrepreneurship.*

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DIFFERENTIATION OF THREE GRAPE VARIETIES BY MEANS OF SENSORY ANALYSIS AND CHARACTERIZATION OF THE VOLATILE COMPOUNDS PROFILE OF THEIR MUSTS

L. M. Palade[1], D. Duta, C. Popescu, C. Croitoru, M. E. Popa

The primary flavours of musts and wines are generally constituted by the terpenes and terpenoids, norisoprenoids, benzol derivatives, aliphatic and glycosidic substances, carotene substances.

The objective of this study was to differentiate among three must samples (Merlot, Cabernet Sauvignon and Feteasca Neagra) based on their volatile profile. The grape samples were obtained from Murfatlar vineyard (Romania). The wines produced from these grapes are awarded the "Protected Denomination of Origin" (PDO) label and finding certain markers for their authenticity should be of great interest for the wine producers.

The chemical compounds profile was evaluated by gas chromatography mass spectrometric detection and by electronic nose analysis. The results reveal several volatile compounds, with differences between the ratios of certain compounds. The headspace analysis (GC-MS) was employed along with the α-Prometheus multi-sensor system used for the food quality control (electronic nose), which provides pattern recognition of the flavouring compounds present in the three must samples.

The gas chromatography mass spectroscopy and electronic nose are very good tools for the authentication of the grape variety.

Keywords: *GC-MS, Electronic nose, grapes, volatiles, authenticity.*

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LACTOSE-REDUCED YOGURT WITH ADDITIONS

M. Blazić[1], C. A. Zalazar, S. Bernal, C. M. Perotti, C. Venica

Some statistical data show that in developed countries about 20% of adult population suffers from some sort of hypersensitivity to food, of which only 2-5% are allergies.

The absence or deficiency of the enzyme β-galactosidase in human small intestine causes various gastrointestinal problems, also known as lactose intolerance. Lactose is the predominant carbohydrate in bovine milk (4,5 to 5 g/100 mL) which is the most consumed and processed milk in the world.

Therefore, the aim of this study was to investigate the application of β-galactosidase to produce yogurt with reduced concentration of lactose in order to develop a new functional fermented milk product.

The hydrolysis of lactose was measured by glucose enzymatic-colorimetric method (Trinder). Sugar, whey protein, powdered milk and pectin were added to yogurt with reduces lactose concentration to improve its sensory properties.

The addition of these supplements didn't have any effect on the β-galactosidaseactivity. Obtained results show that 0,016% (v/v) of β-galactosidasewas sufficient to effectively hydrolyze lactose and that this product is safe for consumption by lactose intolerant people. To obtain more than 90% of lactose hydrolysis, it is necessary to add 0,025% (v/v) of β-galactosidase.

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SCREENING OF ANTIOXIDANT COMPOUNDS AND METHODS USED FOR THEIR DETERMINATION IN *CAMELLIA SINENSIS* TEA: A MINI REVIEW

F. Dumitrescu[1], M. E. Popa, A. Dobre, M. Cucu, N. Belc

Originally from the Far East, tea is the second most widely consumed beverage in the world.

White, green, red or black, the tea has demonstrated numerous beneficial effects on human health, the most important being the antioxidant effect. The antioxidant capacity is largely due to the flavonoids polyphenols (catechins, theaflavin, quercetin, etc.), usually found in green tea and black tea.

The analysis of antioxidant profile and antioxidant content of different types of tea could also indicate the origin of teas and it can be used to identify potential counterfeit samples.

This paper reviewes the latest scientific studies in order to evidence the most sensitive, selective and accurate analytical methods for qualitative and quantitative determination of the antioxidant compounds in tea, and tea beneficial properties. The identification and determination of these constituents have proven to be difficult, especially when the analytical methods are not yet standardized.

Keywords: *tea, antioxidant compounds, beneficial effects, analytical methods.*

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IMMOBILIZED BREWERS YEAST IN IONICALLY CROSS-LINKED GELLAN PARTICLES: PREPARATION, CHARACTERIZATION AND APPLICATIONS

C. Iurcic (Tincu)[1], A. Savin, M. Popa, P. Martin

Introduction The physical entrapment of biocatalysts in granular matrices is a method that provides a valuable protection of the immobilized product. It can be carried out under very mild conditions and it is suitable to produce the spherical microparticles that can be used in continuous fermentation processes.

Materials and Methods The particles were prepared by extruding an aqueous solution of gellan in which the yeast cells are suspended in an extrusion bath having various zinc acetate amounts. The cross-linking occurs through the formation of the ionic bonds between carboxylate anions of the polysaccharide and the Zn^{2+}cation. A favorable effect on the viability of yeast cells was observed when the cross-linker is used in low concentrations. The influence of gellan-yeast and gellan-zinc acetate mass ratio on the stability of the immobilized product was studied. For this purpose, the turbidity in the supernatant of the extrusion bath was determined. The obtained particles were characterized with optical microscopy and SEM, rheological tests. Biocatalytic activity of the new products was evaluated in the aqueous solution during the glucose fermentation (8% glucose in the presence of 0.007% zinc acetate, at a temperature of 30 °C).

Results The particles with yeast cells are spherical (Ø ~3 mm) and their stability is not strongly influenced by the preparation conditions. However, the fermentation capacity is influenced by mentioned characteristics. Some particles containing yeast cells showed the ability to be used in a large number of the fermentative cycles. The specific productivity values achieved by their use are higher than those obtained in the presence of "free" yeast.

Conclusions Spherical gellan particles containing yeast cells can be used for more cycles of fermentation being stable and easy to recover from the fermenter. They can be potentially used in continuous fermentation processes, with high specific productivity and net benefits compared with “free” yeast.

Aknowledgements This work was supported by the strategic grant POSDRU/159/1.5/S/133652, co-financed by the European Social Fund within the Sectorial Operational Program Human Resources Development 2007 – 2013.

Keywords: *gellan, yeast immobilization, zinc acetate, ionic crosslinking.*

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CLENING VALIDATION- COMPULSORY MEASURE REQUIRED FOR QUALITY AND SAFETY OF HOFIGAL DIETARY SUPPLEMENTS

C. V. Popescu[1], S. Manea, M. Fotescu, M. Ciolea, C. Popescu

Introduction: The purpose of this paper is to demonstrate the effectiveness of cleaning surfaces classified enclosures, personal protective equipment to personnel directly involved in the manufacture of food supplements and technological equipment with raw materials coming in contact at different stages of processing, cleaning performed by a system of ecological detergents and disinfectants. The aim of this activity is to get dietary supplements of quality and safety, in accordance with the requirements of the legislation in force, data from the literature and of its policy of quality, safety and hygiene Hofigal.

Materials and Methods: Microbial contamination method according to the European Pharmacopoeia edition in force requirements, to determine the total number of viable aerobic microorganisms (bacteria and fungi).Microbiological test is done by direct inoculation of the sample in the culture media: culture medium with casein hydrolyzed and soy (soy bean Casein Digest Agar) for bacteria and Sabouraud agar culture medium with dextrose (Sabouraud dextrose agar) for yeasts and filamentous fungi, which provides development microorganisms, according to the European Pharmacopoeia edition in force. Cleaning validation procedure is carried out by using of ecological detergents and disinfectants system specific for pharmaceutical industry.

Results: Microbiological control results carried out by using of culture media: casein hydrolyzed and soy (soy bean Casein Digest Agar) and Sabouraud dextrose agar (Sabouraud dextrose agar) shows that the total number of aerobic microorganisms, yeasts and filamentous fungi within the limits for this type of test and according to the admissibility limits imposed by legislation in force.

Conclusion: Cleaning validation procedure applied demonstrated that ecological system of detergents and disinfectants used are effective and major contributing, along with other measures of hygiene, to obtaining of Hofigal quality dietary supplements and secure.

Keywords*: cleaning validation, quality, safety, dietary supplements*

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THE EFFECT OF THE ADDITION OF DIETARY FIBER IN WHITE BEAN OVER THE TECHNOLOGICAL AND SENSORY QUALITIES OF WHITE BREAD

C. M. Canja[1], A. Mazarel, M. I. Lupu, V. Padureanu, C. L. Badarau

The study aims to trace the influence of addition dietary fibres of white beans over technological and sensory properties of white bread.

White beans, in the form of flour has been added due to high dietary fiber content, thus aiming to achieve a functional product with superior properties for people with digestive problems, those who are prone to diabetes, healing colon and prevent constipation operation, reduces the risk of colon cancer, reduce the risk of breast cancer, reduce the risk of obesity, reduce installation cholesterol levels and hepatic cholesterolsynthesis etc.

Bean flour is added to the dough stage (in percentage) of 3, 5, 7 and 10 percent of the mass of the flour used, obtaining four types of bread to which they are determined through a series of physical-chemical indices and sensory as well as volume, porosity, humidity, acidity, smell, yield, taste, color etc.

Keywords: *whitebean, dietary fiber, bread*

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CONSIDERATIONS ON THE PRESENCE OF SPECIES OF THE GENUS ARTEMISIA IN MOLDOVA AND OPPORTUNITIES FOR THEIR USE

R. R. A. Cliniciu[1], V. Oofrei, T. Robut, M. C. Drutu

Artemisia genus according to some authors includes about 400 taxons, and according to others 200 species spread all over the Globe. Many of them have different properties which is why they have numerous uses. In Romania Artemisia genus includes about 16 species, some of them very common. The present paper research aims to present the most common species in Moldova, their composition, their properties, their potential use, while stressing the implications from the point of view of sustainable development and of practicing organic farming at high scale. Finally, the authors propose usability diversification for some of the studied species.

Keywords: *Artemisia, spreading, use, chemical composition, ecology.*

OCIMUM BASILICUM L.: PRESENCE, INFLUENCE AND EVOLUTION IN HUMAN CONCERNS EVER

V. Onofrei[2], C. A. Drutu, R. A. Clinciu Radu, T. Robu

Ocimum L. genus includes about 160 species and varieties, and one of the most popular is Ocimum basilicum L. Cultivated for over 1000 years, common basil is a valuable aromatic and medicinal plant, widely used both in traditional and in scientific medicine, in the perfume and food industry, in cosmetics, organic farming, landscaping and the plant product has profound religious significance, serving as an object of worship.

This paper aims to present in a synthetic manner the most important implications of the species *Ocimum basilicum* L. in human preoccupations ever, highlighting the potential of its use in various fields. By choosing as a research method based on the observation and study of literature, an overview will highlight its main aspects of origin, history and the spreading area, the organ used, chemical composition, biological features, requirements for climate and soil, therapeutic actions and uses. Finally, the authors propose the diversity of usability of the species studied, bringing their modest contribution by opening new approach perspectives.

Keywords: *Ocimum, Ocimum basilicum L., phytotherapy, organic farming.*

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INFLUENCE OF TECHNOLOGICAL FACTORS ON THE QUALITY OF RED WINES AT THE MACERATION-FERMENTATION PROCESS

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The maceration process is the main methodused to obtain themajorityred wines, ensuring better extractionof phenolic compounds, theflavorsubstancesintomust andtheninto wine.

Were analyzedCabernetSauvignon, Merlot andPinotNoir harvestin 2013,obtained by classicmacerationand by winemaker.Winemaker temperaturewas set at12 to 16°C andthe mustwas heatedby passing througha heating andoxygention system, thusfavoringpolymerization ofanthocyanins andtannins. In the winemaker were added 5-15g / hl SO_2 and was homogenised for 5 minutes at 2 hours for three days, the filling factor was 80% by volume and were added enzymes Enovin color and Enozym Vintage. For fermenting musts were used two types of yeast: Viniferm TTA, Fermactive Rouge Expression at 18ºC. To stabilize color was added Vinitanon tannin.

For the classic maceration-fermentation process the temperature gradually increased due to fermentation processes and the stimulation of process was based on ventilation and recirculation of the must. At a temperature of 22°C and when density reached at approx 0.9991 to 1.00 and a sugar content reached to 5.6 to 6.96 g / l, the first fraction of must was separated and pressed and the resulting wine was introduced in barrel of 225 l capacity to start the malolactic fermentation. The fermentation is carried out at a controlled temperature, usually between 20-28˚C, very important for define the quality of the wine.

In maceration-fermentationinwinemaker has been found, afastermalolactic fermentation, the winehas good quality, goodcolor, enough extractandnormal volatile acidity. Enzymesandyeastscan acceleratea numberof biochemical processes may improve the qualityof wine and can give fruitiness, freshness and balance.

Keywords: *wine, maceration-fermentation process, yeasts, enzymes, quality.*

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THE USE OF INSTRUCTIVE-EDUCATIONAL METHODS FOR TEACHING THE CHAPTER "DETERMINATION OF MILK QUALITY"

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This paper intends to enroll in the new Romanian education reform process and the principal aim is methodical study on the teaching of chapter "Determination of milk quality" necessary to obtain dairy dessert type, organizing, conducting and evaluating educational process, ensuring skills training specific to this discipline.

The paper wants to capture the attention of teachers on new teaching concept design, in order to offer supports for organizing, conducting and evaluating instructiv-educational.

The paper makes extensive references on: calanderistic planning, learning unit planning, planning the lesson and teaching materials - work sheets, assessment tests. It insists on strategy planning and deployment of a didactic and educational activity aimed at raising the efficiency of learning.

To form the desired professional competence, a student will study various specialized subjects and shall perform practical activities. These is based on knowledge and intellectual skills background formed by studying subjects of general culture, so we assist to the establishment of a complex interconnections in which everyone can condition the entire process.

The models of teaching technology lessons, except traditional teaching, provide a coherent, consistent, practical framework. They allow the selection of various combinations of strategies, methods, techniques of teaching, learning and assessment.

These models can help a teacher to guide students in learning because it creates a favorable context for planning and organization of teaching, interdisciplinary approach, motivating and involving students in the lesson, encouraging their free speech.

Keywords: *teaching method, evaluating, didactic activities, learning.*

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RESEARCH ON OBTAINING YOGURT WITH CARROT

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Yogurt has a rich nutritional value, but is devoid of dietary fiber and certain vitamins needed by the body (pro-vitamin A).

Research aims is to obtain yogurt with carrot under 2 forms: raw and parboiled, to enrich yogurt with β-carotene and fiber. Yoghurt with carrot was stored 14 days at 40°C, during which time were analyzed: acidity, pH, the evolution of β-carotene and dry matter in the product.

Carrot was used as a source of natural antioxidants, especially carotenoids and phenolic compounds, having the highest content of carotenoids of all foods. For the analysis of cow milk was used Ekomilk Total based on ultrasound technology that allows analyze of milk samples without the use of chemicals or test agents. For determination β-carotene content was used spectrophotometric CECIL CE1021 Series 1000. Samples were first centrifugated at Hettich Universal 320R which is attached to the rotor 1420-R.

The dry matter was determined by Moisture analyzer AND ML-50. Thermostating of samples occurred at CO_2 incubator INCOmed (Memmert provider).

The results showed that with the increase of acidity of the yogurt samples has increased lactic acid. To reduce vitamin A deficiencies of population is required daily consumption of vegetable sources, but also the problem can be solved by consuming yogurt with carrot.

Keywords: *yogurt, β-carotene, carrots, dietary fiber, carotenoids.*

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EFFECTS OF SEVERAL PURPLE POTATO PASTE ADDITIONS ON BREAD QUALITY

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Introduction Diets rich in potato tubers containing polyphenols in flesh can be an excellent sources of natural antioxidants. Anthocyanin, the phytochemical which appears in various potato varieties, known especially for its health promoting effects in red wine, have a strong effects because their antioxidant properties. The goal of this research work was evaluation the anthocyanin and polyphenols content of some potato cultivars probably useful for bakery industry and the influence of these potatoes paste add on several bread quality indicators.

Material and methods Romanian potato cultivars used in experiments were Christian and Albastru Violet de Galanesti. Tuber appearance was evaluated based on tuber size, shape and eye depth. The analysis performed on bread (prepared using different potatoes paste addition 5%, 15% and 30%) were sensorial and physic chemical analysis (product volume, crumb porosity and elasticity, height/diameter ratio, moist and acidity). For potatoes and bread samples, total polyphenols content was determined by Folin Ciocalteu method and anthocyanin content was estimated by pH differential method.

Results The lowest total polyphenolics and anthocyanins content were found in variety Christian, while the highest one was record for cultivar Albastru Violet de Galanesti. Experimental results indicated that 15% potatoes paste from purple potato cultivar add was the most indicate to be used in bread processing. Regarding the contents of anthocyanins and polyphenols, the higher were in cas of the bread with potatoes paste from cv. Albastru Violet de Galanesti (30%). Exceptind the product volume, in all experiments, the quality bread indicators were in accordance with the values specified in the standard. The best values of bread quality were obtained in case of addition 15% purple colored potato paste additon in dough.

Conclusions After these preliminary tests, based on total polyphenol and anthocyanin content and tuber appearance, the purple flesh cultivar Albastru Violet de Galanesti could be recommended for obtaining a new bread, a challenge in the bakery industry.

Keywords: *purple potato, bread, anthocyanin, polyphenols.*

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DIFFERENCES IN THE AMOUNT OF CHOLESTEROL AND TOTAL CAROTENOIDS AS A QUALITY PARAMETER OF TABLE EGGS IN INDUSTRIAL AND DOMESTIC CULTIVATION METHOD

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Cholesterol is one of the basic ingredients of the egg which determines the nutritionalvalue of this food. Due to the negative trend of cholesterol, experts have been recommendingit is good to reduce the consumption of eggs, but recent research shows that consumption ofeggs does not significantly affect the level of LDL cholesterol in the blood.

Number of total carotenoids and cholesterol share was determined in 100 samples of egg yolks from industrial (1-50 JATA) and homegrown (1-50 ECO).

Cholesterol was determined by thin layer chromatography (TLC). Number of total carotenoids was determined by using spectrometry.

Number of total carotenoids in egg yolk dictates the color, and is therefore an important parameter when evaluating the quality to the consumer and samples was evaluated color according to the Roche scale.

Due to the different eating habits in chickens, eggs from industrial production had a lower proportion of cholesterol (46%), the intense orange color and a lower proportion of total carotenoids. Eggs from homegrown production had a higher proportion of cholesterol (53%), less intense orange color, and a higher proportion of total carotenoids.

Keywords: *Cholesterol, Carotenoids, Eggs, Egg yolks, TLC.*

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RECOMBINATION OF DRY WHEY BY CAVITATIONAL DISINTEGRATION

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Dry whey is widely used in milk and confectionery products technology. The problems of whey recombination are connected with stable whey solution production with properties similar to the natural whey. Other problems deal with the pH level regulations and reduction of the chemical stabilizers quantity for high quality products manufacturing.

The aim of the research was to study of cavitational disintegration using for whey recombination process. The different types of activated water were used for whey solution preparing.

The object of research was milk whey with the 50%-level of demineralization, produced by Russian Standard 53492-2009. The pH level and redox of activated water and whey solutions were determined by potentiometric measurement on analyzer pH "Expert 001-1.0.1". Catholyte had produced by PEM-3 module, the value of catholyte pH is 10.45 - 11.2, Redox = (-300 ÷ -350) mV. The cavitational disintegration was carried out by ultrasonic treatment in homogenizer « Hielscher UP 400». Concentration of dry whey was varied from 1 to 11 %.

Reduction of pH level for all solutions with different concentration of dry whey was established. Cavitational disintegration is promoted to stable solutions preparing, and pH level of the solutions prepared by cavitational disintegration had the pH lower by 0.12 than solutions produced by mechanical homogenizing. Solutions based on catholyte had pH 6,7-9,5, and solutions based on water had pH 6.7-7.3. It was established that combination of water type and method of whey recombination might to obtain the solution with needed properties.

The results may be used for manufacturing of high quality fermented milk products and milk deserts based on recombined whey.

Keywords: *Cavitational Disintegration, Recombined milk whey, pH whey solutions.*

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GREEN TEAPOLYPHENOLS-MEDIATED CROSS-LINKING OF WATER SOLUBLE CELLULOSE DERIVATIVES FOR ENCAPSULATION OF PROTEINS, METHYLXANTHINES AND COLOURANTS IN HYDROGEL MICROSTRUCTURES

A. Belscak-Cvitanovic[1], S. Levic, V. Dordevic, A. Vojvodic, K. Trifkovic, D. Komes, B. Bugarski, V. Nedovic

Templated by strong hydrophobic interactions between water soluble cellulose derivatives and galloylated green tea polyphenols, hydrogel microbeads can be formed, however their potential to entrap different active substances must be evaluated. In the present study, green tea extract was used as the cross-linking medium to formulate compositionally and morphologically diverse microstructures; core-shell microbeads of hydroxypropyl methylcellulose (HPMC), hydrogel microbeads of ionically cross-linked HPMC-alginate or HPMC-pectin beads, or HPMC coating applied onto preformed alginate or pectin microbeads.

The optimal formulation in terms of particle size, morphological and textural properties, loading capacity and release profiles of polyphenolic compounds was used to examine the potential of encapsulating proteins (BSA, whey proteins) and caffeine as model active compounds.

The produced particles, obtained by electrostatic extrusion exhibit a very wide particle size distribution, with the mean particle size (d0.5) amounting to 1980 µm for plain HPMC beads, while plain ionically cross-linked alginate beads with HPMC coating were the smallest. HPMC reinforcement of alginate and pectin beads provided the hardest particles, while HPMC coating on preformed alginate particles the most spherical and morphologically regular beads. HPMC reinforcement of alginate and pectin beads enabled to prolongue the release of polyphenols, as well as proteins from the beads(up to 3h), which may be attributed to better polymer entanglement in the microbead matrix or reduction of characteristic alginate and pectin porosity induced by ionic gelation. Up to 89% of polyphenols and proteins were retained in the formed microbeads, while the loading capacity of caffeine was lower,possibly due to their molecular size and functional groups facilitating specific chemical interactions. Taking into account the evaluated physical, morphological, bioactive and release attributes of fomulated microbeads, ionically cross-linked alginate-whey protein microbeads with HPMC coating encapsulating green tea polyphenols provide the optimal combination of beneficial properties appropriate for food applications.

Keywords: *green tea, hydroxypropyl methylcellulose, cross-linking, polyphenols, whey proteins.*

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PLANT ENZYMES USED IN THE DIETARY SUPPLEMENT INDUSTRY

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Plants with phytotherapeutic favorable effect on the human body owe its present value of certain bioactive substances that are found in all species but only some of that have therapeutic proprieties. These highlights enzymes, substances that in small quantities play a key role in maintaining life, accelerating metabolic processes through decomposition and allowing food into assimilated nutrients that can be utilized for the cells and also substances to be removed. Enzymes are responsible for food digestion, energy production processes, defense mechanisms, and more.

In the Hofigal company at Research and Development Department, we conducted research on determining the most important activity of digestive enzymes (amylase, protease, lipase) in several plant materials including the following: - seabucktorn (*Hyppophae rhamnoides*) -fruit; - blackcurrant (*Ribes nigrum*)-leafs; -bitter cucumber (*Momordica charantia*) – leafs and offshoots, Aloe (*Aloe arborescens*) -leafs.

Selected plants were studied and found to be rich in digestive enzymes, as follows:

- The highest amylase levels in descending order are:

-bitter cucumber => blackcurrant => buckthorn => aloe;

Lipase recorded the highest values on:

- buckthorn => aloe => black currant => bitter cucumber;

The highest values of protease were determined to:

- aloe => bitter cucumber => buckthorn => black currant.

Enzymatic analysis of selected plant material was conducted on Hofigal company with plants culture, organically grown and processed according to GMP standards, in order do not alter the pharmacodynamic action of the of interest active bio-subsances and will be used in new enzyme supplements preparations.

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Keywords: *plant material, digestive enzymes, health.*

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APPLICATIONS OF POPULAR MEDICINE IN THE ACTUAL CONTEXT OF SCIENTIFIC KNOWLEDGE AND HEALTH CARE

A. Cozea[1], R. Gruia, M. Neagu

Medicinal plants have been one of the most important interests from ancient times, because of theirs beneficial effects on human health. In modern times, the empirical practice was transformed into science. As a result of the advanced development techniques for the investigation of the health, one of attitude promoted by scientists and supported by studies, is to achieve food supplements.

Starting from this premise was selected a large plant material to be analyzed biochemically and enzymatically after that being chosen the best extraction methods for use in developing dietary supplements. Cakes remaining after extraction will be pyrolyzed and turned into charcoal to be used as a support for fixing extracts of interest.

This study bring in the foreground the necessity of the natural food supplements made from plants selected and organically grown and determinate in biochemical interest compounds that have the role of counteract the negative effects of ,, unbalanced " modern food. Their role is to increase the human body's defense, by protecting against excess of harmful free radicals, and providing in human body essential nutrients that are strictly necessary for cell regeneration. The plant material studied was represented by: - Seabuckhtorn (*Hyppophae rhammnoides*); - Blackcurant (*Ribes nigrum*); -Aloe (*Aloe arborescens*); -Parsley (*Petroselinum crispum*).

Plant material selected was analyzed in: hydrolytic (digestive): enzymes lipase and amylase protease oxidoreducatoare: catalase, superoxide dismutase. The enzyme dosages were used starting from raw plant material, extracts and for the finished product.

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Keywords: *medicinal plants health, food supplements.*

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EFFECTS OF INHALED *FOENICULUM VULGARE* VOLATILE OIL IN AMYLOID BETA (1-42)-INDUCED ANXIETY AND DEPRESSION IN LABORATORY RATS

O. Cioanca[1], M. Hancianu, L. Hritcu

Used as a spice and to improve the palatability of different meat and vegetable dishes, common fennel, *Foeniculum vulgare* Mill, *Apiaceae*, was a traditional remedy for the relief of spasms and colic due to gas accumulation, to stimulate gastrointestinal motility, to alleviate productive coughs as well as for the induction of menstruation and lactation. Fennel essential oil extracted from fennel fruits is used as traditional medicine to improve eyesight, promote courage and mental strength, reduce stress/nervousness and produce calming.

Therefore, we wanted to reinforce some of the folk uses with scientific proves. The present study analyzed the possible anxiolytic and antidepressant of the fennel volatile oil in beta-amyloid (1-42) rat model of Alzheimer's disease (AD). The anxiolytic- and antidepressant-like effects of the fennel volatile oil were studied by means of *in vivo* (elevated plus-maze and forced swimming tests) approaches.

The beta-amyloid (1-42)-treated rats exhibited the following: decrease of the exploratory activity, the percentage of the time spent and the number of entries in the open arm within elevated plus-maze test and decrease of swimming time and increase of immobility time within forced swimming test.

Inhalation of the fennel volatile oil significantly exhibited anxiolytic- and antidepressant-like effects.

Our results suggest that the fennel volatile oil inhalation ameliorates beta-amyloid (1-42)-induced anxiety and depression in laboratory rats. Thus, the results of the present study indicate that the fennel volatile oil may have potential clinical applications in the management of anxiety and depression related to AD conditions.

Keywords: *Foeniculum vulgare oil; anxiety; depression; Alzheimer's disease.*

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EFFECT PROTECTIVE OF *ROSMARINUS OFFICINALIS* L. EXTRACT AGAINST CCL_4-INDUCED HEPATITIS IN MICE

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Rosmarinus officinalis L., a well-known culinary herb, rosemary also has a long history of traditional medicine use. European herb practitioners used it as a tonic and stimulant, as well as to treat digestive, circulatory and nervous disorders.

The hepatic protective activity of rosemary ethanolic extract was investigated in mice on carbon tetrachloride (CCl4) hepatitis model (1 ml/kg body weight, orally, tree times per week). *R. officinalis* was administrated orally in three doses of 5, 50 and respectively 500 mg/kg d.s., three times per week; the experiment lasted for six weeks long. *R. officinalis* protective activity was determined by assessing the levels of plasma total protein, albumin, cholesterol, triglycerides, urea, creatinine and enzymes as Aspartate aminotransaminase (AST), Alanine aminotransaminase (ALT), Gamma-glutamyl transferase (GGT). Expectedly, CCl4 hepatic toxicity was mainly reflected in elevated levels of AST, ALT and GGT ($p<0.01$), and decreasing albumin concentration and A/G ratio. The *R. officinalis* therapy prevented the rise of serum AST and ALT ($p<0.01$) and increased A/G ratio ($p<0.05$).

The effects were visible in the fist examination, at four weeks, but the maximum amplitude was seen in the end of the study at six weeks.

The protective effect of *R. officinalis* was visible both in four and six weeks determination, reflected mainly in lower activity of transaminases as compared to tetrachloride inoculated group ($p<0.05$). However, no dose dependent effect could be proved, but the most effective dose seems to be the average dose 50 mg/kg d.s. In conclusion, we found that ethanolic extract of *R. officinalis* provided protective activity on toxic hepatitis model, in non-dose dependent manner.

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ETHNOBOTANICAL AND ECOLOGICAL STUDIES OF WILD EDIBLE PLANTS FROM BUGEAC STEPPE, REPUBLIC OF MOLDOVA

N. Ciocarlan[1], V. Ghendov

Introduction Data collection on traditional medicine, more recently, ethnobotanical studies are increasing in recent decades in many countries. In our republic ethnobotanical studies show a relatively new research direction, but perspective as local flora provides us a large number of plants with important therapeutic qualities, some growing wild in abundance, requiring no cultivation investment. This study was aimed to identify and document the edible plants and their traditional uses by local communities in the Bugeac steppe region, located in the southern part of the Republic of Moldova.

Methods Using both ethnobotanical and ecological methods, the study was carried out in three rural settlements (Bugeac, Dezghingea and Topal, district Comrat) during the 2012-2014 period. Ethnobotanical information was accumulated via informed questionnaires and oral interviews with local people. Collected species were identified and voucher specimens deposited in the Herbarium of the Botanical Garden (Institute) of ASM.

Results A total of 38species from 33 genera and 17 families have been documented in the study area.The most utilized species belonged to *Rosaceae* (6), *Fabaceae* (5), *Asteraceae*, *Chenopodiaceae* and *Malvaceae* with 4 species each. The most important edible species are *Urtica dioica, Rumex acetosella, Origanum vulgare, Rosa canina, Thymus marshallianus, Fragaria viridis*. The bio-ecological features include: therophytes (11), hemichriptophytes (19), geophytes (2), chamephytes (1) and phanerophytes (5); the mesohygrophytes (1), mesophytes (17), xeromesophytes (19) and xerophytes (1).

Conclusions Our study reveals that people from studied area continues to use the knowledge of wild medicinal crop in their day-to-day life and encourages further ethnobotanical investigations in rural areas throughout the country.

Keywords *ethnobotany, bio-ecology, wild edible plants, Bugeac steppe, Republic of Moldova.*

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MEDICINAL FLORA AND CONSERVATION ISSUES OF PLANT RESOURCES OF "TAPOVA" RESERVATION IN REPUBLIC OF MOLDOVA

V. Ghendov[1], N. Ciocarlan, T. Izverscaia

Introduction Gaining knowledge about native medicinal plants used in folk medicine ethnobotanical studies requires reconsideration of their pharmacological action to better use thereof. Also, the information gained directly contributes to conservation and sustainable use of their natural resources.

Methods The research was conducted during 2007-2013 in the Landscape reservation "Tapova". Voucher specimens of the plants are lodged in the Herbarium of Botanical Garden (Institute) of ASM (Chisinau).

Results The spontaneous vascular flora of Landscape reservation "Tapova", a protected area of national interest (mixed type nature reserve: flora, fauna, geological and landscape), located in Orhei district in vicinity of Țâpova village, territory in administration of Orhei forestry (204 ha) and "Lalova" agricultural enterprise (102 ha), comprises 571 species of higher plants of 332 genera and 81 families, most of which (70.22%) are forest and grassland (steppe) plants.

There were 38 rare species revealed in the floristic composition, protected in Moldova at the national level, 29 species are included in the National Red List of Romania. Others are 17 species – protected in Ukraine. Notable is the presence of four species threatened on European level and included in the European Red List of plants - *Angelica palustris*, *Koeleria moldavica*, *Lilium martagon* and *Schivereckia podolica*.

Conclusions The plants with medicinal properties amount 279 species, with the most representative families – *Asteraceae* (44 sp.), *Lamiaceae* (25), *Rosaceae* (16), *Fabaceae* (16) and *Brassicaceae* (15 species). The vast majority of them are used in the treatment of various skin diseases and respiratory disorders.

Keywords: *medicinal spontaneous flora, conservation, Republic of Moldova.*

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INTRODUCING AND PROMOTING CONDIMENTAR-AROMATIC SPECIES *VERBENA TRIPHYILLA* L'HER IN THE CLIMATIC CONDITIONS OF REPUBLIC OF MOLDOVA

L. Chisnicean[1]

Introduction *Verbena triphylla* L'Hér. is a perspective perennial species with spice, aromatic, curative proprieties and decorative appearance. Its introduction in the climate conditions of Moldova is related especially by the choice of multiplication. During the process of introduction there have been applied several methods of vegetative multiplication in order to identify the most efficient and fast one.

Material and methods As a starting material in the process of multiplication of the species, were used green and lignified apical cuttings, collected from the mother plants. In order to stimulate root's appearance were applied rooting stimulation preparates. As a substrate for rooting the river sand and soil mixture with Biohumus was used. Purification of the collected materials used and the instruments used during the cutting was made with 1% solutions of potassium permanganate. Prepared cuttings were planted in mini-greenhouses covered with special material "Agril", buy properties to maintain constant temperature and humidity.

Results Green apical cuttings (not lignified) treated with rooting stimulator had rooting rate of 69% while untreated had the rate of 67%, difference being insignificant, considering the cost of solutions. I also noticed that no rooting substrate is not the most important criterion in the rooting process, results being similar (66% rooted cuttings, manufactured with stimulator on both substrates and 65% unprocessed on both substrates). Lignified cuttings were more receptive to rooting stimulator having rooting rate equal to 89% and 79% unprocessed ones. The rooting substrate did not influence the rate of rooting, results were similar.

Conclusion Multiplying this precious condiment species should be performed by using the lignified apical cuttings, rooting stimulators, which allow rapid rooting without significant losses.

Keywords: *Verbena, spice, method, multiplication, rooting cuttings, substrate, stimulating.*

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BIOCATALYTIC CONVERTION OF α-PINENE INTO VALUE-ADDED PRODUCTS

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Introduction In the era of renewable carbon sources as a key element in biorefinery, we know of only biomass alternative for the replacement of fossil resources. Recently investigations demonstrated both terrestrial and marine environments contain important renewable carbon sources represented often by monoterpenoid compounds (monoterpenes).

In this study, biocatalytic oxidation of α-pinene designed in varied configurations has been investigated for the production of value-added products for flavors, pharmaceuticals, perfumery and food industry as well as the precursors applied in the pesticides and polymeric industries (e.g. α-pinene oxide, verbenol, pinanediol, camphene, campholenal) (fig. 1).

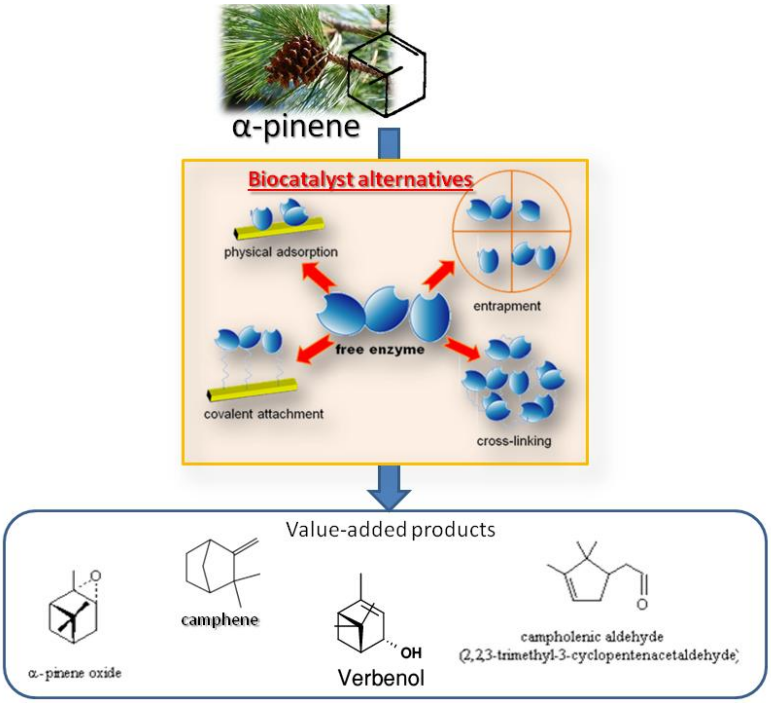

Fig. 1. *Different designs for biotransformation of α-pinene into value-added products.*

Experimental/methodology Biocatalysts were constructed as lipase enzyme absorbed/entrapped/cross-linked leading to the specific configurations. The immobilization approaches are detailed in the previous papers [1,2].

Biocatalytic oxidation of α-pinene was performed in the mixture of substrate and oxidation agent (1:1= α-pinene:H_2O_2/UHP) catalysed by lipase enzyme (50 mg/mL).

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The reaction was developed in ethyl acetate for 24 h under room temperature. Then, the reaction phases were separated by centrifugation. The supernatant was further frozen and extracted with pentane.

The evolution of the biocatalytic process was followed based on GC-MS/FID analysis of the reaction products.

Results and discussion Lipase enzyme from *Aspergillus niger* source was immobilized leading to varied configurations (e.g. absorption, entrapment, covalent and cross-linking). The biocatalysts were tested; the results are presented in table 1. Enzyme immobilization using the entrapment approach allowed to improve the α-pinene conversion and moreover to concentrate the selectivity onto verbenol production.

The other biocatalyst configurations behaved similar between them in term of selectivity leading to α-pinene oxide as dominant product next to verbenol, camphene, campholenal. All of the experimental results will be detailed and correlated to the corresponding biochemical processes during the conference presentation.

Table 1. *The effect of biocatalyst design on biochemical route of the α-pinene oxidation process.(CLEA-cross-linked enzyme aggregates and CLEMPA–cross-linked enzyme aggregates onto magnetic particles).*

biocatalyst	**Conversion (%)**	**Selectivity(%)**			
		α-pinene oxide	camphene	verbenol	campholenic aldehyde
Free lipase	15.30	57.61	2.09	1.04	3.12
Adsorbed lipase	13.25	43.21	3.20	2.21	4.35
Covalent attachment of lipase	10.50	47.90	2.34	10.75	3.21
Entrapped lipase	22.58	26.34	1.36	21.00	1.67
CLEA	27.06	35.31	0.38	3.06	6.53
CLEMPA	9.61	42.37	0.89	3.06	8.20

Conclusions Biocatalytic system for α-pinene valorization had been developed for production of value-added products, especially α-pinene oxide and verbenol.

Acknowledgements The authors kindly acknowledge to UEFISCDI for the financial support through the project PN-II-PCCA-2013, no. 105/2014.

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Keywords: *immobilized enzyme, biocatalytic oxidation, α-pinene, α-pinene oxide, verbenol.*

NATURAL REMEDIES AND GEMMODERIVATES USED IN DYSLIPIDEMIA AND FATTY LIVER

A. D. Raiciu[1], I. Burghiu-Hobeanu, St. Manea

Complex food supplement is a natural detoxifier phytocomplex composition which provides a general detoxifying action by neutralizing toxins and eliminate them from the body, has hepatoprotective action, the reconstruction of liver cell, stimulates gallbladder activity and combat the risk of gallstones.

Gemoterapia acts upon organic dysfunctions, each extract hydro-alcoholic - glycero having a well defined organotropism acts mainly by stimulating cellular function and tissue homeostasis rebalancing.

Matherials and methods

The authors present the results of a case study, observational, consisting of 20 patients with dyslipidemia and hepatic steatosis, divided into 2 groups: group A and group B, each consisting of 10 patients.

During the study, patients received:

• LOT A: Complex natural detoxifier 2 tablets 3 times a day 15 minutes before meals and morning - a single dose of Rosmarinus officinalis sprouts Gemoderivat of the evening - a monodozăde Gemoderivat Betula pubescens buds;

• LOT B: control group.

Patients were monitored for clinical and laboratory (blood liver transaminase determinations: glutamic oxaloacetic-TGO, glutamic pyruvic-TGP, lipidogram: total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides) at baseline (T0 time) and final (time T1).

Statistical evaluation of the results was performed by testul't 'student and ANOVA.

Results Among the beneficial effects reported at end of study were:

• balancing main metabolic functions:

• hepato - protective properties materialized by lowering elevated serum transaminases: TGO with 12.78% for TGO and 11, 46%.

Conclusions

Action milk thistle as a remedy for liver diseases is undeniable plant is considered the greatest effect on these diseases.

All gemoterapiei beneficial effects of modulation can be attributed to human telomerase activity, which is in full hypothesis research and debate.

Key words:*Armurariu,Steatoză, Rosmarinus officinalis, Betula pubescens, dislipidemie, gemoderivat.*

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THE ROMANIAN "GREEN KID" INITIATIVE: FOOD, EDUCATION, AND FUN A SUCCESSFUL PROJECT FOR LEARNING PROPER NUTRITION AT AN EARLY AGE

L. Alexandru[1]

There is a strong and direct relationship between food and health. Learning proper nutrition and a healthy lifestyle at an early age means building a healthier future. The Green Kid project effectively provides this education for health. It breaks down nutrition into accessible concepts for young children and is already determining major dietary changes in many Romanian families.

Methodology and implementation

Since 2012, the Green Kid pilot programs were implemented in two Romanian kindergartens. The curriculum, suited to 3 to 6 year-olds, includes 32 lessons per academic year. All the lessons integrate academic disciplines with food and arts through experiential learning. The program is structured around three key elements: Food, Education, and Fun, and has the following goals:

- enhancing children's interest towards plant-based foods, as well as acceptance of a diverse diet
- increasing the content of raw foods in the children's meals
- improving understanding of the relationship between food, active living, and health
- developing life skills such as cooking, gardening, smart shopping
- encouraging the children's aesthetic sense (food art)
- generating a positive impact on the eating patterns of the children's families

Results and conclusions

The program has proved highly successful, and all goals were achieved very quickly. While initially children weren't interested in vegetables, ate very few raw foods and turned down greens, their eating patterns changed fundamentally. Two months into the program, they now accept even unpopular raw veggies, are more open towards new foods and ask their parents for dietary changes.

At the moment, the program also includes a website (www.copilulverde.ro), workshops, and valuable books. The first release is "Yummy Stories", a delightful collection of six fairy tales encouraging healthy eating habits.

Keywords: *health education, healthy eating habits, plant-based, preschoolers, nutrition*

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THE ROLE OF NUTRITION IN PHYTOTHERAPY OF MENORRHAGIA

C. D. Cimpean[1], C. Hotiu

Introduction Menorrhagia often affect the quality of life of many womens. The causes may be different (thyroid disease, bleeding disorders, hormonal disorders, genital infections, tumors of the endometrium etc.), but a large number of womens experience menorrhagia "constitutional", without any associated pathology.

In these cases, herbal and diet therapy are helpful, lacking unpleasant consequences of specific invasive gynecological interventions or use of hormonal medication especially contraceptives.

Materials and methods A total of 10 women, aged between 20 and 51, which were presented at consultations for constant menorrhagia, diagnosed as "constitutional" were treated by phytotherapy and Ayurvedic diet therapy between 3 and 6 months, with improvement of specific symptoms or remission.

Results In most cases, the specific symptoms of menorrhagia have improved since the first month of treatment.

Compliance with the recommendations of ayurvedic food allowed in all cases reducing the amount and duration of menstrual bleeding.

Conclusions Food recommendations are helpful in the medical management of menorrhagia. Such recommendations may be useful in the specific treatment and regimens of other bleeding disorders.

Keywords: *menorrhagia, phytotherapy, diet therapy, Ayurveda.*

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WHAT IS GOOD FOOD?

A. Abrán[1]

This presentation is concerned with the way people make food, taste food and think about food as a part of a healing process or a part of supporting the general well-being of their bodies, and, sometimes, their souls.

My interest in healing foods, or foods as medicines rose as part of a larger anthropology doctoral research I am conducting in Romania, mostly Transylvania between May 2014 and September 2015.

During this research I am carrying out interviews with people making plant based remedies from alternative healers to cultivators and scientists, and observe and participate in people's practices with medicinal plants in places ranging from hidden healing centers to factories. Food plays an important role wherever people make plant based remedies, sometimes food becoming the remedy itself.

What is good food is thus a constant topic of debate.

In this presentation I am going to show what counts as good food, what is good food made of, what is poisonous food and how these are subjected to overlap and controversy.

Keywords: *social anthropology, food, healing, Transylvania.*

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PRACTICAL APPLICATION OF THE PHYTOTHERAPEUTIC POTENTIAL OF SOME INDIGENOUS FRUITS IN DIETARY SUPPLEMENTS ABLE TO AMELIORATE SPECIFIC INTESTINAL AFFECTIONS

C. Luntraru[1], V. Tamas, S. Manea, M. Neagu, C. Nica

On the background of an increasingly unhealthy diet - because of advanced processing and use of a large number of food additives that may cause indigestion, intolerance to certain foods, enzyme imbalance - also of some infections, side effects of some medications, allergies and surgeries, the incidence of intestinal diseases is continuously growing.

In this context, this paper presents a comprehensive study of composition, performed by physicochemical methods, of some fruits known in folk medicine, used in different forms in the amelioration of certain intestinal diseases, especially diarrhea and colitis of various causes.

The studied fruits were: blueberries, blackthorn, blackberries, quinces, buckthorns, Cornelian cherries, cranberries, etc. The results, presented in detail in the paper, indicate the presence of potentially beneficial phytochemicals in the amelioration of various forms of colitis and diarrhea, like: tannins, polyphenols, flavones, procyanidins, mucilage, pectin, enzymes, essential oils, vitamins and minerals that have astringent, anti-inflammatory, antiseptic, antispasmodic, antioxidant, remineralizing, rehydration, enzyme rebalancing and supply of essential nutrients in biocompatible forms, properties.

Based on our good results there will be designed formulas and forms of new dietary supplements that would be helpful in the amelioration of mentioned intestinal disorders.

Keywords: *diarrhea, colitis, fruits, phytochemical compounds.*

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SMALLFLOWER HAIRY WILLOWHERB (*EPILOBIUM PARVIFLORUM*) KNOWN IN FOLK MEDICINE AND RESUMED IN MODERN STUDIES FOR BENEFICIAL EFFECTS IN PROSTATE DISEASES

C. Nica[1], A. Suciu, V. Staicu, V. Tamas

Willow herb has been used over the years for medicinal purposes, in the form of infusion or tea, as a treatment for prostate and urinary problems such as benign prostatic hyperplasia (BPH) or various gastrointestinal disorders such as diarrhea and dysentery; willow herb extract is also recognized for its anti-inflammatory effects.

This paper presents extraction studies, from *Epilobium parviflorum*, of substances with beneficial potential in diseases of the prostate and analysis regarding the presence and content of phytochemicals with anti-inflammatory, antiseptic and anti-tumor properties.

Among the most important compounds are: ursolic acid, oleanolic acid and phytosterols determined by qualitative and quantitative physicochemical analysis (TLC and HPLC); also, we have analyzed the content of polyphenols and flavones, the antioxidant activity, as well as oxidative stress enzymatic profile (SOD, catalase).

The obtained results indicate high levels of bioactive compounds and significant antioxidant activity, which justifies the use of willow herb extracts to reduce discomfort caused by prostate problems and improve the quality of the affected people life.

Keywords: *prostate, phytochemical compounds, ursolic acid, polyphenols.*

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A STUDY ON THE CONTENT OF PHYTOTHERAPIC COMPOUNDS FROM INDIGENOUS *URTICA DIOICA* ROOT THAT MAY HAVE A BENEFICIAL EFFECT IN TREATING BENIGN PROSTATIC HYPERPLAZIA

S. Alexandru[1], V. Tamas, A. Marculescu

Benign prostatic hyperplasia (BPH) is a constant problem in many men over age 60 and often it has its onset about age 40. 50% of men present histopathologic BPH by age 60. [2]

BPH is considered by medical and scientific community to be part of the normal ageing process and it is characterized by an enlargement of the prostate gland that affects the normal flow of urine from bladder by urethral obstruction and bladder outlet obstruction.

There are a number of natural treatments that are used to treat BPH or its symptoms. Besides *Urtica dioica* root (UDR), some exotic plants like *Serenoa repens* and *Pygeum africanum* are extensively used in various formulations alone or combined.

Our study began analyzing several indigenous plants for the purpose of creating a combination of active substances that can synergically have a beneficial effect in treating BPH. Of these, UDR has been used for more than 30 years in various formulations for BPH and some *in vitro* and *in vivo* studies, and also clinical trials had showed positive results.

We analyzed dried UDR from spontaneous flora (marchland area of Bucharest) and different extracts for active substances that may be involved in the beneficial effect on BPH. We found various quantities of beta-sitosterol and stigmasterol – HPLC analysis; polyphenols and free amino acids – UV-VIS analysis.

Studies show that the above chemical compounds and also some polysaccharides, lignans, isolectins and coumarins may play a role in the beneficial effect of UDR on BPH.

Keywords: *prostate, benign prostatic hyperplasia, urtica dioica, natural treatments.*

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CASE STUDY: THE FAVORABLE EVOLUTION OF A UPPER RESPIRATORY TRACT INFECTIONS TREATED WITH APITHERAPY AND PHYTOTHERAPY

D. I. Vasile

Propolis is well studied and recognised for his efficiency in Upper Respiratory Tract Infections, especially tonsilitis and pharyngotonsillitis. Mixing of honey, bee propolis, echinaceea and seabuckthorn fruits combine the antibiotic and antiviral effects of propolis with immunostimulating action of Echinaceea and vitaminizing and mineralizing properties of Seabuckthorn berries. Honey is used to sustain and amplify antiviral and antiseptic actions, also being a valuable energy booster in respiratory infections.

The combination of propolis, echinacea, seabuckthorn and honey was effective in treating Upper Respiratory Tract Infections.

Materials and methodology We used in several cases a mixture of propolis (alcoholic extract), seabuckthorn (dried fruits powder), echinacea (alcoholic extract) and honey. We selected 30 of these cases considering a definite and clear pattern of symptoms relevant for diagnosing Upper Respiratory Tract Infections.

The representative selected simptoms were: upper respiratory tract cattarh, dysphagia, dysphonia, nasal obstruction, dry cough, fever (moderate), hyperemic pharynx without pulpy deposits

17 subjects were treated exclusively using api-phyto-therapy, and 13 of the cases receieved a mixt treatment including conventional and phytoterapeutic treatment.

From the 30 selected subjects, 19 were kids (7 -14 years), and 11 adults.

Daily used dosage was 1/2 tsp 4 times a day for kids and 1 tsp 4 to 6 times a day for adults.

Keywords: *Propolis, Echinaceea, Honey, Seabuckthorn, Upper Respiratory Tract Infections Treatment.*

ENZYMATIC TREATMENTS USED TO IMPROVE POLYPHENOL STABILITY AND CONTENT IN FRUIT JUICES

S. Gavrilas[1], M. D. Stanescu

Introduction The apple and raspberry juice are very good sources of nutrients and antioxidants. The research conducted had mainly focus on improving juices in polyphenols and prevent their early degradation. It is known that the polyphenols oxidation could affect the sensorial proprieties of juices due to haze formation and flavor modification.

Materials and methods

Materials The apple juice was purchased from a food store. The wild raspberry juice was obtained in laboratory conditions.

The total polyphenol content was determined using Folin-Ciocalteu method.

The enzymes used were laboratory obtained (laccase) or commercial (pectinolytic products).

Methods Biosynthesized laccase using *Trametes pubescens* fungus was immobilized on PVA cryogel beats. The commercial apple juice was treated with free and immobilized laccase in order to determine the effect of those on the naturally presented polyphenols.

The wild raspberry juice was treated with varying amounts of pectinolytic products. After the treatment, the juice yield, the total polyphenol content, as well as the flavones and the anthocyanins present were determined.

Results

- The quantity of insoluble polymers formed in apple juice after using immobilized laccase was lower compared with the free enzyme or untreated sample;
- Due to pectonolytic products the increase in raspberry juice quantity achieved 36%.

Conclusions

- The polyphenol content is stabilized by laccase treatment;
- The experimental results evidenced that raw raspberry juice treated with pectinases improved the juice yield and enriched it in polyphenols.

Keywords: *phenols, laccase, pectins, apple and raspberry juice.*

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NEW IMPEDIMETRIC SENSOR FOR OCHRATOXIN DETECTION

M. Badea[1], L. Floroian, P. Restani, A. Vasilescu, C.S.A. Cobzac, M. Moga

In this work, an impedimetric immunosensor for ochratoxin A (OTA) detection, a common toxic botanical contaminant, was developed via the immobilization of anti-OTA antibody on bovine serum albumin modified gold electrodes.

A four-step reaction protocol was tested to modify the gold electrode and obtain the sensing substrate. All the steps of immunosensor elaboration and also immunochemical reaction between surface-bound antibody and ochratoxin A were analyzed using cyclic voltammetry and electrochemical impedance spectroscopy. Modification of the impedance due to the specific antigen-antibody reaction at immunosensor surface was utilized in order to detect ochratoxin A.

Linear proportionality of the charge transfer resistance to the concentration of OTA allows ochratoxin A detection in the range 2.5-100 ng/mL.

When compared with the classical methods, the main difference consisted in the incubation of this immunosensor with OTA followed by the electrochemical measurement containing only the redox probe. In this way, the potential disadvantage coming from using large volumes of OTA solutions is reduced. Moreover, the incubation step, which also is a conventional step ELISA assays, allowed the application of OTA detection in liquorice samples.

Acknowledgement: The writing of this work has received partial funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245199. It has been carried out within the PlantLIBRA project (website: www.plantlibra.eu). This report does not necessarily reflect the Commission views or its future policy on these areas.

Keywords: *ochratoxin detection; impedimetric immunosensor; electrochemical impedance spectroscopy.*

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ANTIBACTERIAL ACTIVITY OF GEOTRICHUM CANDIDUM METABOLITES AGAINST PATHOGENIC BACTERIA

G. Badalyan, K. Grigoryan[1], M. Sargsyan

Introduction *Geotrichum lactis* is one of the prevailing fungi in the dairy industry. Mentioned species are characterized with high energy of growth at big range of pH and temperature. It posses proteolytic and lypolitic activity, thus causes the critical decrease of quality of dairy products at very short time periods.

On the other hand *G. lactis* is widely used in cheese making industry for processing of "camembert" and "brie". Due to high antagonistic activity it prevents the growth of opportunistic pathogenic and pathogenic bacteria in cheese in some measure.

The main objective of the presented work was to investigate the prevalence of *G. lactis* in cultured milk food curd and possibilities of using its metabolites in dairy industry as a biopreservative.

Methods Mycological analysis of curds samples have been carried out according to ISO 6611:2004 (IDF 94:2004).

The antibacterial activity of metabolites of *G. lactis* has been done by well-diffusion method in accordance with (NCCLS, 2003).

Antibacterial activity of metabolites has been performed against *Staphylococcus aureus* ATCC 6538 and *Enterobacter aerogenes* ATC C1545.

Results 30 samples of curd have been analysied and more than 27 strains of *G. lactis* have been isolated. The macro and micro morphological criteria at different selective media were studied. The dynamics of their growth has been studied in modified Chapek-Dox broth (HiMedia, M076) at different temperatures (25, 30,370C) and incubation times.

The maximal synthesis of metabolites which possessed high antibacterial activity occurred at 30^0C on 3rd day of incubation and pH values 3.55-3.60. The correlation between antibacterial activity of the metabolites and presence of special microelements in media has been noticed.

The optimal conditions for producing of metabolites which possessed high antibacterial activity *St. aureus* ATCC 6538 and coliform bacteria have been developed.

Keywords: *curd, G. lactis ,antibacterial activity.*

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RESEARCH REGARDING THE INFLUENCE OF FLOUR EXTRACTION DEGREE ON ACRYLAMIDE FORMATION IN BISCUITS

G. Mustatea[1], M. Negoita, M. E. Popa

Acrylamide (C_3H_5NO) is a chemical compound classified by International Agency for Research on Cancer (IARC) as probable carcinogenic to humans.

Being well known that acrylamide is mainly formed by Maillard reaction in food products containing high levels of carbohydrates, the paper aim is to underline the influence of flour extraction degree as well as asparagine content on the formation of acrylamide in biscuits.

Acrylamide content determination was performed by gas chromatography coupled with tandem mass spectrometry (GC/MS/MS), using isotope dilution calibration after derivatization while the asparagine content was analyzed by ion chromatography with integrated pulsed amperometry.

Asparagine amount in the raw material (flour) seems to be a limiting factor for the acrylamide formation in bakery (biscuits).

The conclusion of our research was that the higher acrylamide amount was determined for biscuits made from flour with higher asparagine content having also higher ash content.

Keywords: *acrylamide, asparagine, biscuits.*

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SCREENING OF PHENOLIC COMPOUNDS, ANTIOXIDANT AND ANTIMICROBIAL POTENTIAL OF ROMANIAN *ORIGANUM VULGARE*

D. Benedec[1], L. Vlase, B. Sevastre, N. Fit, A. C. Mot, R. Silaghi-Dumitrescu, G. Damian, N. – K. Olah, D. Hanganu

Origanum vulgare L. (*Lamiaceae*) from Romania widely used for to promote good health in traditional medicine or as natural food additives was investigated in terms of the polyphenolic composition and its biological activities. The identification and quantification of major phenolic compounds were performed by HPLC-MS and TLC-densitometry methods. The total polyphenols and flavonoids content was spectrophotometrically determined. The antioxidant activity was evaluated using the DPPH bleaching method, TEAC assay, hemoglobin ascorbate peroxidase activity inhibition (HAPX) assay and an EPR (Electron Paramagnetic Resonance) spectroscopy method.

The antimicrobial tests were performed using the disk diffusion method. The phenolic profile showed the presence of phenolic acid derivatives, flavonoid glycosides and free flavonoid aglycones (e.g. rosmarinic acid, rutoside, isoquercitrin, luteolin).

The ethanolic extract of *O. vulgare* contained a large amount of polyphenolic compounds (more than 10 %), and it showed a high antioxidant activity, as witnessed by a number of methods. The antimicrobial tests underlined effectiveness against Gram-positive bacterial and fungal strains.

The results of this study showed that *O. vulgare* extract can be used in the pharmaceutical and food due to its strong antioxidant and antimicrobial properties. Likewise, the phytochemical and pharmacological potential shown, will help to maximize the desired therapeutic benefits of this well known medicinal and aromatic plant. The research was conducted with the financial support of "Iuliu Hațieganu" UMF Cluj-Napoca (research grant: 1494/6/28.01.2014).

Keywords: *Origanum vulgare, HPLC-MS, antioxidant activity, HAPX.*

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THE EFFECT OF CHOSEN FOOD OILS TO SUPPLEMENTATION OF LAST FATTENING PIG PRERIOD ON FATTY ACIDS STRUCTURE IN PIG MUSCUL FAT AND THE CONSUMPTION PREFERENCE

B. Cermak[1], M. Podsednicek, T. Paradovsky, M. Soch, L. Zabransky, M. Ingvortova, K. Pejchova, D. Mnerie, D.Tucu, D. Jirotkova

Fatty acids profile in broilers feed, it is possible to influence their share in a desired structure, which can balance the n-6:n-3 ratio in food, according to the consumers needs. Fota et al (2010). Flax seed to lactating goats can be used as nutritional supplement to reduce saturated fatty acids and increase polyunsaturated fatty acids in milk.

A significant increase in CLA in milk was achieved by suplementation to goats(Ingvortová et al (2013).

In experiment last month of fattening group of pig in five groups of pig was fed with a basal diet, which incorporated various fats (canabis oil-2%, soybean oil-5%, linseed oil-5%, raps oil5%). The indicators (food intake, body weight gain, and the conversion) were established during the experiment, and in the end, the content of essential fatty acids (linoleic and linolenic acids) in pigs meat were determined.

The data, analyzed and statistically interpreted. By the four experimental groups,there are, some variations of the determied fatty acids content in pectoral muscles as well as in breast skin.

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Keywords: *pig, protein and fat structure, food vegetal oils. fatty acids profile, ω-3 enriched foods.*

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FAT CONTENT AND FATTY ACID COMPOSITION OF TRADITIONAL DRY-FERMENTED SAUSAGES COMING FROM CROATIAN HOUSEHOLDS

J. Pleadin[1], D. Kovacevic, A. Vulic, T. Barbir, M. M. Staver, N. Vahcic

The production of traditional dry-fermented sausages mostly takes place in rural households based on the original recipes implemented by the manufacturer. The aim of this study was to investigate into the differences in fat content and fatty acid composition of Croatian traditional dry-fermented sausages produced by a large number of households that resort to a variety of technologies and are situated in four Croatian regions.

The study comprised a total of 84 pork dry-fermented sausage samples collected over a two-year period (2013-2014). Total fat content was determined using the standardized Soxhlet method, while fatty acid methyl esters were determined using a gas chromatography (GC-FID).

The fat content was shown to range from 21.70% to 52.40%, with statistically significant differences ($p < 0.05$) across the producing households. The results of fatty acid analysis showed the highest representation of oleic acid (C18:1n-9C), followed by palmitic (C16:0), stearic (C18:0) and linoleic (C18:2n-6) acid. Out of the total fatty acid esters identified, SFA accounted for 42.86±3.86%, MUFA for 46.11±4.27% and PUFA for 11.03±1.12%.

The percent-share of fatty acids of the n-6 and n-3 group was 9.07±0.89% and 1.96±0.23% of the total PUFA, respectively, the ratios thereby being the following: n-6/n-3, 4.63±0.71; MUFA/SFA, 1.08±0.11; and PUFA/SFA, 0.26±0.07. The revealed sausage composition is typical of pork meat products; however, the fatty acid content and SFA, MUFA & PUFA representation significantly varied ($p < 0.05$) across the producing households. Substantial variations in fat content and fatty acid composition can be attributed to the differences in the amount of added fatback and the fatness of the stuffing meat, as well as to the differences in technological processes implemented by individual manufacturers.

Keywords: *fat content, fatty acid composition, traditional dry-fermented sausages, Croatian households.*

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INVESTIGATION INTO THE NITRATE AND NITRITE CONTENT IN CROATIAN INDUSTRIAL MEAT PRODUCTS

J. Pleadin[1], D. Kovacević, A. Vulic

Nitrates and/or nitrites are widely used as additives in the meat products' manufacturing, so as to obtain their specific sensory properties, stability and safety; in the process, the growth of *Staphylococcus aureus* and *Clostridium botulinum* spores gets to be inhibited, as well. However, traditional nitrate & nitrite use in the meat industry is being questioned due to their involvement into the formation of nitrosamine, shown to have carcinogenic properties.

On top of that, meat products are being recognized as important sources of microorganisms frequently causing human food-borne diseases. In this study, residual sodium nitrate and nitrite levels were determined in marketed meat products throughout a four-year period (2011-2014) using enzymatic spectrophotometric methods, so as to estimate their safety and gain insight into the differences in nitrate/nitrite levels in products coming from various meat production plants. In total, 448 samples of dry, thermally processed sausages (n=410) and semi-dry and dry-cured meat products (n=38) produced by different Croatian meat production plants were sampled.

The average sodium nitrate content determined in dry-fermented sausages and dry-cured meat products was 130±72 mg/kg and 64±43 mg/kg, respectively. Sodium nitrite content increased in the following manner: 7±4 mg/kg (dry-fermented sausages), 24±16 mg/kg (semi-dry meat products), 37±23 mg/kg (dry-cured meat products) and 42±21 mg/kg (semi-dry sausages), so that significant differences ($p < 0.05$) *per* product groups and production plants were demonstrated.

When compared against the maximum permitted levels (MPLs), nitrite and nitrate levels were higher in two semi-dry sausage (109 mg/kg and 115 mg/kg, respectively) and one dry-fermented sausage sample (315 mg/kg). The study results impose the need for a continuous control of residual nitrate/nitrite levels in final products placed on the market, elucidation of conditions favouring nitrosamine formation and identification of technological procedures capable of reducing the use of these additives in the meat industry.

Keywords: *nitrite, nitrate, meat products, maximum permitted levels, Croatian meat production plants.*

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THE IMPACT OF RIPENING LENGTH AND CASING DAMAGING ON MYCOTOXIN CONTAMINATION OF DRY-FERMENTED SAUSAGES

J. Pleadin, D. Kovacevic[1], N. Kudumija

Meat products such as dry-fermented sausages may contribute to the entry of mycotoxins into the human body. Aflatoxin B_1 (AFB_1) and ochratoxin A (OTA) may enter this type of product due to the natural contamination of feedstuffs and consequent contamination of pork meat used as a raw material. The contamination may also arise on the grounds of contaminated spices or toxin production by moulds of the *Aspergillus* and *Penicillium* genera that spontaneously overgrow the sausage surface during a long ripening period.

The aim of this study was to investigate the impact of ripening length and casing damaging on AFB_1 and OTA production during a six-month ripening. In total, 33 samples of dry-fermented sausages were produced in a controlled household environment according to traditional recipes. Both intact and damage casing samples were retrieved prior to ripening and once a month during a six-month ripening period. Quantitative determination of AFB_1 and OTA was performed using validated ELISA immunoassay methods. Whereas with intact casing sausages no contamination had been observed throughout the production process, statistically significantly different ($p < 0.05$) concentrations of AFB_1 (1.62 – 3.52 µg/kg) and OTA (2.07 – 11.15 µg/kg) were observed with the damaged casing products at the ripening months 5 and 6, with the maximal values seen in the ripening end-phase (month 6).

The results show that casing damaging occurring during a long-term ripening may result in mycotoxin entry from the dry-fermented sausage surface into the product's interior, imposing therefore the need for casing preservation in each and every production stage via the HACCP implementation and for the continuous removal of moulds from the product surfaces, all of that to the end of minimizing the risk of mycotoxin contamination of the final product.

Keywords: *mycotoxins, ochratoxin A, aflatoxin B_1, dry-fermented sausages, ripening period, casing damaging.*

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COMPARATIVE STUDY OF THE MINERAL COMPOSITION OF BEEF STEAK AND PORK CHOPS DEPENDING ON THE THERMAL PREPARATION METHOD

G.V. Goran[1], L. Tudoreanu, E. Rotaru, V. Crivineanu

Introduction Red meat is an important source of vitamins B, minerals and in particular iron and zinc. Beef is one of the richest natural sources of dietary zinc and iron. Thermal preparation can lead to minerals and vitamins loss and thus to the decrease of meat nutritional value. Moreover it can lead to changes in the fatty acid composition due to lipid oxidation.

Aims and objectives This study focuses on the effect of three different thermal preparation methods on the mineral concentrations of beef and pork as well as on the comparison between beef and pork meat.

Materials and methods In this study, beef rib eye steak and pork loin samples were selected and analyzed. Minerals concentrations in row and cooked (boiled, roasted in the oven, microwaved) beef and pork meat were analyzed by ICP-OES.

Results The results showed that for the beef meat, thermal preparation influenced the concentrations of Al, Ba, Be, Bi, Ca, Cr, Cu, Fe, K, Li, Mn, Na, Sr, Zn, compared to raw beef. In general, no significant differences between thermal preparation methods were observed for the pork meat. However thermal preparation clearly decreased minerals concentrations in cooked samples compared to raw meat. The highest mineral concentration was identified in the samples cooked in the oven. Trace elements concentrations in beef rib eye steak were significantly higher compared to pork loin.

Conclusions. The concentration of trace elements in beef rib eye steak were significantly higher compared to pork loin. In beef, sodium concentration decreased in all samples, suggesting that sodium is lost with water. Zinc is mainly linked to proteins therefore it is susceptible not to be released from the protein structure during thermal preparation which has been confirmed by the study results. The percentage of water loss during the microwave thermal preparation for pork samples was higher than the two other treatments.

Keywords: *beef rib eye steak, pork loin/chops, minerals, thermal preparation.*

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COMPARATIVE STUDY OF THE MINERAL COMPOSITION OF LAMB LIVER AND KIDNEY DEPENDING ON THE THERMAL PREPARATION METHOD

G.V. Goran[1], L. Tudoreanu, E. Rotaru, V. Crivineanu

Introduction Romanian traditional cuisine uses widely lamb offal and are considered to be an important dietary source of minerals. However, traditional produces containing lamb offal might pose a risk for consumers due to the possible presence of Cd and Pb in offal. Moreover thermal preparation may decrease minerals' concentrations and may increase toxic metals (Pb and Cd) concentrations.

Aims and objectives This study main goal was to determine the effect of thermal preparation methods on the minerals concentrations in lamb liver and kidneys.

Materials and methods In this study, liver and kidney samples from lambs were selected and analyzed. All samples were cooked in cooking plastic bags in boiling water (no water contact), roasted in the oven, and in the microwave oven. The raw and cooked samples were analyzed by ICP-OES and minerals concentrations were recorded

Results The thermal preparation influenced all studied mineral concentrations. Minerals concentrations were slightly increased, showing a significant difference between microwave cooked samples and to raw samples. Generally, the thermal preparation induced no significant differences in offal macro minerals' concentrations. However the concentration in Fe and Zn increased for the microwave cooked samples compared to raw samples. Moreover Cu concentration of microwave cooked samples decreased compared to controls.

Conclusions Trace elements concentrations in kidney samples were lower compared to liver samples. In both organs, cooking methods did not lead to significant differences of macro minerals concentrations. Insoluble minerals such as Zn and Fe are linked to proteins and therefore they do not drain from the samples' tissues during cooking. However this is not the case for Cu from kidney samples. The minerals concentrations in the microwave cooked offal samples were higher than the minerals concentrations from samples cooked by convective and conductive heat.

Keywords: *lamb, liver, kidney, minerals, thermal preparation.*

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EFFECT OF MODIFIED ATMOSPHERE ON SELECTED QUALITATIVE ASPECTS OF COMMERCIAL FRUIT JUICES

M. Polovka[1], B. Tobolkova, E. Belajova, J. Durec

Fruit juices belongs to the most popular drinks worldwide. Increasing consumers demands towards high quality and safe food products push their producers to increase the production and qualitative standards of the products. Recently, innovations in juices production resulted in modification of production conditions and also inovations in packaging materials in order to maintain the maximum of nutritional quality and valuable components, and to prolong the shelflife and sensorial quality.

It is presupposed, that the production atmosphere may influence all these qualitative factors, as well. In this contribution, the effect of modified production atmosphere application (nitrogene, argon, CO2) on selected qualitative parameters of fruit juices (antioxidant properties, content of ascorbic acid, total polyphenols, selected flavonoids and colour characteristics) in comparison to juices produced upon typical oxygene atmosphere was evaluated by EPR, UV-VIS and HPLC. Besides the effect of production atmosphere, also the effect of long-term isothermal storage on changes of these parameter was considered during the whole expiration period and 2 months after the expiration date.

Results obtained clearly indicated significant influence of production atmosphere on the monitored qualitative parameters, proving that replacement of oxygen by innert gases prolongs signíficantly the juices shelflive. Kinetic study of the changes of the monitored parameters upon the storage period indicate the retardation of their decrease as a result of inert atmosphere application in dependence on type of production gas. In case of CO2 application, even the chemisorption was observed, accompanied by the acidity modification resulting thus by significant modification of majority of the monitored characteristics in comparison to those observed for other gases applied.

Inert gases could improve the quality of fruit juices, however the application of certain gas is the compromise of expenses on technology modification, gas. Factors including potential physical and\or chemical interactions of gas with juice components should also be considered.

Acknowledgement.This work is a partial study of the research project "Improvement of nutritional and sensorial parameters of fruity and vegetable drinks via an inert gases application - ITMS 26220220175" implementation, supported by the Research & Development Operational Programme funded by the European Regional Development Fund.

Keywords*: juices, quality, stability, production atmosphere, EPR, UV-VIS, HPLC.*

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SENSORY PROFILE OF FRUIT AND VEGETABLE JUICES – ATTRIBUTES RELATED TO SHELF-LIFE

Z. Ciesarova[1], K. Kukurova, J.Sadecka, J. Durec

Fruit and vegetable pulp juices produced from fruit and vegetable under controlled air atmosphere and pasteurized prior packaging were undergone to sensory analysis before and after a shelf-lifedate in order to identify main attributes connected with ageing of these products.

Eight different kinds of juices were involved in the study: orange, apple, pear, pineapple, peach, strawberry, apple-beetroot, and vegetable mix. Method of quantitative descriptive analysis (QDA) was used to describe the sensory characteristics of the samples by a trained panel numbering eight assessors per two independent sessions. Each product was described in a brainstorming initial phase of the experiment with the aim to create its sensory profile.

Sensory analysis was conducted by visual observations such as colour description, consistency, homogeneity and sedimentation, followed by in-depth flavour description.The main effort was focused onan identification of changes in odour and taste descriptors, off-flavour occurrence, aftertaste and overall sensory impression. During storage of juices significant differences were determined in colour darkening (formation of brown or disappearing of red pigments), loss of colour brightness, lack of freshness perception in odour, changes in flavour, mitigation of taste and aftertaste intensity and harmony, as well as overall sensory impression in general.

A map of desirable and undesirable perceptions can help identify the beginning of juice ageing without anyinstrumentation.

Keywords: *fruit juices, vegetable juices, sensory profile, shelf-life, ageing.*

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THE IMPACT OF CONTAMINATION WITH NOSEMA SSP. SPORES ON HONEY OBTAINED BY APIS MELLIFERA CARPATHICA

V. Savu[1], A. Sapcaliu, C. Mateescu, I. Radoi

Nosema is a parasitic disease that affects old honey bees. It is produced by ubiquitous and opportunistic germs of Nosema spp., coupled with huge losses of honey bees within colonies (by depopulation), and reducing of honey production. In Romania, Nosema was officially admitted as being produced by two species of Nosema (Nosema apis and Nosema ceranae).

The aim of our study was to establish a possible correlation between the honey naturally infested with spores of Nosema spp. (from families diagnosed positive), and the quality of honey used for human consumption. The study was performed on 65 honey samples received from private apiaries, of which 40% of them were taken and analyzed (26 positive samples). Various microscopic analyzes, organoleptic and physicochemical on the properties of honey samples were made.

The results showed us that there were significant changes in the honey quality correlated with the degree of its natural pollution.

We were found that the honey samples with more than 5 spores of Nosema spp./experimental field have presented serious deterioration in terms of organoleptic and physical-chemical properties. We grouped honey samples (26 samples) into 3 categories, according with their physicochemical and organoleptic changes. These changes in the honey quality have a negative economic impact on the use of bee products, and on health of bee families, too.

Acknowledgements: The research was supported by project **PN 108/2012**/"Studies on the preparation and testing of an apiphytotherapeutical product for veterinary use "NOSEMA-API" for the treatment and prophylaxis of Nosema disease in bee families"

Keywords: *Apis mellifera, honey bee, quality, Nosema spp. spores.*

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VEGETABLE OILS AND OILY EXTRACTS CHARACHTERISATION WITH PERFORMANT TECHNIQUES

N. Ionescu (Bordei)[1], M. Popescu, V. Tamas

The main purpose of this study was to evaluate the importance of some vegetable oils compounds obtained by cold pressing. The vegetable oils such as: rosehip (*Rosa canina*), flax (*Linum usitatissimum*), hemp (*Cannabis sativa*), amaranth (*Amaranthus caudatus*), safflower (*Carthamus tinctorius*) and seabuchthorn (*Hippophae rhamnoides*), coming from plant seeds grown on organic soils , were used to obtained the carrot concentrated extracts.

To highlight the essential fatty acids was used the technique of gas chromatography coupled with mass spectrometry (GC-MS).

The most significant methods for the analysis of carotenoids from the carrot extracts were molecular absorption spectrophotometry UV_VIS and high performance liquid chromatography (HPLC).

The carrot extracts will be used to synthesis nanostructured lipid carriers (NLC), in order to obtained new formulation of anti-acne cosmetics.

Acknowledgement The results were obtained with the support of the Ministry of European Funds through the Operational Programme *Human Resources Development 2007-2013, Contract no. HRD/ 159 / 1.5 / S / 132397.* The work was also supported by a project of the Ministry National Education, UEFISCDI, project number PN-II-PT-PCCA-2013-4-1761 (no. 204/2014) and Hofigal company

Keywords: *vegetable oils, oil extracts, GC-MS, HPLC, UV-VIS.*

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UNDERSTANDING THE RESTAURANTS CUSTOMERS.FOOD CHOICES AND BUSINESS IMPLICATIONS

I. C. Enache[1], R. Gruia

The paper aims at developing the knowledge base related to hospitality business customers by analyzing the customer satisfaction in relation to perceived food quality and characteristics.

The customer satisfaction is a strong predictor of customer retention, image and word-of-mouth. Understanding the impact of food quality and characteristics on restaurant perception is a key step to customer satisfaction.

A quantitative method is used to assess the customer perception and a fuzzy logic model gives a better representation of the results. It is also argued that cuisine and restaurant size have a statistically significant impact on restaurant perception.

The article presents only part of the results of a larger study on customer behavior and satisfaction in relation to Braşov restaurants.

Keywords: *hospitality business, customer satisfaction, restaurant perceptions, food quality.*

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QUALITY PARAMETERS OF WHEAT BREAD ENRICHED WITH PUMPKIN (*CUCURBITA MOSCHATA* DUCHESNE EX POIRET) BY-PRODUCTS

S. Kampuse[1], L.Ozola, E.Straumīte, R. Galoburda

Pumpkin processing into puree, juice, candied fruit and pumpkin seed oil results in large amount of by-products. Pumpkins are rich in carotenes, vitamins, minerals, pectin and dietary fiber. Some earlier studies revealed that pumpkin incorporation in wheat bread would improve its nutritional value and quality characteristics. There are only few studies on pumpkin by-product use in bread making.

The aim of the current study was to evaluate effect of fresh pumpkin pomace and pumpkin residue powder on wheat bread quality. Bread was made according to the traditional technology, incorporating into dough 5%, 10%, 20% of dry pumpkin residue powder made from pomace, skin, seeds, and pulp located among seeds or 10%, 15%, 20%, 30%, 40%, or 50% of fresh pumpkin pomace obtained as a residue after juice production. The total content of carotenes was analyzed by spectrophotometric method (UV/VIS spectrophotometer Jenway 6705) at 440 nm.

The initial increase of pumpkin residue additive indicated increase in loaf volume, which started to decrease at higher amounts (20% for powder and 40-50% for pomace). Sensory evaluation (appearance; surface, crust; porosity; texture, crumb; taste, and flavor) of wheat bread with pumpkin revealed very high consumer acceptance except sample with 50% pomace additive. Total carotene content and color b* value in wheat bread increased by adding pumpkin by-products.

The carotene content in the sample with 20% pumpkin residue powder was 2.21 mg 100 g $^{-1}$ DW, in the sample with 50% pumpkin pomace it was 0.85 mg 100 g $^{-1}$ DW, which was significantly higher ($p<0.5$) than its content in control sample - 0.07 mg 100 g $^{-1}$ DW. It is recommended to add 5% and 10% of pumpkin powder and no more than 30% of pumpkin pomace to dough for production of wheat bread with pumpkin by-product additives.

Keywords: *pumpkin by-products, pomace, total carotenes, porosity, texture.*

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EVALUATION OF THE INFORMATIONAL QUALITY OF FOOD BY SENSITIVE CRYSTALLIZATION

C. D. Cimpean[1], C. Hotiu

Introduction It is well known that the growth of crystals results, when the growth is slow, in well defined macro-crystalline forms (e.g. quartz). The pure hydrated cupric chloride crystallizes in 100 mm - Petri dishes as very small grains of fine needles, without any dendrite-like shape. The organic additive has an inhibiting effect on the nucleation generation, amplifying the crystal volume few thousand times, the crystals are growing in three concentric circles generated by the radial growth of the dendrites formed from the initial growth point. This phenomenon can be used as well as a morphogenetic qualitative method for analyzing the biological informational quality of the added additive. In the food and dietary supplement industry the sensitive crystallization method can be used as quick and qualitative analysis method and it is one of the few methods that allow analysis of information quality.

Materials and methods In this paper we present the using of the method of sensitive crystallization for qualitative analysis to determine the information quality of some samples of bee products (honey, dried and raw bee-pollen, royal jelly).

Results With this method, the fine differences may be measured as the information between different types of honey and bee-pollen, and can be considered to have influence on the quality information bee products on various factors such as the drying conditions, storage temperature and even of informational non-physical factors (prayer) which under certain conditions can cause informational regeneration of bee products.

Conclusions Sensitive crystallization method has already become a useful tool in the food-quality, serving both producers and consumers adds the information dimension to food-quality.

Keywords: *sensitive crystallization, informational quality, qualitative morphogenetic analysis.*

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THE INFLUENCE OF COOKWARE ON THE CONCENTRATION OF TRACE METALS AND LIPID PEROXIDATION IN PORK MUSCLE

C. Papuc[1], I. Chera, C. Predescu, V. Nicorescu, I. Gajaila, G. V. Goran

To assess cookware's influence on the concentration of essential and non-essential trace metals and on the lipid peroxidation processes in pork muscle during heat treatment, meat samples were cooked without the addition of oil, salt or spices, at a temperature of 200°C ± 2°C for 50 minutes, in pans made of aluminum, ceramic-coated aluminum, brass and stainless steel. Fe, Cu, Zn, Mn, Sn, Cr, Ni, Ti, Al, Pb, Cd and U in samples were subsequently determined by optical emission spectrometry (OES). In order to assess the intensity of lipid peroxidation, peroxide value (PV) and thiobarbituric acid reactive substances (TBARS) were determined by colorimetric methods.

Compared to control samples (uncooked meat), trace elements' concentrations were significantly ($p<0.05$) higher in meat samples cooked in: aluminum pans – Mn, Sn, Ti and Al, ceramic-coated aluminum pans – Sn, Ni, Cr, Ti and U, brass pans – Fe, Cu, Zn, Mn, Sn, Ni, Cr, Ti, Al and Pb, stainless steel pans – Sn, Ni, Cr, Ti and Al. PV was significantly ($p<0.05$) higher in samples of meat cooked in ceramic-coated aluminum pans and significantly ($p<0.05$) lower in samples of meat cooked in all other cookware. TBARS values were significantly ($p<0.05$) higher in all meat samples, regardless of the cookware's type.

The results showed that trace elements' concentration and the intensity of lipid peroxidation in cooked meat significantly ($p<0.05$) depend on the cookware's type.

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Keywords: *pork muscle, trace elements, peroxide value, TBARS.*

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COLD ATMOSPHERIC PLASMA (CAP) TREATMENT AS AN INACTIVATION METHOD OF DIFFERENT SPORES: INACTIVATION KINETICS AND FOOD APPLICATION

I. Smeu[1], D. Martinet, C. Ellert, M. Beyrer

Introduction The need for enhancing the safety of food powders has increased the interest in chemical-free and low temperature innovative technologies, such as CAP treatment.

The objective of this studywas to compare the inactivation kinetics of various types of spores to direct CAP and to use these results as reference for spores partially protected by incorporation into a food powder.

Materials and methods Spores of *B. subtilis, B.coagulans, G. Stearothermophilus* and *P.nalgiovense*were distributed on glass slides or incorporated in agglomerated starch particles and plasma treated for 0 to 240 s.

The used equipment was a dielectric barrier discharge plasma device operated at atmospheric pressure with air as working gas. sPlasma generated spectrum was analysed and inactivation kinetics as a function of specific power input were determined.

Results Most efficient inactivation on glass slides was observed for *B. coagulans*, 1.8 to 3.3 $\log_{10}$, from 5 to 240s (e.g. $D_{25°C\ (P=30W)}$=0.05min), followed by *P. nalgiovense*, *G. stearothermophilus* and *B. subtilis* (e.g. $D_{25°C\ (P=30W)}$=2min). Observed effects of spore inactivation in starch powder were different.

Conclusions High levels of spore inactivation can be achieved by CAP treatment, which also shows a possible commercially applicability for the food industry. Nevertheless, further studies are needed in order to increase its efficiency by shorter treatment time or higher power inputand to obtain a continuous process.

Keywords: *plasma, inactivation, spores, food powder.*

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PLASMIN DIGEST OF αS-CASEIN, AS A SOURCES OF ANTIBACTERIAL PEPTIDES

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This study evaluated the antibacterial properties of plasmin digest of bovine αs-casein (PDαs).Plasmin, αs-casein, nisin and PDαs were tested in vitro abouttheir antibacterial activityagainst pathogenic (*Escherichia coli* and *Staphylococcus aureus*) and probiotic (*Lactobacillus casei* and *Lactobacillus acidophilus*) bacteria.

The antibacterial activitiesof target compounds were evaluated by turbidimetry in broth culture. After enzymatic treatment, the antimicrobial potential of bovine αs-casein was improved.We have demonstratedthat αs-casein and plasmin had no antibacterial activity, PDαs and nisin showed antibacterial property against the tested bacteria.

Determination of the minimum inhibitory concentration(MIC) and minimum bactericidal concentration (MBC) of PDαsrevealed that Gram-positive bacteria are generally more sensitive to antibacterial compounds than Gram-negative bacterium. The growth curves alterations of target bacteria in the presence of PDαs were evaluated by turbidity in broth culture.

The effect of differentconcentrations of PDαs on the maximum absorbance, lag phase and slope of tested bacteria was statistically significant (p=0.0).Plate count confirmation of tested bacteria was restricted in the presence of PDαssimilar to growth curves. Their deterrent effects depended upon their concentrations, higher concentration revealed stronger antibacterial activity.

The maximum inhibitory effect of PDαs was created in MIC concentration and during the log phase. The results showed that PDαs with antibacterial potential can be considered as neutral antibacterial agent in the food chain.

Keywords: *Bovine; αs-casein; Antibacterial; Plasmin; Growth curve.*

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RESEARCH ON DETECTION OF PAHS IN SAMPLES OF MEAT AND SMOKED MEAT PRODUCTS, THE VALUES OBTAINED, THEIR PRESENCE AND SIGNIFICANCE ON HUMAN HEALTH

G. Puchianu[1], I. A. Dogaru, A. Mărculescu

During the period: 20/11/2013 - 20/06/2014 in Brasov LSVSA were analyzed a total of 28 samples of smoked meat and meat products for the PAH's detection. Sampling was conducted in accordance with Regulation EC 333/2007.

The detection method used was liquid chromatography with fluorescence detector - HPLC (High Performance Liquid Chromatography) which is a qualitative analysis method used in biochemistry and analytical chemistry for separation, identification and quantification of compounds.

The values obtained were between 0 and 1.70 mg / kg for benzopyrene and 0.31 mg / kg - 9.06 mg / kg for 4 PAH amount. However, they are less than the maximum permissible levels specified by the regulation.

The maximum value obtained for benzo (a) pyrene was 1.70 mg / kg smoked tenderloin and the maximum admissible value is 5.0 mg / kg (- 3 3 mg / kg), and for the sum of four PAHs, the maximum value obtained was 9.06 mg / kg smoked pork, and the maximum admissible value of 30.0 mg / kg (- 20.94 mg / kg).

Even if the values obtained are within limits of admissibility, smoked meat and meat products must be assessed and controlled, and the setting of maximum levels for benzo (a) pyrene are extremely important because they are designed to protect the public health.

Key words: *Policyclic aromatic hydrocarbons, benzo pyrene;*

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RESEARCH ON MICROBIOLOGICAL QUALITY AND PHYSICO - CHEMICAL AZUGA SPRING WATER AND EXPLOITATION OF RESULTS OBTAINED BY IDENTIFYING POTENTIAL HEALTH BENEFITS TO CONSUMERS

Ghe. Puchianu[1], V. Padureanu, D. V. Enache, V. Necula

Between 2013 - 2014 the SC Azuga Watters SRL were taken a number of 98 samples of spring water. Sampling was performed at different stages of technological process: when the draw before and after filtration and bottling.

Samples were examined in terms of microbiological and physico - chemical (chemical parameters and indicators) by the Institute of Research - Development for Industrial Ecology - ECOIND Bucharest - Pollution Control Department.

To perform microbiological examinations and physical - chemical were USING standardized methods, interpretations being made by raporatre values and maximum allowed concentrations in Law 458/200, as amended by Law no. 311/2004 on drinking water quality and GD 1020/2005 - technical rules for the operation and marketing of natural mineral water source and bottling.

Results of laboratory microbiological and physico - chemical, showed values below the limit of detection methods or below the maximum allowable concentrations. Some of the values obtained can recommend Azuga spring water, as with beneficial effects on consumer health, as follows: pH: 6.37 to 8.29, with mean values biggest source Park II, may confer a stimulating effect on various digestive functions; Magnesium -: 4.38 -9.5 mg / l, with the highest average values Cărbunari source can have a diuretic effect due to their rapid resorption, favoring the elimination of uric acid increased; Sodium: 0.91 to 13.8 mg / l, with the highest average values ear sources Park I and III, corresponding to a low-sodium diet and can be consumed by people with hypertension, et.

Key words: *Spring water (spring water, L'eau de source, Quelle Waser), concentration, resorption;*

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MISIDENTIFICATION OF *TORQUE TENO VIRUS* IN MEAT FOOD PRODUCTS FROM ROMANIA USING DIFFERENT SETS OF PRIMERS

S. Spandole[1], L. M. Berca, M. Adascalului, O. M. Niculae, S. Cristea, G. Mihaescu, D. Cimponeriu

Brief introduction Torque teno viruses (TTVs) are newly discovered infectious agents found in human and animal hosts. TTVs are highly prevalent in healthy individuals world-wide, as well as in farm and wild animals. Few studies investigated the presence of TTV DNA in food and, to our knowledge, there is no study assessing the possibility of using TTVs as viral markers for food safety and quality assessment.

The purpose of this study was to test whether human TTVs DNA is present in industrially processed meat products.

Materials and methods For this study, 160 meat products (e.g. ham, salami, baloney, unprocessed meats) were collected from retailers or Romanian industrial producers and DNA was extracted using SureFood®Prep (R-Biopharm). SureFood® Animal QUANT (R-Biopharm) was utilized for real-time quantitative detection of beef, pork, chicken and turkey DNA.

The DNA of human anelloviruses was identified by PCR using different primer sets originating in both codifying and untranslated (3' and 5' UTR) regions. Validation of results consisted of sequencing amplicons with distinctive band patterns.

Results Using codifying region primers, no specific amplicons were detected in any of the samples. PCR with 5' UTR primers detected TTV and TTMV DNA with high prevalence; however viral sequences were not confirmed by sequencing any amplicons resulted from this study. The sequences obtained were similar to regions from pig, chicken, turkey and bacterial genomes. These species were found on the labeling of the products from which the amplicons were obtained and were confirmed by RT-PCR.

Conclusions The primers used in our study may not amplify specifically viral DNA in certain circumstances, such as those when complex mixtures of DNA (e.g. food-purified DNA) are used as template. Further investigations are needed for determining whether TTVs could be viral markers for animal-sourced foods quality assessment.

Keywords: *TTVs, viral bio-indicator, food quality assessment.*

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SOME CONSIDERATIONS ON THE MILK'S BEHAVIOR IN THE LYOPHILIZATION PROCESS

D. Mnerie[1], G. V. Mnerie, D. Tucu, B. Cermák

The need for milk preservation in safety conditions for public health, has led the development of a true industry. The lyophilization process it has many advantages over other methods. To ensure a very good quality of milk lyophilized powder it is necessary an optimum technological design and respecting hygienic design principles, without risking of the contamination due to negative effects from work equipment.

Material and method For to investigate the behavior of milk during lyophilization were conducted laboratory experiments using dedicated equipment located in three research centers from Romania, Czech Republic and Hungary. Also, were used special devices for to create similar conditions with industrial applications, including sequential monitoring of the process. The experiments followed the drying performances, the temperature variations inside of milk, the behavior of milk into contact with 5 different types of metal materials that may come into contact during the industrial lyophlization. Experiments were repeated using more milk with different origins.

Result and discussions The results highlight the moving of the sublimation front in a different way, in relation with the milk characteristics. It was also analyzed the influence of metallic materials which were in contact with milk during the lyophilization process. It was noted changes of both the quantities of nutrients and heavy metals. Also, highlights the data that reflect certain changes of neutral lipid and heavy metals concentrations due in the contact of food with different metal alloys during lyophilization process. It confirms once again the risk of contamination of food when the trays are by aluminum alloy, low alloy steel or brass. A comparative study was made on the milk powder quality relative to the metallic material use for manufacturing of the trays as support for milk during the process, resulting better performance for the manufactured trays of austenitic stainless steel.

Conclusion The milk lyophilization can be perfectible being an optimum technical solution for each kind of milk. It is possible to monitoring the lyophilization process for obtain a good quality, without negative effects or some contaminations. For the construction of the drying trays, using as milk support in lyophlization process is recommended to make by austenitic stainless steel. For an easy cleaning and reduced etching after every use is recommended the surface with very fine roughness. However it is more advantageous to design of a special composite material resistant to thermal cycle and at low pressure applications, specific for lyophilization technology, and with a sufficient mechanical resistance**.**

Key words: *milk, lyophilization, sublimation front, neutral lipids, heavy metals.*

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THERMAL LOAD AS A CHARACTERISTIC VALUE FOR QUALITY CHANGES OF AIR DRIED FOOD

A.-M. Nunez Vega, S. Arendt[1], W. Speckle, W. Hofacker

Besides energy efficiency, product quality is gaining importance in the design of drying processes for sensitive biological foodstuffs. The influence of drying parameters such as air temperature, air velocity and dew point temperature on the drying kinetics of apples has been extensively investigated, but the information about effects on product quality available in the literature is often contradictory. Furthermore quality changes obtained applying different drying parameters are usually hard to compare. As most quality changes can be expressed as zero, first or second order reactions and mainly depend on drying air temperature and drying time, it would be desirable to cross-check the results in function of these two parameters.

Materials and Methods This paper introduces a method of quality determination using a new reference value, the cumulated thermal load. It is defined as the time integral of the product surface temperature and improves the comparability of quality changes obtained by different experimental settings in drying of apples and tomatoes.

Results It could be shown that quality parameters like colour changes and shrinkage during apple drying and the content of temperature sensitive acids in tomatoes vary linearly with the integral of temperature over time. This allows reducing the influence of other drying parameters such as humidity or air velocity to their impact on drying time.

Conclusions The new approach allows for easy determination of risc for product quality changes due to heat treatment. Even if the conservation process is influenced by other process parameters, it is possible to predict the quality changes.

Keywords: *convective drying, product quality, quality determination.*

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QUALITY ANALYSIS OF FRESH AND DRIED TOMATOES

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Dried agricultural products with high content of ascorbic or other organic acids are desired because of their health-promoting effect. However, the content of organic acids changes during the conservation process. But it shouldn't be changed drastically because they define the flavor of tomatoes and the quality of the product.

In this study the quality criteria of fresh and dried tomatoes, their content of ascorbic acid and organic acids, like citric, malic and lactic acid were analyzed. The analysis was carried out with a HPLC, using tomatoes dried with an experimental Thin-Layer-Dryer, at 40, 60 and 80 °C and at different dew-points (10 °C, 15 °C, 30 °C). In these experiments the air flow was kept constant at 1 m/s. During the drying process the water content, the temperature and the color of the tomatoes were determined continuously.

Results For fresh tomatoes almost constant values were detected with due regard to natural variations. It could be shown that concentrations of ascorbic and citric acid in dried tomatoes decrease if the drying-temperature is low and long drying-times are required. Malic acid behaves conversely, the concentration increases if the drying-temperature is minimized. This shows that duration of the process and process temperature cause contrary effects. Lactic acid could hardly be detected, both in dried as well as in fresh tomatoes. Furthermore it could be shown that the texture of the samples has big effect on the extraction-performance. It is necessary to pulverize dried as well as fresh tomato-samples before extraction to extract the sub- stances in a reproducible manner.

Conclusion Finally it can be concluded that not only the used drying-temperatures influence the quality of dried tomatoes but also the duration of the drying process. The presence of degrading substances as oxygen seems to plays an important role. This results lead to the conclusion, that the drying process of tomatoes can be optimized for two different objectives: on one hand, to maintain the content of citric acid by using a fast, high temperature pro- cess, or, on the other hand, to maintain other valuable substances by using a low temperature long duration process.

Keywords: *convective drying, product quality, quality determination.*

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ANTIMICROBIAL EFFECT OF CHITIN NANO-FIBRILS IN INNOVATIVE FORMULATIONS FOR FOOD PACKAGING MATERIALS

J. T. Rosnes[1], L. Shinde, M. Sivertsvik, G. Tishchenko, M.B. Coltelli, P. Cinelli, A. Lazzeri, P. Morganti

Introduction Smoked salmon is normally vacuum packaged and if bacterial growth at the fish surface-packaging film interface could be delayed, increased product shelf-life could be possible. The present work reports on experiments in which various chitosan-based antimicrobial films were applied onto the surfaces of vacuum-packed smoked salmon products. Chitosan has been proved to be nontoxic, biodegradable, biofunctional, biocompatible and have antimicrobial characteristics. The abilities of the films to retain included antimicrobial substances and to inhibit the growth of indigenous spoilage bacteria were examined. Total viable counts, H2S-producing bacteria, psychrotrophic bacteria and lactic acid bacteria were investigated.

Material and methods Smoked salmon was purchased in a supermarket, and were cut into pieces of about 20 – 25 g. The pieces were wrapped in bioactive films, packaged in plastic pouches, vacuumed (99.5 %) and stored at 4 ^{o}C for 13 days.

The n-Chitopack materials tested was casted films from mixtures of chitosan and chitin nano-fibrils, CS/NC-PLA or CS/NC-PGPR film material of PLA and PHA consisting 2% chitin nano-fibrils for anti-microbial activity. The spoilage potential was examined by enumeration of total viable counts, H_2S-producing bacteria, psychrotrophic bacteria and lactic acid bacteria.

Results The developed films and composites had varying anti-microbial activity against target microorganisms during the storage experiment. A reduced growth of spoilage bacteria was found on the smoked salmon enclosed in antibacterial films compared to the control samples. It was the casted chitosan/chitin nano-fibrils that showed the best anti-microbial capacity.

Conclusions The numbers of total viable counts were lower for the smoked samples enclosed in antibacterial films and a general trend observed was maximum numbers at about10^4 bacteria/g. For these samples there were lower numbers using CS/NC-PLA or CS/NC-PGPR films compared to the control.

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Keywords: *food packaging, polylactic acid, polyalkanoate, chitosan.*

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OPTIMIZING OF MANUFACTURING PROCESS OF PASTA FROM RICE FLOUR

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The paper presents results of research for integrated optimization of the manufacturing process of gluten-free pasta from rice flour. Its objectives are optimizing of manufacturing technology (raw materials, operations, etc.) but also reducing of the risks associated with industrial manufacturing process.

The gluten-free pasta are designated for patients with celiac disease, but are rare and expensive product. In order to determine the manufacturing optimum technology was done firstly the determining of optimal manufacturing recipe for establishing optimal technological parameters and the optimum cooking time. It were used different raw materials (rice flour, egg, corn starch, emulsifier) and were determined the rheological properties of the curve (Mixolab program and Mixolab Profiler), in association with time, viscosity, temperature.

Were experienced three broad noodle recipes for pasta, noodles and noodles thin extruded. It was analyzed the final product quality and identifying optimal product recipe. Integrated approach involved an analysis of manufacturing costs, and a risk analysis of the manufacturing process for determining critical points in order to implement adequate HACCP system. The research was completed by behavior analysis at boiling. Food Impact Assessment involved a study regarding acceptance of gluten-free pasta based on a questionnaire with 11 questions distributed to 50 children from the hospital „Louis Țurcanu" Timisoara.

It asked for information on how children diagnosed with celiac disease consumes gluten-free pasta, from where they buy these products, information about the retail distribution system, how many information and education on gluten-free products they have. Research findings showed that all gluten-free flour blends can be used in the manufacture of gluten-free pasta, best mixtures being those of rice flour and buckwheat flour, rice with soy. Also preferred are imported gluten-free products and gluten-free pasta. Concerning Romanian manufacturing pasta it was appreciated and should continue. The results of the research were taken by a company in order to assimilate the manufacturing of new products.

***Key words**: gluten-free pasta, rice flour, manufacturing recipes, optimization, risk, costs*

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DEVELOPMENT OF INNOVATIVE BIODEGRADABLE PACKAGING SYSTEM TO IMPROVE SHELF LIFE, QUALITY AND SAFETY OF FRESH PRODUCTS

L. Moldovan[1], G. Pantea

Currently smart packaging technology depends on package based indicators. Recent developments in 'Thermomorphic adhesives' could be utilized in the development of package based indicators that utilize the third dimension and addition of a feedback system, improve the traceability of packed products.

At present current package based feedback systems send information back to the computer terminal, for example state of the art in relation to this type of technology is a temperature profile recorder that can be analyzed on a computer terminal. A possible evolutionary method from this current state may involve a sensor mechanism that identifies a long time/temp lag or in a batch, or in the room it is being stored in. The new RFDI technologies enable modern labeling systems for food packaging.

Active and intelligent packaging has many advantages than the common used methods:

• Reduce product wastage, monitor atmosphere, temperature or food inside a pack. Nanotechnology using different means of indicators like varnish or coatings for plastics materials to indicate time, temperature inside the package.

• Active and intelligent packaging is often applied using existing techniques:

labelling or pick & place. New products, such as nano-coatings, anti-microbial solutions, tags for all kinds of applications and particularly printed electronics will require new equipments functionalities.

Sustainability of the new packaging methods consists in:

• Extrended shelflife of the packed product;

• Improvements of the equipment for the food packaging;

• Guaranteeing packaging quality and a better preservation of the product.

Product presentation and information are key factors, brands are mostly defined by their packaging methods.

Keywords: *active packaging, food safety, food traceability, intelligent packaging.*

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POLY (VINYL ALCOHOL)/CHITOSAN NANOCOMPOSITES FOR FOOD PACKAGING APPLICATIONS

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Introduction Poly (vinyl alcohol) (PVA) is a biodegradable synthetic polymer, has good biocompatibility and, excellent film-forming properties. It could preserve food for longer time and keep fresh. PVA has various applications in the food industries as films, coating agent, etc. Poly(vinyl alcohol) films are especially used for chocolate, powdered drinks and spices to retain the aroma and to reduce the contaminated container waste, resalable pouches with zipper, fish food packaging bag; dissolvable pouches for food. PVA and chitosan based hydrogels, are often chosen for food packaging applications because of their low toxicity and high biocompatibility as biomaterials. The superior physical, mechanical and thermal characteristics of poly (vinyl alcohol) hydrogels can be obtained by nanoparticles (montmorillonite) incorporation. The aim of this study is to obtain nanocomposite hydrogels based on polyvinyl alcohol/chitosan/montmorillonite by using non-invasive and low cost freeze/thawing method.

Materials and methods The materials used in this study were: PVA with a hydrolysis degree of 99%; chitosan a product of low molecular weight and a dynamic viscosity of a solution of concentration 5 wt % of 20,000 cPs; organically modified montmorillonite has a moisture content of < 2 % and a density of 1.98 g/cm^3. The freezed-thawed obtained membranes were thermally characterized by means of thermogravimetry, DSC and DMTA analyses; the morphological aspects were followed by scanning electron microscopy and the antibacterial activity was tested against bacteria *Salmonella typhymurium, Escherichia coli,* and *Listeria monocytogenes.*

Results. The PVA/chitosan/montmorillonite nanocomposites hydrogels evidenced a compact, void-free aspect, show higher mechanical and thermal properties and excellent antimicrobial activity against bacteria *Salmonella typhymurium, Escherichia coli,* and *Listeria monocytogenes,* chitosan and nanoclay acting synergetically.

Conclusions Nanocomposite polyvinyl alcohol/chitosan/montmorillonite hydrogels obtained by the freeze-thaw method have an increase of thermal stability, mechanical properties and excellent antimicrobial activity active compounds acting synergically.

Acknowledgements: The research leading to these results has received funding from Romanian-EEA Research Programme operated by MEN under the EEA Financial Mechanism 2009-2014 project contract no. 1SEE/2014.

Keywords: *Polyvinyl alcohol; Chitosan; Montmorillonite; Hydrogels; Freezing/thawing.*

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FOOD PACKAGING MATERIAL BASED ON CHITOSAN / POLY (LACTIC ACID)

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Introduction Biopolymers have been widely investigated over the last two decades because they accomplish all requirements for food packaging manufacturing and are a viable solution to the waste disposal.

Poly (lactic acid) (PLA) is proposed as biodegradable matrix with good mechanical properties, available from annual renewable sources useful in food packaging, to replace some petroleum derivatives. Chitosan has been widely used in food packaging due to its exceptional properties such as film forming ability, bioactivity, good gas and aroma barrier properties in dry conditions, biodegradability, biocompatibility, non-toxicity, antifungal and antibacterial activity.

Materials and Methods The main objective of this work is the combination of the characteristics of both polymers to obtain bioactive food packaging.

This objective was achieved by surface modification of PLA by plasma gas discharge, and chitosan covalent immobilization onto surface by using a coupling reaction. Three types of chitosan with different molecular weights and deacetylation degree were used, being deposited on PLA surface by immersion in solution and electrospraying. The obtained materials were characterized by ATR-FTIR spectroscopy, scanning electron microscopy (SEM), contact angle measurements and antioxidant and antimicrobial activities were evaluated.

Results The coating method affects the morphology of the deposited film. By immersion method are obtained compact layers while by electrospraying nanostructured thin coatings are obtained. The necessity of using chemical coupling agents for achieving stable chitosan coatings on PLA surface stands out, concluding that simple physical adsorption is not enough for achieving an irreversible immobilization.

Conclusion It has been established that both methods of coating and the molecular mass/ deacetylation degree of chitosan influence the antimicrobial activity of the materials. In terms of efficiency and reagents consumption the electrospraying method is a more convenient coating technique.

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Keywords: *poly(lactic acid); chitosan; food packaging; surface functionalization; electrospraying.*

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CHITOSAN/NATURAL OILS AS COMPONENTS IN INNOVATIVE FORMULATIONS FOR FOOD PACKAGING

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Introduction Chitosan acts as a food preservative of natural origin and as a bioactive component of packaging, and is an excellent film forming material. It presents good mechanical properties, biodegradability, biocompatibility, non-toxicity, antimicrobial activity so it not only retards microbial growth in food, but also improves the quality and shelf-life of food. Therefore, chitosan it is an interesting choice for active antimicrobial food packaging applications.

Essential oils (EOs) and their components are recognized for their antibacterial, antifungal, antiviral, insecticidal and antioxidant properties, showing promising activities against food-borne pathogens and food spoilage microorganisms.

The aim of this research is the use of EOs/chitosan systems as new approaches taking advantage of their synergistic and additive effects. New innovative methods of encapsulation and coating preparation have been proposed, such as electrospinning and surface activation by "cold" plasma/gamma irradiation exposure, followed by coating.

Materials and methods Three types of chitosan with different molecular weights and deacetylation degree and six natural oils: thyme, clove, rosemary, ti tree from FARES SA (essential oils) and cold pressed rosehip and grape seed oils with compositions determined by GC-MS and GC-FID have been used both by incorporation in/or coating polylactic acid and polyalkanoates films. The obtained materials have been characterized by ATR-FTIR, SEM, AFM, contact angle measurements, etc. The antifungal activity was assessed by *in vitro* tests against 3 species of food spoilage fungi: *Penicillium spp., Aspergillus spp.* and *Fusarium spp.* The antibacterial activity was studied against *Escherichia coli* and *Staphylococcus aureus.*

Results The obtained films/coating/meshes/nanofibres formulations of different compositions have particular morphologies, the coating are stable in harsh conditions and exhibit good compatibility with environment and antifungal and antibacterial properties.

Conclusions The efficiency of the tested materials for active food packaging depends on composition and morphology of the resulted films.

Acknowledgements: The research leading to these results has received funding from Romanian-EEA Research Programme operated by MEN under the EEA Financial Mechanism 2009-2014 project contract no. 1SEE/2014.

Keywords: *food packaging, polylactic acid, polyalkanoate, chitosan, natural oils.*

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EVALUATION OF STRENGTH CHARACTERISTICS OF THE SOME BISCUITS ASSORTMENTS BY USING CONE PENETROMETER

Ghe. Voicu[1], E. M. Stefan, G. A. Constantin, P. Voicu, A. Lupu

In commercial activity of food products handling and transportation, these can be subjected to mechanical stresses that can lead to deterioration by deformation, rupture or shatter. This is the case of biscuits, regardless of their type (gluten or sugar), of addition of the flour or ingredients from which they are manufactured.

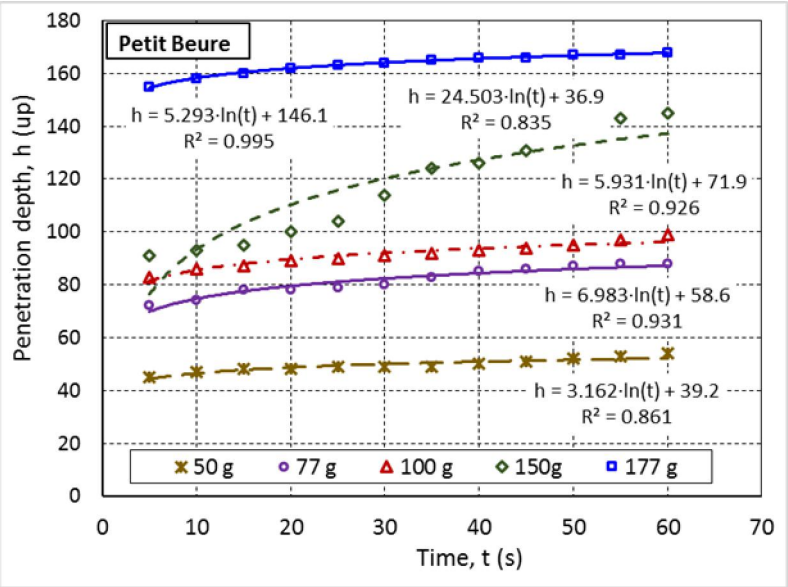
However, gluten biscuits has a higher mechanical strength at break or crush compared to sugar biscuits who crumbles easily (especially those for children).

In paper are presented results of experimental evaluation of texture for four commercial varieties of biscuits, using needle sharp pin penetrometer at five different additional weights on cone stem.

The types of biscuits tested in the laboratory were Petit Beurre, Picnic and Maia (all three produced by RoStar, Romania) and dietary biscuits Sultani, manufactured by Eti Burcak Sultani (Turkey, at packages of 138 g).

For the four types of biscuits and five additional weights (50, 77, 100, 150 and 177 g), experimental data obtained were subjected to a regression analysis in MS Office Excel program, using Velon relationship ($h = a \cdot ln(t) + b$). Regression curves were analysed comparative to identify any differences and to highlight variation mode of penetration depth h, in ratio with time t.

Based on the depth of penetration between two time intervals (from 5 to 5 seconds) was then plotted the variation curve of penetration velocity in ratio with time.



It was found that the law of Velon verify the experimental data for all kinds of biscuits and for all the five additional weights.

Correlation coefficient R^2 in most cases analysed had values above 0.850. The values recorded for the depth of penetration were within,

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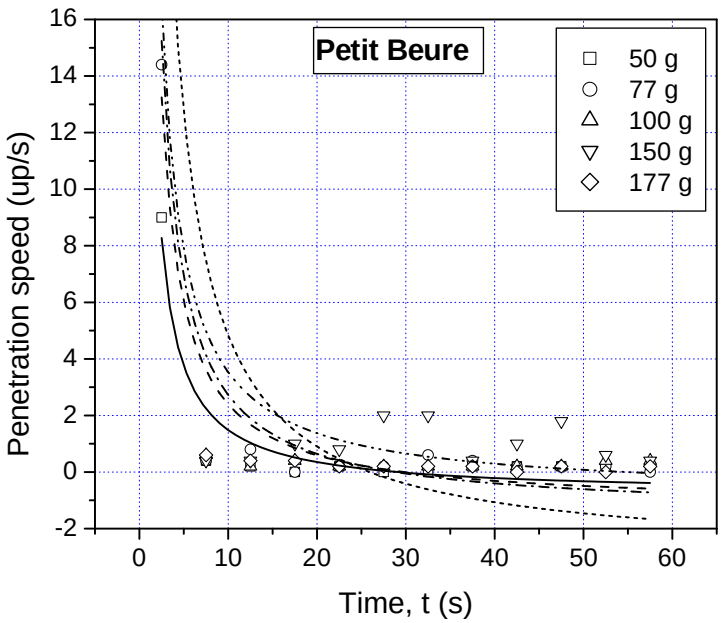
generally, within 45-55 penetrometer units (u.p.) at an additional mass of 50 g, respective between 155-168 u.p., at an additional mass of 177 g, for Petit Beurre biscuits.

For Sultani dietary biscuits, penetration depth values were within the limits 32-35 u.p., at an additional mass of 50 g and between 80-114 u.p., at an additional mass of 177g.



The data presented in the paper may be used by operators in manufacturing technological flow, and by merchants of these food products, to determine the most effective parameters of operating modes (at packaging and handling).

Keywords: *biscuits, strength/texture, sharp pin penetrometer, penetration depth, penetration velocity;*

THE SELECTION OF REGRESSION MODELS KINETICS OF DRYING APPLES "RED DELICIOUS" FOR DIFFERENT TEMPERATURE DRYING

P. Dasić[1], M. Karic

The apple "red delicious" is one of the most popular apple varieties originating from the USA. This cultivar of apple achieves enviable quality in agro-ecological conditions in the Republic of Serbia and belongs to the world's leading variety in the structure of production. The fruits are very large; fruit flesh is yellow, covered in red reaching a dark red color in full ripeness. It is delicious and juicy, sweet and aromatic, and lots of scientists have discovered that this apple contains significantly more antioxidants than other varieties. In terms of apple production in Serbia still the most produced is the old variety Idared whereas in recent years the production of new varieties having greater demand has increased. In the paper the kinematics of drying apples "red delicious" for different drying temperatures of 40 and 60 ^{o}C is examined. Used as the research material were the samples of apple "red delicious" grown in the municipality of Trstenik (Serbia). For drying of the apple variety experimental plant of vacuum condensing dryer for fruit and vegetables were used realized by the second author of this paper. The mass of material M_m [g] during the time of drying the apples "Red Delicious" for different drying temperatures of 40 and 60 °C was measured, and both the moisture content reduced to dry matter w^s and drying speed were calculated. The aim of this paper is to select the regression models of drying kinematics for the apples "Red delicious" for different drying temperatures of 40 and 60 °C that best approximated the experimental data. For the selection the following regression models were used: linear, quadratic, cubic, exponential, degrees, logarithmic and complex power-exponential regression models. The selection of regression model was implemented based on coefficient of determination (R^2), coefficient of correlation (r), mean squared error (MSE), root-mean-square error (RMSE), mean absolute deviation (MAD), mean absolute error (MAE) and mean absolute percentage error (MAPE). This paper presents an analysis of selection of regression models of drying kinematics of the apples "Red delicious" for different drying temperatures of 40 and 60 °C that best approximated the experimental data, based on the aforementioned maximum and/or minimum values of performance indicators.

Keywords: *regression model, coefficient of determination, kinetics of drying apple, temperature drying.*

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FOOD OR FUEL: A REVIEW

V. Marinkovic[1], S. Spaic, V. Milanko, B. Skrbic

Introduction World energy consumption is constantly increasing. Oil, natural gas and coal remains the dominant source of energy. Since reserves of fossil fuels are declining, biomass, a renewable source of energy should play an important role as an alternative source of energy.

First generation fuels seemed to be an appropriate solution to the transport sector reduce dependence of oil products, however it is obtained from the feedstocks intended for the production of food for humans and animals, which contributed to the increase in food prices. Bioethanol is produced from feedstocks based on sugar (sugar cane, sugar beet) and starch (maize, wheat, barley, rye). Biodiesel is produced from vegetable oils and animal fats and waste oils from restaurants, households and industry. Biogas is obtained by anaerobic fermentation of waste (municipal waste, manure) or any other biodegradable waste. The production of this raw material is very expensive because it requires a good quality land and investment in agricultural production as well as state subsidies.

Therefore, the research focused on sustainable second-generation biofuels, whose production is based on inedible biomass-lignocellulosic materials such as forest resources, energy crops and wastes from the manufacture and processing of agricultural products (straw, corn stalks, residues from the treatment fruit (pitted plums, cherries, etc.). In contrast to feedstocks used for the production of food, lignocellulosic biomass is not used directly for food production and does not require extensive preparation of the land for production.

Second-generation biofuels (bioethanol from lignocellulosic materials, biodiesel from non-edible oils, fischer tropshov diesel, dimethylether, biomethane and biohydrogen) is still not produced for commercial purposes. Routes for production second generation biofuels are thermochemical and biochemical conversion of biomass.

Conclusion The biggest obstacle for the production of second-generation biofuels are high investment costs, and costs of production itself biofuels compared to fossil fuels or first-generation biofuels. To address the economic and technical issues necessary investments in research, development and demonstration by the government and the private sector.

Keywords: *biofuels, food, lignocellulosic material.*

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THE MORPHOLOGY AND ANATOMY OF DIFFERENT VARIETIES OF RED GRAPES SEEDS; CONTENT AND PHYSICO-CHEMICAL CHARACTERISTICS OF THEIR OILS OBTAINED BY COLD PRESSING

M. Malicanin[1], D. Loncarevic, V. Rac, V. Rakic

The composition and health benefits provoked the interest toward grape-seed oil in recent years. Particularly interesting are green technologies that enable its isolation without the application of organic solvents.

Cold pressing of grape seeds of five cultivars: “Pinot noir”, “Prokupac”, “Gamay”, “Merlot” and “Cabernet Sauvignon” was done using a press Hanaro, Tip A (P = 600 bar, $T_{cylinder}$ = 50°C, T_{oil} < 30°C, time of pressing = 1.5 hour, mass of seeds = 3 kg). The extraction yields were calculated, while the obtained oils were characterized in terms of natural antioxidants (total phenolic compounds (TPC) and α-tocopherol) and fatty acid contents using appropriate methods recommended by AOCS. The resistance of oils to autoxidation was estimated using differential scanning calorimetry (DSC). Moisture and total oil content (as determined by Soxhlet method) were determined in all three types of seeds; while their anatomy and morphology were studied by scanning electron microscopy (SEM).

The obtained results suggest that both total oil contents and extraction yields (found in the range from ~4.7% (Prokupac) to ~7.5% (Gamay)) are dependent on grape variety. These results can be correlated with the seeds’ morphology: SEM micrographs indicate that the epidermis of Prokupac seeds is dense. Grape-seed oils investigated here are found to be nutritionally highly valuable, since the content of ω-6 linoleic fatty acid is extremely high (in average 73.09%). The contents of TPC and of α-tocopherol are dependent on grape variety; the contents of α-tocopherol are lined as: Prokupac = Pinot Noir ≥ Gamay ≥ Merlot > C. Sauvignon. The highest amounts of TPC and the highest oxidative stability were noted in the oils from Prokupac and Gamay seeds.

The obtained results suggest that grape-seed oil is higly valuble edible vegetable oil, whihc important characteristics are dependent on grape variety.

Keywords: *Grape-seed oil, cold pressing, α-tocopherol, total phenolic compounds, antioxidant, oxidative stability, fatty acid composition, differential scanning calorimetry.*

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ELECTROCHEMICALLY ACTIVATED DISINFECTION SOLUTIONS IN AGRICULTURE

D. Jirotkova[1], M. Soch, N. Kernerova,
L. Zabransky, P. Tejml, K. Volfová, K. Hysplerova

The paper deals with verification of the effects of the electrolyzed NaCl-water solution where a new possibility for an alternative procedure to disinfect water is provided.

Nanotechnologies are utilized increasingly in particular spheres of nationale conomy. These modern methods are also utilized in agriculture. There are tested various methods, for example utilization of stable wall painting by titanium oxide for the purpose of improvement of climatic relations in livestock stables, or utilization of water treated by electrolyte for disinfection of stable space and reduction of consumption of chemical preparations used at disinfection in parlours. The paper deals with the possibility to use the properties of electrolyzed water to disinfect breeding halls and to water animals. The aim of the research was to find out whether electrolyzed water used for disinfection of breeding hall and watering of animal influences selected indicators of the meat quality. Electrolyzed water is produced in a special device that produces biocide solution using potable water with added NaCl. The technology of production guarantees the product is entirely ecological, biologically fully degradable, non-toxic that can replace traditional chemical agents. Possibilities of disinfection using this solution have been verified directly in stables at the interval of 20, 40, 60 min. after application. Staphylococci and streptococci and enterococci were inactive always after 60 minutes of effect. There was significant decrease in the number of total number of microorganisms. An evaluation of the qualitative features of the produced chicken meat, focused mainly on the PSE meat disorder, was a part of the examination, samples of the meat were taken (gradually 157 pieces in total) and analysed.

Further, the solution of electrolyzed water was used to water poultry; and the effect on some of the properties of poultry meat, changes in pH, colour and loss of water, was observed.

Key-words: *disinfection, nanotechnologies, poultry, water treated by electrolyte, meat quality;*

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METHOD FOR MANUFACTURING OF EXTRUDED POLY-CEREAL PRODUCTS OF HIGH DEGREE OF PREPARATION

A .A Ospanov[1], N.Zh. Muslimov, A .K Timurbekova, G.B. Dzhumabekova

Lack of macro- and micronutrients leads to reduction of nutritive and biological value of food products, and, thus, to the depletion of adaptive capacities of an organism and onset of a wide range of alimentary diseases.

Therefore one of the key priorities of the modern food industry is to develop technologies and to expand a line of functional food products, which decrease risks of developing chronic diseases and maintain health.

As a result of the performed researches a method for manufacturing of a extruded poly-cereal product was developed, which, firstly, reduces irrational power consumptions, ensures food products expansion and improves nutritive quality by combining several types of coarse whole meals of grain crops; secondly, supports starch modification and gelatinization, lowers the ratio of unassimilable compounds and content of microorganisms in poly-cereal mixtures; thirdly, raises the degree of preparation of poly-cereal based food products, which significantly improves marketable and organoleptical properties of the quality.

Obtained dependence of the power consumption by electric drive of the extruder (N, kW) on humidity (W, %) and the rotation rate of the working member (n, min-1) provides adequate accuracy for disclosure of extrusion process in the investigated ranges of factor values, which have impact on efficiency of technological process management.

Key words: *poly-cereal mixtures, extrusion technology, blending, mixing, extrusion, coarse whole meal*

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INFLUENCE OF PARAMETERS OF SUBCRITICAL WATER EXTRACTION OVER YIELD OF TARGET COMPONENTS FROM GRAPE POMACE

V. Sukmanov[1], Y. Petrova, L. Gaceu, A. Birca, V. Zavialov, C. Popovici, I. Lagovskiy

The work presents the results of studies of dry grape pomace extracts of Moldova grape for table use obtained in subcritical water. The authors have conducted a set of laboratory studies on the effect and determination of rational parameters of processes that ensure maximum yield of target components - dry and reducing substances, titratable acids, polyphenols; they have also analyzed the antioxidative activity of extracts obtained.

Extraction was performed in the temperature range T 100^0C ÷ 160^0C, a pressure P=12 MPa, exposition τ from 30 to 90 min., hydro ratio 1:5 and 1:10.

Standard methods were used for studies. Yield of dry extract was determined by vacuum vaporization of the extract under vacuum on a rotary evaporator to a constant weight. Fehling's solution was used at determination of reducing substances. Calculation was performed on glucose. The total content of polyphenolic compounds was determined in conversion to gallus acid by the Folin-Ciocalteu reagent. Study of the antioxidative activity of extracts and kinetics of inhibition of free radicals was performed by the method of using diphenyl pircyl hydrazyl (DPH).

Acidity was determined by potentiometric titration using ionoselective electrodes.

The results of study showed that at subcritical water extraction the yield of dry extract is more than two times higher than at washing of sweet pomace with hot water.

Yield of polyphenolic compounds exceeds the amount of polyphenols obtained during extraction with organic solvents and water at temperatures up to 60°C. Extracts of grape pomace obtained in the medium of subcritical water have high antioxidative activity from 33% to 94% relative to DPH.

Yield of acids at low extraction temperatures (100-120°C) with subcritical water corresponds to the amount of acids in initial pomace, obtained by washing sweet pomace with hot water. At higher temperatures (> 120°C) the number of organic acids formed was 2-3 times greater than at acidic hydrolysis of wood at 160-180°C.

The obtained response surfaces of yield of dry and reducing substances, polyphenols, titratable acids from time, temperature and hydromodulus allow obtaining rational parameters of the processing of grape pomace in industrial environments.

Keywords: *grape pomace, subcritical water, extraction, target component, rational parameters.*

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PREPARATION OF ETHYL ALCOHOL FROM GRAPE POMACE EXTRACTED BY SUBCRITICAL WATER

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The main byproduct of winemaking is grape marc (GM). This article discusses the process of obtaining raw alcohol from grape pomace by subcritical water extraction. Extraction was performed under a temperature range of T 100C ÷ 160C, pressure P = 12 MPa, exposure of 30 to 90 min and hydronic modules 1:5 and 1:10.

We conducted fermentation at 10-35 C, pH 3.0-6.0. Alcoholic fermentation was carried out at expense of cultural, and due to wild yeast. Exposure time of extracts was from several hours up to 1.5 weeks.

Before fermentation extracts were subjected to inversion by boiling sulfuric acid in an open flask. This, together with water vapor purged volatiles, i.e. cleans the extract. After inversion excess acid was neutralized with lime.

The resulting precipitate was filtered off on a Buchner funnel. The crude alcohol was distilled off together with water vapor. For analysis of results amount of carbohydrates of various groups in original press cake was determined. Free carbohydrates, water-soluble polysaccharides, pectins, hemicellulose A and B were determined by the method of, based on a combination of carbohydrates separation schemes by Bailey, which is sequential extraction of material to different solvents and spectrophotometric method by Dreywood. Cellulose was determined by alcoholic nitrogenous method (Kurshner).

Results obtained in studies showed that the highest yield of extractives (primarily due to sugars and their degradation products) was observed at high temperatures (140°C - 160°C). But there is pollution of sugar solution harmful to microorganism's substances. Purification was performed by steam stripping of volatile compounds (furfural, formic acid, etc.) and subsequent filtration. The thus obtained solution was further subjected to extraction with inversion for larger amounts of fermentable carbohydrates. The highest yield of crude alcohol takes place for purified extract obtained by following process parameters: T = 160°C, P = 12MPa, t = 90 min, hydronic module 1:10. This yield was ~ 160 (liters of absolute alcohol) / (ton of oven-dry pomace).

Keywords: *extraction, subcritical water, raw alcohol , grape pomace.*

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NEW ASPECTS IN THE TECHNOLOGY OF AROMATIC COMPONENTS FORMATION

A .T. Bezysov, H.E. Dubova[1], N.V. Rogova

This paper presents a novel approach to the selection of plants to restore the lost aroma based on the oxidation processes.

The predisposition of raw material components to lipid oxidation is the basis of selection criteria. It was determined that the content of unsaturated fatty acids in the lipid extract of watermelon, pumpkin, cucumbers is 30-40%, the ratio of linoleic and linolenic acids in fruit is different.

The formation of diene conjugates and hydroperoxides, malonidialdehyde after various processing treatment methods is shown. The efficiency of aroma restoration depends on the number of formed 9-, 13- hydroperoxides that serve as a substrate for aroma-forming enzymes.

The antioxidant capacity and the oxidation-reduction potential of fresh fruits and fruits after cooking have been analyzed.

These characteristics determine the fruit ability to repeated formation of aromatic components. It has been ascertained that gourds have sufficient potential to restore aroma by exogenous lipoxygenases.

Key words: *oxidation, linoleic, linolenic, hydroperoxide;*

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DEVELOPMENT OF THE FOOD SECTOR IN THE REPUBLIC OF MOLDOVA

A. Stratan[1], V. Moroz, A. Ignat, E. Lucanesco

Global transformation and modernization of the food sector in the Republic of Moldova has faced several challenges over the past decades when the country started a complex processes of transformation of political and economic systems, such as liberalization of exchange rates, prices, and privatization of enterprises and agricultural holdings, which caused a collapse of the system of vertical coordination and significant disruptions in the agri-food chain.

Disruptions in relationships between farmers, input suppliers and food businesses also resulted in serious constraints faced by many farms and processors in accessing basic inputs.

At the same time the food export is represented mainly by primary agricultural commodities or semi-processed food products.

The purpose of this article is to assess the impact of resent changes and identify possible solutions for strengthening the resilience of the food sector against external trade shocks.

Given the challenges of the recent development in food sector the following research methods were used: analysis of the food sector structure and development tendencies, analysis of the legal framework regulation the food safety system in the Republic of Moldova, analysis of the food distribution system and country's food security, analysis of the export development trends for main groups of agri-food products, analysis of the impact of external shocks over the export development and country's economic stability and food security.

The main sources of primary information for this study were data from the publications of the National Bureau of Statistics of the Republic of Moldova and the data bases of the National Bureau of Statistics of the Republic of Moldova. As a secondary source of information a range of articles and studies elaborated by local and foreign experts were used.

In this paper the importance and the most recent changes of the food industry in the Republic of Moldova were demonstrated, the main impediments were analyzed and proposals to foster the food sector development were provided.

There are positive trends in the development of the agri-food sector of the Republic of Moldova during the last years.

However the vulnerability of this sector to natural, economic and commercial risks remains to be very high.

The current situation in the international trade with agri-food products placed the Republic of Moldova in a difficult position.

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Exchange of sanctions between a number of Western countries and the Russian Federation provides multiple restrictions on the conduct of economic activities, including international trade that makes it necessary to review existing economic policies.

Prohibitions and restrictions on the part of the Russian Federation on the import of agricultural products from the Republic of Moldova are forcing the government to urgently diversify export markets and to take measures to strengthen the economic security of the country.

The food sector of the Republic of Moldova needs specific actions in order to stimulate development of the high value agriculture through creation of product sales strengthening quality control, organizing regional wholesale markets, assisting producers to sell their products, development of market infrastructure at central level, development of the post harvest and market infrastructure.

Keywords: *food sector, agriculture, food consumption, agri food trade.*

DETERMINATION OF THE OPENING FORCE OF CARDBOARD BOXES BY SPECIALLY DESIGNED EXPERIMENTAL DEVICE

S. Stefanov, N. Arabadzhieva, W. Hadzhiiski

Determination of the opening force of cardboard boxes by using specially created device is presented.

Check for the correspondence between the actual opening force and the measured by the experimental device is done.

Regression dependency is written between the experimental results and examined adequacy of the model.

Keywords: *force of opening, folding boxes, paperboard, experiment, stiffness, packaging automation;*

RAPID PROTOTYPING TECHNOLOGY IN PERSONALIZED CHOCOLATE PRODUCTS

N. Simunic[1], N. Mustapić, A. Fuduric

Brief Introduction This paper describes a practical and simple approach to designing personalized chocolate products using engineering software for 3D design and rapid prototyping techniques.

Advanced technologies reduce production time, costs and even allow production of custom made products on demand. The feasibility of this approach was verified with development of a new personalized product, a box of chocolates that resembles the university crest.

Materials and methods Advanced engineering software for 3D design has been used to design and model a university crest. The model was manufactured on a rapid prototyping machine, i.e. ZCorp 450 3D printer.

After cleaning and fixing with Z - Bond adhesive physical model was ready for mold manufacturing. RTV silicone was used to form the mold by casting around the 3D printed model. After silicone curing the mold was ready for chocolate production. Also the packaging for the personalized chocolate was designed in graphic design software CorelDraw.

Results In very short period of time a completely personalized box of chocolates has been designed and reproduced using advanced engineering technologies like 3D design and additive manufacturing.

Conclusion Custom made products in food industry today maybe should occur through a departure from conventional approaches and traditional materials and designs. Application of Rapid Prototyping technologies in new product development as compared to the conventional approach, depending on the size of production can provide savings in the amount of 50 – 90% of used resources. Some disadvantages like high costs and limited choice of materials will probably be overcomed in future so the rapid prototyping technology will meet all the requirements set by production in the chocolate manufacturing industry.

Keywords: *personalized chocolate production, 3D design, rapid prototyping.*

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PURIFICATION OF THE WASTE WATER FROM MILK INDUSTRY

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Introduction Milk processing industry produce highly polluted wastewater with a high concentration in organic compounds that have to be removed before reusing the treated effluent.

Most of the wastewaters resulted from milk industry (dairy industry) results from washing processes, cheese obtaining, some offals from cheese and butter production that are accidentally evacuated into the river.

Total effluents can be classified in three groups:

1) effluents from the small processing plant of milk;

2) effluents from cheese and butter plant with a high concentration of greases;

3) effluents from dairy industry with a high concentration in organic compound.

The quantity of water required in a milk processing plant depends on the size of plant, generally expressed in terms of maximum weight of milk handled in a single day, and the processes involved.

Materials and method Waste water quality was determined by estimated physical, chemical and biological characteristics of waste water in monthly interval. The samples were collected and analysed for temperature, pH, Total Solids, Total Dissolved Solids, Bio-chemical Oxygen Demand (BOD) and Chemical Oxygen Demand.

Results and Discussion Water quality of water from milk processing industry was analysed by studying the characteristics of waste water from a milk plant during year 2014.

Temperature: Temperature affect the chemical and biological processes that takes place in water, the water temperature plays an important role in influencing the abundance of phytoplankton.

Colour: It is a characteristic that express the general condition of wastewater. The blackening of wastewater is due to the formation of various sulphides, especially ferrous sulphide. This results when hydrogen sulphide produced under anaerobic conditions combined with divalent metal, such as iron.

Conclusions These parameters and other physical and chemical characteristics were compared and analysed for different effluents from milk industry and the influence of different conditions on these characteristic

Keywords*: effluent, offals, dairy industry.*

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FOOD BIODIVERSITY AND ACTION DIRECTIONS IN HEALTH GENERATING GASTRONOMY RESEARCH

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Brief introduction The study is carrying on an approach on the direction: „alimentary biodiversity – biotechnological molecular gastronomy", in a paradigm with consistent theoretic and practical potential to offer attractive and good culinary products for consumers, with the same effects upon health as supplements in pharmaceutical form. The paper proposes a maximizing of the bio utilization of excellence gastronomic dishes, based on incorporated food diversity, with recognized nutritional and therapeutic qualities, but also with hedonic characteristics, scientifically adapting old time empiric ideas of the oriental food manner.

Materials and methods There are taken into consideration methodological landings of paradigm changes in the integrated system *environment – alimentary biodiversity - processing - food*, with finality towards health generating gastronomy.

Results In the paper there is underlined the fact that, through the directions of health generating gastronomy, dishes become in fact innovative composite food which, by (bio)diversity, equilibrium and, in relation with environment factors, open new research paths. Theoretically and experimentally there appears a conceptual coherence and a large diversification of gastronomic products towards a multifunctional efficiency: energetic, nutritional, psycho-sensorial, having at the same time a punctual metabolic function of prophylactic type too.

Conclusions There is to be observed an evolutionary trend in explaining correlations between environment (exogenous factors, biodiversity), (semi) culinary preparations and composite food, directly linked to health promotion, based on constitutive elements of ancient nutritional remedies, together with complementary nutraceutic synergy of the bio compounds in question (especially on exemplified research directions: maximizing the phyto therapeutic potential of cereal, antocyaninic, mushroom or of animal origin resources), that also situate hedonic attributes on the same landing of interest, in products of gastronomic type.

Keywords: *aliments, biodiversity, health generating gastronomy, composite food, excellence gastronomic preparations.*

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RESEARCHES REGARDING THE MODELLING OF HEAT TRANSFER DURING WINE-MAKING FERMENTATION

V. Padureanu[1], L. Costiuc, M. I. Lupu[1], I. Pantea, G. Paraschiv

During fermentation there are significant changes of physic-chemical properties of the must. The most important factor that contributes to the change of these properties is the temperature. The paper aims to develop a model for the simulation of the energetic balance during must fermentation for a pilot installation made of two cylindrical stainless steel tanks, which are equipped with a cooling coating. We studied the temperature variation during must fermentation taking into account the changes that appear in must during the fermentation process, and we calculate the heat loses from the tank surface. It was analyzed the relation between the following parameters: tank properties, convection coefficients from the exterior and the interior surfaces of the tank, including the temperature and air speed and the coefficient of total thermal transfer k.

Keywords: *wine fermentation, heat transfer, model.*

THE RICHNESS OF SPECIFIC POPULATIONS OF THE PURE BEECH FORESTS MIXED WITH CONIFERS FROM THE CIUCAS MASSIF

A. Sava[1]

Knowledge of specific population's biodiversity is key for both the environment and to humans, thus, the need to preserve them. Species, individually, plants, animals, microorganisms, are sources of raw materials for food, medicine, clothing, energy and more. Biodiversity is a possible option for future human needs, aesthetic, spiritual and educational benefits. Forest ecosystems regulate the water regime, influencing the frequency of flood sand water available during the dry season. The see co-systems, like others, influence local climate and the general climate. Relations betweenbiological diversityat different levels-genes, species, habitats, communities and ecosystems-andthe ecological andevolutionary processes, consisting ofnutrientsand water circuit, photosynthesis, mutual aid (mutualism), speciation and others, belong to the biosphere. So, biosphere is composed of elements of life, which is the biodiversity and ecological processes, represented by inter- and intra specific interactions and their environment. The finding thata biocoenosis species are represented by a different number of individuals, led to the development patterns of abundance of specific populations.

Keywords: *biodiversity, specific populations, species richness, species layers*

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MATHEMATICAL MODEL FOR ANALYSIS THE INFLUENCE OF VIRTUAL POINT POSITION ON THE STABILITY AND DYNAMICS OF PLOWING UNITS

A. N. Ormenisan[1], S. Popescu, C. Csatlos

Tractors with *backmounted* agricultural machines are one of the most important and used agricultural units for soil working. Among *backmounted* agricultural machines, plough occupies the most important position, being the largest consumer of energy. On ploughing units are acting a complex of forces and moments (torques) with time-varying directions and sizes.

The position of virtual point has a great influence on the ploughing units stability. With the help of mathematical models can be studied the variation of coordinates of the virtual point for various adjustments and variation of forces and moments acting on the ploughing unit on the whole. If they are brought to the corresponding values by means of automatic control systems, ploughing unit will operate stable and on optimal energy parameters.

Keywords: *tractor, plough, virtual point.*

INFLUENCE FACTORS ON THE TEMPERATURE VARIATION OF RAW MATERIALS DURING THE PRESSING OIL PROCESS

A. N. Ormenisan[1]

Pressing oil raw materials to obtain edible oils is a highly complex dynamic process. The phenomena that occur during pressing with expeller presses, significant changes on pressing products, meaning vegetable oil and hardened cake. In the pressing chamber physico-chemical transformations take place of the raw materials determined primarily by the increase in pressure.

As a result of the relative movement of the particles into the pressing chamber, frictional forces arise which increase the temperature to values above 50^0C. Experiments performed and presented in this paper shows that, for expeller presses, into the pressing chamber are developing high temperatures, facilitating the discharge of the oil, but the same time, cold pressing specific temperature limits are exceeded.

Keywords: *pressing, oil materials, vegetable oil, temperature.*

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CONTROL DRYING PROCESS FRUITS AND VEGETABLES USING SOLAR ENERGY

G. Brătucu[1], A. Marin, D. D. Paunescu

Through the use of a technical equipment made by the authors, by using solar energy, we studied the influence of the following factors on the rate of dehydration of vegetables and fruit: colour of product seating surfaces; angle of inclination to the solar radiation; the layout of the area; possible transparent foil coating equipment; species, variety and initial dimensions of the products subject to dehydration, sectioning mode and size slices; speed of air movement on the surface of products subject to dehydration.

The final quality of the products was assessed by analysing the conservation of vitamin C, colour and taste.

Tomatoes, carrots and apples were studied while sectioned into half and quarters and into 5 mm and 10 mm thick slices.

The black colour of the areas involved and the 5 mm slices were adequate, whereas on the white background of the products that had been sliced in half there was mould and the colour and taste deteriorated.

Key Words: *fruits and vegetables, dehydration, solar energy equipment*

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THE EFFECT OF MOISTURE CONTENT ON GRINDING PROCESS OF WHEAT AND MAIZE SINGLE KERNEL

M. I. Lupu[1], V. Padureanu, C. M. Canja, I. Pantea

The mechanical properties and the resistance of grains are key characteristics that enhance grinding behavior of wheat and maize and are dependent on the moisture content of the grains.

These properties were defined in the single-kernel compression test, and it seems that the qualities expressing the relations resulting during mechanical loads like mechanical and rheological properties are significant.

The aim of the study reported here is to show the influence of moisture content on grinding process of wheat and maize single kernel. To show this influence it is necessary to study the physical and mechanical properties of wheat and maize kernels at different moisture content 10%, 12%, 14%, 16%, 18% and 20%.

The measurement results showed significant relationship between the cereal type, its resistance characteristics and the moisture content in the grinding process.

Keywords: *wheat and maize, moisture content, force-deformation curve, energy consumption*

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SEVERAL EFFECTS OF SOME ELECTROTHERAPY TREATMENTS OF PVX AND PVY INFECTED POTATO PLANTLETS CV. ROCLAS

C. L. Badarau[1], F. Damsa, A. Nistor

Introduction The potato quality is strongly influenced by potato virus X and potato virus Y. Using several electrotherapy treatment variants, the virus infection level decreased significantly.The aime of this study was to estimate some biological effects of these treatments.

Material and methods The biological material used in experiments was plants (variety Roclas, virus free biological material) mechanically inoculated with PVX and PVY. Electrotherapy was applied in 9 variants: after washing and sizing explants, potato stems infected were exposed to either 40, 50 or 100 miliampers, for 5, 10 or 20 minutes, followed by sterilization and planting the axillary buds tip in vitro. Physiological indicators were determined after 42 days of vegetation (PVX infected material) and after 36 vegetation days for the other plants. Monitoring the vegetative state of healthy regenerated plant was done by estimation the chlorophyll content of leaf (portable device SPAD 502 Chlorophyll Meter) and the anthocyanin content at leaf (portable device ACM 200 plus, Antocianin Chlorophyll Meter).

Results Within the elimination of viruses PVY and PVX by electrotherapy was noticed a significant decrease of chlorophyll content compared to the control in case of variant V9 (100mA/20minutes). Regarding the content of anthocyanin, there were significant differences between values recorded in the experimental variants. Compared to the negative control, however, it was found small increase of anthocyanin content in case of material initially infected with PVY.

Conclusions As opposed the content of anthocyanin, we remark that monitoring of chlorophyll content indicate some changes in plant physiology, being observed effects of electrotherapy treatments over the biological material regenerated from plantlets infected with PVX and PVY and treated.

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Keywords: *Potato, potato virus X, potato virus Y, electrotherapy, chlorophyll, anthocyanin.*

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TOTAL MONOMERIC ANTHOCYANIN AND TOTAL FLAVONOID CONTENT OF PROCESSED PURPLE POTATO

F. Damsa[1], A. Woinaroschy, G. Olteanu, C. L. Badarau, A. Marculescu

It is well known that processing change physical and chemical composition of foods, hus affecting the content of bioactive substances.

Potatoes are almost always consumed after processing (baked, fried or boiled) making it critical to understand the effect of such processing techniques on the containing in bioactive compounds.

In order to determine the influence of processing on the content of anthocyanin pigments and flavonoids was achieved the extraction of these compounds from boiled and baked purple potato tuber (Albastru-Violet de Galanesti variety).

Also, in order to obtain the maximum amount of anthocyanin pigments and flavonoids from processed potatoes was applied ultrasonic extraction (20 kHz) compared to simple extraction in solvent with intermittent shaking.

The total anthocyanins content were determined spectrophotometrically by the pH differential method and the total flavonoids content were determine colorimetric by AlCl3 method. This study proves that the potato processing decreases the content of anthocyanin pigments and flavonoids.

Keywords: *purple potato, anthocyanin pigments, flavonoid, processed potato.*

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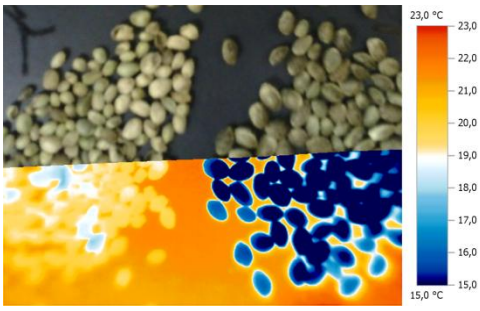
INFRARED THERMOVISION METHOD FOR ASSESMENT OF RIPENESS FOR HEMP (*CANNABIS SATIVA L.)* FIBER SEEDS

D.C. Ola[1], L. Gaceu, H. J. Gusovius, J. Budde

Introduction Fiber plants such as hemp and flax are considered valuable crops for being a source of natural fibers and oil rich seeds regarded as valuable food supplements for human nutrition. The harvested seeds need to be kept at refrigeration temperatures and are transported at room temperatures in order to be processed into final products. The seeds classification is difficult to be made by colour or shape. The unripe seeds need to be excluded from the manufacturing process since they are a source of bad taste and change in colour. **Materials and method used in research of the seeds quality**. The experiments conducted were focused on the non-invasive evaluation of hemp seeds quality by using the thermal characteristics of ripe seeds versus unripe seeds. The method used a TESTO thermal camera that was able to detect the changes in temperature of ripe seeds and unripe seeds. The grading process took place at a temperature higher that that of the seeds, respectively at 22 ^{o}C.

The image analysis of the digital infrared images was processed using the Testo IRSoft version 3.1.



a) b)

Seed samples used for determination of the quality of fiber hemp seeds using the thermo-camera. a – unripe seeds; b – ripe seeds.

Results The method revealed a very good contrast between seeds that were mature and therefore would change their temperature slower, versus seeds that were immature and would reach faster a higher temperature.

Conclusions The image analysis method provided surprising good results. The method offered good repeatability for various seeds sample of different sorts.

Keywords: *grading of seeds, temperature contrast, pixel intensity level, colour histogram.*

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ANALYSIS OF THE DISTRIBUTION VARIATION OF THE DECONTAMINATING UV-C DOSES ON THE BERRIES' SURFACE

D. D. Paunescu[1], C. C. Paunescu, G. Bratucu

UV-C non-ionizing radiation is successfully used in various areas to reduce the microbial population existing on the exterior surfaces of products; mainly acting on them by altering the structure of their nucleic acids.

The UV-C treatment on fresh cultured raspberry fruit led to a significant reduction in the number of total aerobic germs, positively influencing their organoleptic qualities and duration of storage.

After NTG analysis it was found that while on the untreated fruit the maximum number of aerobic germs increased up to $1.8 \cdot 10^5$ cfu/g, on the treated raspberry it reached only $5.9 \cdot 10^3$ cfu/g. As the mathematical modeling revealed, the distribution of radiation on the surface of the fruit subjected to decontamination is not uniform, thus research was conducted further to find a method which allows the whole fruit to be exposed to UV-C, using a newly developed conveyor, with a vibrating belt and UV-C LEDs as radiating elements.

BRAND COMMUNICATION STRATEGY: THE FINEST INGREDIENT OF THE ROMANIAN BEER

Florin Nechita[1]

The study builds upon a review relevant marketing, brand management and consumer behavior literature and aims to exemplify how branding and communication strategies influenced the development of the Romanian beer market in the last quarter of the century.

By focusing on a variety of advertising campaigns and budgets analysis in connection with New Product Development (NPD), the study will valorize the 13 years experience of the author while working in the industry and the PhD research years that came after.

The review provides practical implications about the trends that will shape this category in the future.

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LABEL OF ORGANIC PRODUCTS - MEANS OF PROMOTING. EUROPEAN AND NATIONAL REGULATORY FRAMEWORK

L. Manea[1]

The organic market is a growing market, because both on international and European level as on Romanian level, the cultivated land areas in organic system are growing, number of certified organic operators is in uptrend, the consumption of organic products recorded positive growth, being no more a characteristic for countries with high GDP per capita. No matter how we define organic agriculture, whether we use the terms organic, ecological or biological, the main goal of green agriculture is that agricultural and food to be fresh, authentic, as more appropriate to human metabolism, and so the processing technologies to respect nature and its cycles through a rational use of soil, water and air and reducing pollution caused by forms of plant cultivation and animal husbandry.

Aiming as main objective to analysis the European and national regulatory framework to capture objectives, principles and rules of organic agriculture system (processing, labeling, marketing and promotion, inspection and certification), in his documentary has been used both studies about organic products and their labeling, as analyze of statistical data from EUROSTAT and MARD on the number of operators and certified organic acreage in organic system in EU Member States and in Romania, comparing the European legislative framework with national legislation.

It is found both in the EU regulations, as well as at the national rules on labeling of organic products that are precise formulations, that legal measures aimed to increase consumer confidence in organic products, as products produced and certified according to strict rules of production, processing, promotion, survey and certification. Thus, labeling and mandatory labeling rules ensure the identification of product, fast and simple information of consumers and the promotion of products on the market.

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Keywords: *organic agriculture, organic products, labelling, promotion, certified organic operators, consumer, certification bodies.*

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CONSUMER PERCEPTIONS OF NUTRITION AND HEALTH CLAIMS IN THE REPUBLIC OF MOLDOVA

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Health is the key driver for Europe‘s growth and prosperity. A healthy diet is one that helps maintain or improve general health. There is now increasing scientific evidence that some food components have beneficial physiological effects over and beyond the provision of basic nutrients.

Food labelings' aim is to provide consumers with information which may influence their purchasing decisions.

The objective of this study was to establish if consumers from the Republic of Moldova understand the various forms of nutrition and claims claims currently presented on foodstuffs and the efficiency of such labels to assist them make informed purchasing choices. As a research method to quantitatively study used a questionnaire applied to their face to face by interviewers. Data was collected from total of 568 consumers lived in Chisinau.

The instrument used was a questionnaire structured in seven questions: what influences more people decision for purchase of a food, how much do people trust in nutrition labels, what is the degree of importance which people appreciate for the elements of the food labels, what is the level of knowledge and understanding of the information on the food labels, is there any significant difference between different groups of respondents what are the reasons for read the information on product labels.

The data was analyzed and statistically interpreted. Significant different were found on the use and understanding of nutrition labels from Moldovan consumers. The study has shown that some aspects of food labeling are confusing, this indicates a need to educate consumers on the different aspects of food labeling to enable them to make more informed purchasing decisions.

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Keywords: *Nutrition claims, health claims, consumers perception, health, information, purchasing desision*

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STUDY ABOUT THE XENOBIOTICS IN FOOD LABELING APPLIED IN THE COUNTRIES FROM THE BLACK SEA REGION

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Public health relevance

In the food policies, for to ensure the public health, the nutritional labeling of foodstuff proves really an important priority. Usually labels contain more information about nutrients but about xenobiotic is writing just a little or nothing. The risks of the foodstuff consumption, are related to the errors that can occur due to the presence of chemical xenobiotics in food.

Material and method The study was conducted after collection of food labels from stores from 5 countries from Black Sea Region. The labels were sorted according to the type of food, and after the country of origin. On the labels with information about the presence of chemical xenobiotic and/or warnings about the effects of those, was analised some details, especially about the food pollutans and additives.

Result and discussions The results put in evidence the ignorance from some food manufacturers and from distributor toward the importance of the chemical xenobiotic which are in the foodstuffs togheter with the nutrients.

Also are made some remarks about the communication risks if the labels are poorer in possible bad informations.

Conclusion It is necessary to introduce on each food labels the xenobiotic information and the warnings about the methods (hygienic and/or technological) for reducing the risk of food conumption, in the context of interrelations between food safety and food and nutritional security, for to ensure the public health.

***Key words**:* chemical xenobiotic, food nutritional labeling, communication risk, food pollutants.

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HELIANTHUS TUBEROSUS L. FLOUR A POTENTIAL SOURCE OF BIOACTIVE COMPOUNDS IN BAKERY PRODUCT

L. Apostol[1], M. E. Popa, N. Belc, L. Gaceu

The main aim of this study is to establish the optimum dose from nutritional and technological point of view of *Helianthus tuberosus L* flour used as functional ingredient in bakery products industry.

Helianthus tuberosus L, included in *Asteraceae* family, is suitable for cultivation in temperate zones and producing a high yield of edible tubers.

Helianthus tuberosus L has an important functional potential given by its high content of inulin, minerals, amino acids and organic silicon.

In this work *Helianthus tuberosus L* have been used for enrichment of wheat flour with functional bio compounds such as: bioactive carbohydrates (dietary fiber, inulin), bioactive protein and minerals.

Within the laboratory experiments, the potential functional of wheat flour enriched with the *Helianthus tuberosus L* flour, in different proportions, was evaluated concerning chemical composition and rheological behaviour of the doughs. Protein, inulin, fiber, fat, ash and minerals content were determined.

Industrial relevance:

In this study, Helianthus tuberosus L flour was incorporated into wheat flour at four different levels and found that incorporation up to a 10% level into the formulation of wheat flour yielded an acceptable product in terms of rheological parameters , with improved nutritional and functional properties. This study provides useful information for using *Helianthus tuberosus L.* (Jerusalem artichoke), as source of functional ingredient in bakery industry.

Key words: *Helianthus tuberosus L*, Jerusalem artichoke, functional ingredient, dietary fibre, inulin, mineral element.

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EGG SURFACE DECONTAMINATION BY USING HIGH VOLTAGE PULSED, COLD ATMOSPHERIC PLASMA JETS

N. Georgescu[1], L. Apostol, I. Vatuiu, L. Gaceu

Extensive research on the use of cold atmospheric plasmas to inactivate microorganisms on food surfaces is a relatively recent event. These plasmas make the decontamination process practical, inexpensive and suitable for applications when product preservation is desired. The cold atmospheric plasma has major advantages in comparison to the alternative methods of egg decontamination.

Fig. 1: The source of high voltage pulsed, cold atmospheric plasma jets.

The plasma source has a coaxial structure (Fig. 1). The plasma is produced in a discharge chamber, by applying high voltage pulses betweeen two electrodes: 1) The high voltage electrode is an axial syringe needle, of 150 mm length, and 1.2/1.6 mm input/output diameter; 2) The ground electrode is a 40 mm length copper cylinder, mounted at 10 mm distance from the plasma exit hole, on a Teflon structure which has 6/8 mm input/output diameter. The syringe needle tip is axially placed, at 12 mm distance from the plasma exit hole. The discharge chamber is inside the Teflon structure, along the ground electrode.

The high voltage pulses (20 – 25 kV amplitude, 200 ns width, 100 pulses per second) generate a dielectric barrier discharge, in a He-O_2 gas mixture. The helium gas, which facilitates the occurrence of electric discharges at atmospheric pressure, is introduced in the discharge chamber through a lateral orifice. The helium flow rate is of 2.5 l/min. The oxygen gas is introduced through the syringe needle, with flow rates of 12.5 – 50 ml/min, so that its concentration in the helium gas is of 0.5 – 2 %. The oxygen role is to chemically activate the discharge plasma, in order to have a strong bactericidal effect. The helium flow pushes the discharge plasma out, forming the plasma jet (Fig. 2d). The plasma exit hole has 2 mm diameter.

The main chemically active agents are oxygen atoms and the OH radicals. It is well known that these agents easily interact with microorganisms cells giving rise to oxidizing reactions. Oxygen atoms are generated by electron-O_2 interaction. OH radicals are the result of the electrons and oxygen-atoms reactions with the water molecules from the air which the plasma jet encounters.

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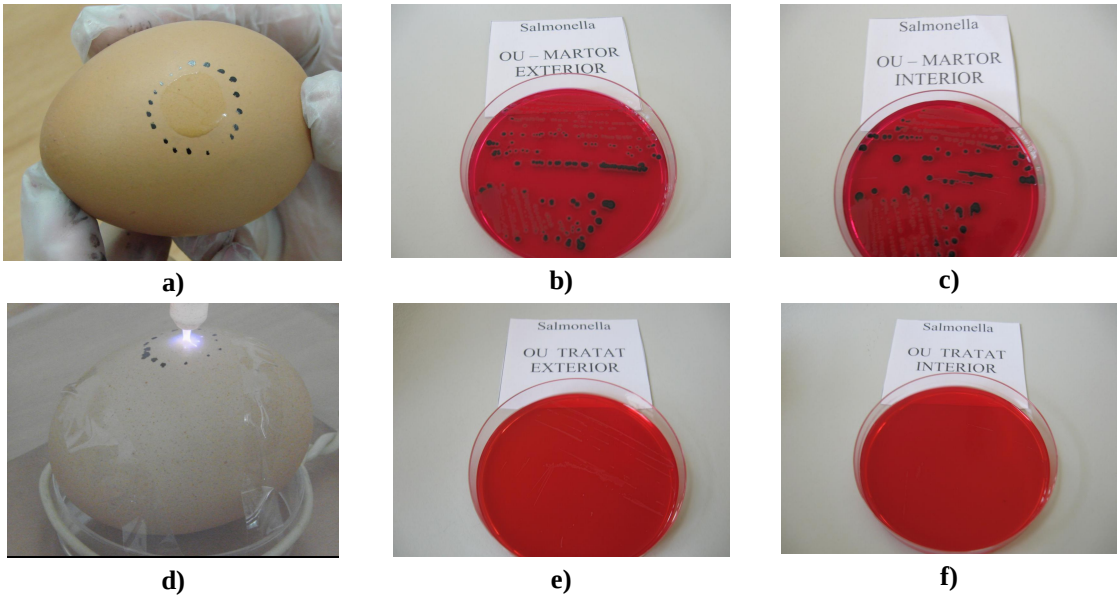

Fig. 2: a) Untreated egg. **b), c)** The outer (**b**) and the inner (**c**) eggshell surface samples formed microorganism colonies. Conclusion: the untreated eggs are contaminated. **d)** Plasma treatment. **e), f)** The outer (**e**) and the inner (**f**) eggshell surface samples did not formed microorganism colonies. Conclusion: the plasma treated eggs are decontaminated.

By spectral analysis, an optimization of the O_2 concentration in the helium gas has been achieved. The chemical activity of the plasma jet has been estimated by the intensity of the O I 777 nm emission spectrum line. This intensity is maximized for 1 % molecular oxygen concentration in the helium gas. In order to verify the effectiveness of the plasma treatment for the eggs superficial decontamination, a target pathogen has been deliberately inoculated onto the surface of the eggs. The choice of the pathogen was based on the fact that *Salmonella* has long been recognized as an important zoonotic pathogen of economic significance in animals and humans. An egg surface of about 1 cm^2 (Fig. 2a) has been contaminated with a solution containing *Salmonella enterica ATCC 14028* (7.7 * 10^3 CFU/ml – CFU denotes Colony-Forming Units). The treatment has been made with high voltage pulsed, cold atmospheric plasma jets (Fig. 2d). The high voltage pulses had 20 kV amplitude. The helium and oxygen flow rates were of 2.5 l/min, and 25 ml/min, respectively. The treatment time was of 5 min. After the plasma treatment, both the untreated and the treated eggs have been maintained for 24 h at 37^0 C. Afterwards, microorganism detaching techniques were used for the external/internal eggshell surface. The obtained samples were spread onto agar in Petri dishes and incubated at 37° C for 24 h. After the incubation, the resulting microorganism colonies have been photographed.

For the untreated eggs, the samples from the external/internal eggshell surface formed microorganism colonies in the Petri dishes (Fig. 2 b, c). This means that both the external and the internal eggshell surface were contaminated. For the treated eggs, the Petri dishes remained clean (Fig. 2 e, f), i.e. the high voltage pulsed, cold atmospheric plasma treatment totally destroyed *Salmonella enterica* from the eggshell surface. No negative effects of this treatment on egg quality were observed.

Findings from this study indicate that cold atmospheric plasma is a new promising technique to decontaminate the eggs surface. Our future research will be focused on the treatment of the whole egg surface, by immersing eggs in large volumes (liters) of cold atmospheric plasma.

CHITOSAN AS A BIOPOLYMER FOR FOOD PACKAGING APPLICATIONS - A REVIEW

A. C. Mitelut[1], E. E. Tanase, M. E. Popa, V. I.Popa

Within the recent years, researches about the applications of intelligent and active packaging for food applications have taken a great importance for food industry. Active packaging is an innovative approach to enhance the shelf life of food stuffs while improving their quality, safety and integrity.

Polysaccharides are some of the most promising natural materials to substitute for synthetic polymers in a number of applications due to their abundance in nature. Chitosan, a deacetylated derivative of chitin, is the second most abundant polysaccharide found in nature after cellulose.

Chitosan has been widely used in several industries due to its natural origin and exceptional properties such as biodegradability, biocompatibility and non-toxicity. Moreover, chitosan is a good inhibitor against the growth of a wide variety of yeasts, fungi and bacteria, and also displays gas and aroma barrier properties in dry conditions. These characteristics, beside its ease of film formation, make chitosan an interesting choice for active antimicrobial food packaging applications.

This study aims to present a review regarding chitin and chitosan biopolymers, their properties and the ability to be used in applications in food packaging industry.

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Keywords: *active packaging, chitosan, biodegradability, antimicrobial applications.*

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ASSESSMENT OF THE ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS FOR NEW FOOD PACKAGING MATERIALS DESIGN

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Food safety and food quality are major concerns for food producers, food industries, governments, and consumers. Microbial growth damages the overall quality and safety of a product. As a result of microbial growth, off-odors and changes in the aroma, color, and texture can be accelerated. Effective preventive measures and intelligent preservation methods have been put into place to reduce food spoilage and to prolong food shelf life. One of these methods is active packaging using essential oils.

Essential oils are mixtures of natural volatile compounds deriving from the plant secondary metabolism, mainly monoterpenes, sesquiterpenes, and their oxygenated derivatives. Essential oils have been shown to possess antibacterial, antifungal, antiviral, insecticidal and antioxidant properties by numerous researchers.

The purpose of the present study was to determine the antifungal activity of four essential oils (thyme, clove, rosemary and ti-tree) and also for two cold pressing oils (grape-seed oil and rose hip-seed oil). The essential oils were selected from the market by comparing specifications of various producing companies trough the determination of their composition by GC-MSD/FID analysis based on AFNOR/ISO standard limits, all oils being selected based on their antioxidant activity and previous research results regarding the most active compounds effectiveness.

The antifungal activity was conducted against three food spoilage fungi: *Fusarium graminearum, Penicillium corylophilum* and *Aspergillus niger*. The method used to evaluate the antifungal activity of the tested oils was disc diffusion method. Different amounts of oil were applied on 6 mm diameter paper disks and placed onto the agar surface previously inoculated with selected fungi. The plates were incubated at 25°C for 7 days.

The results demonstrates the potential of thyme essential oil, clove essential oil and ti-tree essential oil to be used as antifungal agents against the tested fungi. In active packaging, the antimicrobial potential of essential oils could be the answer to the current search for environmental solutions and for assuring the microbial safety of food products.

Acknowledgements: The research leading to these results has received funding from Romanian - EEA Research Programme operated by MEN under the EEA Financial Mechanism 2009 - 2014 and project contract no. 1SEE/2014.

Keywords: *food safety, antifungal activity, spoilage fungi, essential oils.*

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THE IMPACT OF RECYCLING PROCESS OF WILD BERRIES ON THE CONTENT OF PHENOLIC COMPOUNDS

G. Khomich[1], V. Ishchenko

Wild berries raw material is a source of quite deficient polyphenols with high hypotensive and vascular firming action which are able to excrete a number of xenobiotics from the human body, and can be a substitute for modern dangerous food additives of synthetic origin.

Phenolic composition of blueberries, black elderberries, black ashberries and the impact of processing technologies on their content in the production of juices, purees and freezing of raw materials were investigated. Phenolic compounds were determined at liquid chromatograph of Agilent Technologies Company (model 1100).

It was established that fractional composition has decisive importance in the mechanism of stability of wild berries polyphenolic complex and regions of cultivation and technological methods of processing affect the change of it. Anthocyanins prevail among the phenolic compounds in the raw material.

During the research of technological methods of processing of wild raw material it was determined that the maximum exclusion of phenolic and coloring substances is achieved by receiving juice using fermentolysis and amounts to 80%; in case of receiving of puree – 50%; in the case of freezing keeps up to 98% from their content in the outputting raw. The destruction of coloring substances starts at temperature effects higher than 90 °C.

The technologies of processing of juice production's wastes with receiving puree, water and water-alcohol extracts on the basis of marc were developed. The food concentrate of polyphenols with high content of phenolic (11711.3 mg / dm ^{3}) and coloring (11000.6 mg / dm ^{3}) substances was received from blueberries marc. Conducted medical and biological researches of the food concentrate of polyphenols from blueberries show that its use promotes antioxidant protection to the body and activates reductive-oxidative processes in tissues.

Results of conducted researches demonstrate a high content of phenolic compounds in the composition of wild berries and expediency of their using in the food industry during the production of food products with increased content of biologically active substances.

Keywords: *black ashberry, black elderberries, blueberries, juice, puree, marc, phenolic compounds, anthocyanins.*

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THE USE OF CHAENOMELES IN THE PRODUCTION OF FOODSTUFFS

G. Khomich[1], Y. Levchenko, A. Gorobets

Chaenomeles is a fruit culture, representative of sort of quince's. According to the content of acids, pectin matters, aromatic agents it is similar to lemons, and according to the content of vitamins they exceed it several times. Unlike lemon trees, it can be grown in the open in all areas of gardening.

Fruits of chaenomeles of different sorts and products of their processing have been investigated.

Control of quality of source raw material was researched according to organoleptic, physical-chemical and structural and mechanical indexes. A source raw material and received samples of juices were analyzed by standard methods.

The analysis of chemical composition of chaenomeles confirmed, that the fruits contain considerable amount of L-ascorbic acid (106,00 - 249,00 mg/100 gramme), phenic (366 - 610 mg/100 gramme) and pectin matters (0,85 – 1,8 %). The fruits are characterized by high acidity (4,9 - 5,1 %), that allows to use them as the natural source of organic acids in the production of foodstuffs.

The technologies of extraction of juice and puree from the fruits of chaenomeles have been investigated. A sort Vitaminyi is recommended for the extraction of juice, a sort Pomaranchevyi is recommended for production of puree.

Products of processing of chaenomeles were used for developing new recipes of foodstuffs.

The use of juice and puree of chaenomeles in production of jelly and fruit sauces allowed to get a ready product with high organoleptic indexes and enhanced content of biologically active agents, and considerably to decrease content of structure-formers as compared to control samples.

Research on using products of processing of chaenomeles (juice, puree, dried up and ground up marc) in technology of producing flour confectionery (shortbread, yeasted dough) was conducted. Received ready products are characterized by improved physical and chemical and structural and mechanical properties.

Keywords: *chaenomeles, juice, puree, marc, structure-former, organic acids.*

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INFLUENCE OF FINE POWDERS OF VIBURNUM AND SEA BUCKTHORN ON STRUCTURAL AND MECHANICAL PROPERTIES OF SPONGE CAKES

Dibrivs'ka N[1]., **I. Kibalnyk**

Structural and mechanical properties of the food characterize their resistance to the influence of external energy and also the quality of food. Porosity of sponge cakes characterizes their volume and digestibility. Elasticity measures the ability of sponge cakes to restore the previous volume after removing the deforming forces.

Fine powders of viburnum and sea buckthorn, obtained by non-waste processing technologies have been used for research. It differs by the use of a cryogenic "shock" freezing cryodestruction to particle size of the product of about several microns. As a result, powder with high content of natural low-molecular substances which is good for nutrient absorbtion by living organisms and high solubility is obtained. Mass fraction of carotenoids and ascorbic acid increased by 2.5 ... 3.0, and the mass fraction of polyphenols by 1.9 ... 2.2.

In the ready-made sponge cakes porosity (the method is based on determining the ratio of crumb pores volume to the total volume of crumb and expressed as a percentage) and boundary of elasticity (penetration method, which is based on the indenter submerged in the product) were determined.

Indicators of porosity and elasticity of sponge cakes after addition of fine powder of either viburnum or sea buckthorn increase when concentration of additives is increased. Indicators of porosity for sponge cakes with addition of powder are higher in comparison with controls by 2 ... 6%, and rates of boundary of elasticity by 2 ... 7%. It is shown that sponge cakes with addition of berry powders formed better structure and stronger ties. Research samples of sponge cakes show better organoleptic characteristics, ready-made products have nice light berry flavor and aroma.

The data revealed a rational concentration of replacing wheat flour by fine powder viburnum (sea buckthorn) in the amount of 10%. It was identified that during storage period sponge cakes with powder get stale slower.

Key words: *cake, fine powder, structural and mechanical properties.*

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USE OF MICROWAVE-VACUUM SPRAY DRYING IN FOOD TECHNOLOGY

Y. Bychkov[1], V. Oberemok, T. Dmitryuk

One of the objectives of the food industry in Ukraine is the rational use of agricultural products in order to reduce their waste. Vegetable materials are characterized by short shelf life. The timeliness is the necessity of processing large quantities of this material within short periods of time. Traditional methods of processing plant raw material are characterized either by high energy requirements and low productivity or large quantity of wastes and low quality of the product.

There are different ways of drying plant material: solar-air (natural), artificial in dryers, freezing (sublimation), infrared light etc. Each of them has its advantages and disadvantages.

As one of the prospective ways of plant materials processing we can consider obtaining powder mixtures, since the use of soluble powder in production greatly simplifies storage and transportation. Getting powders in laboratory conditions was performed in two ways. The first one was in the initial plant material drying in the microwave-vacuum dryer, followed by further grinding in the machine EMAVSH. The pointed out combination makes it possible to obtain powders of aromatic plants with high dispersion of corresponding organoleptic properties. The disadvantage of this processing is usage of the machine EMAVSH in periodic mode. The second way involves reuse of wastes of processing of carrots, soybean meal, seeds of various crops. The essence of powder manufacturing process is in initial grinding and getting the suspension on machine EMAVSH, with further drying. The advantage of this process is the use of EMAVSH in continuous mode that greatly improves performance of the line. Current problem item is the method of drying the obtained suspension. We propose to use the method of microwave-vacuum spray drying.

Thus, one could argue that the timely issue is to get dry powder out of raw materials of plant origin. Analyzing different methods of drying and equipment that implements them, we came to a conclusion that an alternative to obtaining powders are spray driers. Taking into consideration information on a variety of different modes of drying plant material and getting finely dispersed powders out of them, the question remains open as to a combination of processes of drying, grinding etc. So promising may be using microwave vacuum to intensify the process of spray drying.

Thus, further studies involve the development of the process and physical design of industrial microwave vacuum spray dryers.

Keywords: *spray drying, microwave, vacuum.*

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USING PHYSICAL AND ELECTRICAL METHODS IN CONDUCTIVE MEAT FRYING

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The process of conductive meat frying is inefficient in terms of energy costs and heavy losses of raw materials. Energetic and exergic analysis of the conductive meat frying process and known devices for its realization allowed to formulate possible directions of such equipment with taking into consideration the bias of formation in crust and in meat products themselves of heterocyclic amines by reducing the temperature of process and technology requirements in the process of frying meat with high quantity of connective tissue.

The research of mass conductivity in meat under the influence of heat flow from electric heaters through a flat metal wall, current of electro-osmosis and pressure revealed patterns of occurrence of flow of matter, with the help of which factors of the intensification of double-sided meat frying process were explained in terms of electro-osmosis and meat with high quantity of connective tissue in functionally closed space.

The flow of substances occurring in meat under the combined influence of the heat flow from the heater and current of electro-osmosis, directly proportionally depends on the heat flow, voltage of current, size of meat sample and ratio of the surface area of the electrode to the surface area of the sample, nonlinearly depends on the thickness of the sample and moisture content of meat.

During the research of the emergence of the flow of matter in meat under the combined action of heat flow and pressure, the conditions were defined under which there is no flow of matter and thermal conductivity of meat is close to the thermal conductivity of meat juice, that allows to lead the process of conductive frying of meat with high quantity of connective tissue without the presence of external water.

On the basis of the identified rational parameters were developed and pilot samples of devices for two-sided frying of meat was manufactured.

Keywords: *electro-osmosis, two-sided frying of meat.*

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OCCURENCE OF *FUSARIUM* MYCOTOXINS IN CEREALS IN EUROPE – A REVIEW

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Fusarium mycotoxins include a great number of compounds. The quality of cereals is very important for both human and animal nutrition because if the daily intake of cereals is great, which is normal, the contaminants can be greater.

And this can be a real problem for health in general. Trichothecenes, zearalenone (ZEN) and fumonisins are the major *Fusarium* mycotoxins occurring in cereal grains, animal feeds and forages. Conditions that predispose to mycotoxin production by *Fusarium* species include humidity, temperature, aeration and substrate type. Favourable temperature and water activity are crucial for mycotoxigenic fungi and mycotoxin production.

The relationship between climate change in Europe and mycotoxin development is an accepted idea by most scientists. Trichothecenes, zearalenone (ZEN) and fumonisins are the major *Fusarium* mycotoxins occurring in cereal grains, animal feeds and forages.

Even if a great number of fungal metabolites have been designated as mycotoxins, a small number are known to have significant animal/human health and economic significance. For this, the world-wide impact of mycotoxins on human and animal health is likely underestimated and the future in this area is to identify additional specific biomarkers and group of biomarkers that can be used to establish the adverse biological effects of individual mycotoxins.

Keywords: *Fusarium mycotoxins, trichothecenes, deoxynivalenol, zearalenone, cereals, Europe.*

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PROSPECTS OF USING WALNUT IN TECHNOLOGIES OF DRINKS

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An important part of the overall food scheme is drinks. Unfortunately, the range of drinks is presented solely by drinks pro-duced with the use of traditional fruits and vegetables. The development and introduction of new technologies, selection of food compositions with the use of alternative plant materials such as walnut of milk-wax maturity stage is actual.

Walnut is a unique plant in which all components have high biologically active properties. Walnut kernels contain much protein; essential oils; have high content of vitamins C, E, K, P; contain many minerals materials such as iron, copper, phosphorus, iodine, potassium, magnesium, calcium, cobalt. In unripe fruits and their green shell there is a lot of vitamin C.

Green walnuts are hardly used in the food industry that is why it is an underdeveloped industrial culture.

Thorough research allowed to determine optimal timing of in-dustrial raw nut harvesting namely fruits of milk-wax maturity stage - mid- and late June; pericarp of ripe nuts - late September and early October.

The influence of complex technological factors on extraction of biologically active substances of nuts (the type and concentration of extractant, hydrological values, duration and frequency rate of extraction, particle size material) has been identified. The technology of extract of walnut of milk-wax maturity stage by double extraction has been developed. It was identified that the maximum extraction of bioactive components from raw materials is possible by extraction with 70% aqueous alcohol solution, the hydrological raw materials: extractant 1:1 or 50% aqueous sugar solution under hydrological module - 1: 0.75, particle size of raw material - 10 ... 15 mm, duration - no more than 30 days.

The expediency of using extracts of walnuts of milk-wax maturity stage to create tinned fruit drinks was proved. The technologies of drinks using biologically valuable nut extracts were developed and patented Ukraine.

Keywords: *walnuts, milk-wax maturity stage, extracts, biologically active substances.*

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THE EFFECT OF HAWTHORN (*CRATAEGUS MONOGYNA*) POLYPHENOLS ON REFRIGERATED MINCED BEEF

C. Papuc[1], L. Tudoreanu, C. Predescu, V. Nicorescu, C. Petcu

Plants polyphenols are compounds with antioxidant activity which, in certain concentrations, may inhibit lipid peroxidation and protein oxidation in refrigerated meat. In this study we tested the antioxidant activity of polyphenols extracted from hawthorn (*Crataegus monogyna*) on minced beef subject to refrigeration, and their effects on rheological properties of beef, compared to buylated hydroxyanisole (BHA) synthetic antioxidant.

Minced beef was treated with different concentrations of polyphenols and BHA and then refrigerated at 4°C for one week. To assess the protective activity of polyphenols on lipids, thiobarbituric acid reactive substances (TBARS), conjugated dienes (CD) and conjugated trienes (CT) values were determined. Oxidative processes of soluble proteins have been evaluated by assessing protein patterns (by SDS-PAGE), relative concentration of myoglobin (Mb) and metmyoglobin (MMb). Rheological properties of beef were determined by assessing the consistency coefficient by backward extrusion and the maximum force and energy of forward extrusion using Kramer cell. The results showed that polyphenols extracted from hawthorn are able to protect lipids and myoglobin against oxidation as effective as BHA synthetic antioxidant. Electrophoretic pattern of soluble proteins in beef treated with hawthorn polyphenols was similar to that found for soluble proteins in beef treated with BHA.

Due to the antioxidant activity exerted on lipids and proteins, polyphenols extracted from hawthorn can successfully replace BHA synthetic antioxidant in meats.

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Key words: *beef, lipid peroxidation, protein patterns, myoglobin, metmyoglobin, rheological properties*

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PRETREATMENT AND FREEZING STORAGE EFFECT ON ANTIOXIDANT CAPACITY OF SOUR CHERRIES AND CORRELATION WITH COLOR CHANGES

A. Stan[1], M. E. Popa

During smoothie production is mandatory to have raw materials for the whole year, so it is necessary to storage it after different pretreatments. Freezing preservation is the most used method for the half-finished products in smoothie industry.

Color, flavor, texture and physic-chemical properties are very important quality attributes of fruits, these affecting the acceptability of fruits, fresh, frozen or processed (concentrates, jam, juice, nectar, syrup, dairy products) and being of major concern in product design.

Sour cherries are commercially important and consumed in a variety of ways, including fresh, frozen and canned, or as juice, brined or dried.

The aim of this study is to observe the influence of freezing storage on color, texture, antioxidant activity, vitamin C content and physic-chemical properties of sour cherry and sour cherries puree.

For this purpose, were realized and analyzed 4 different samples starting with just harvested sour cherries, pressed sour cherries, sour cherries immersed in ascorbic acid 1% for 5 minutes and sour cherries blanched at 95^0C for 5 minute.

The analysis have been made, before and after freezing and also after 6 month of frozen storage. During frozen storage the lightness index, L, yellowness index, b and the redness index, a, were also measured and it was observed colour changes for all of sour cherry samples. pH and acidity values, showed that the sour cherry samples registered insignificant changes compared to standard (control) samples.

Keywords: *color, antioxidant activity, sour cherry, freezing, shelf life.*

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CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF FLAVONOID CONSTITUENTS OF THE FLOWERS OF *RHODODENDRON KOTSCHYI* SMIK

C. Georgescu[1], I. Crăciun, M. Mironescu, F. G. Gligor

Introduction *Rhododendron kotschyi* belongs to the *Rhododendroideae* subfamily, the *Ferruginea* subsection of the *Ericaceae* family, popularly known as rose bay. Flavonoids are widespread compounds of the flora and there is special interest in medicinal plants. They normally occur as glycosides but it is difficult to determine all glycosides in a crude plant extract because more reference compounds are not available commercially.

Isorhamnetin, kaempferol, luteolin, rutin, myricetin, chlorogenic acid and /or quercetin have been recognized as the major aglycones of medicinal plants.

Aim: Since no data on flavonoid constituents of flowers from Romania was found in the literature, the aim of this study was to carry out a phytochemical analysis *Rhododendron kotschyi* of this natural product. Antimicrobial activity of the flavonoid constituents of *Rhododendron kotschyi* flowers was estimated in this work, too.

Materials and methods In this paper standards of the flavonoids occurring in flowers extracts of *Rhododendron kotschyi* have been analyzed for the first time by HPLC, using reversed phase columns, isocratic elution and UV detection.

Two samples of flowers of *Rhododendron kotschyi* were collected from Fagaras Mountains. For the antimicrobial activity was used the disc – diffusion mehod and metanolic solution and extracted flavonoid constituents.

Results The extracted, separated and identified compounds was rutin, quercetin and chlorogenic acid.

The flavonoid constituents have shown higher activity against Gram-negative bacteria (*E. coli* and *Ps. aeruginosa*), than against Gram-positive (*Staphylococcus aureus* and *Bacillus subtilis*) ones.

Conclusions. This paper reveals important and new informations about the chemical composition of the flowers of *Rhododendron kotschyi* harvested in Romania, useful in pharmaceutical or food industry and antimicrobial activity of flavonoid constituents.

Keywords: *Rhododendron kotschyi Smik., flavonoid, HPLC, antimicrobial activity*.

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FOOD PACKAGING MATERIALS: CURRENT TRENDS AND FUTURE OPPORTUNITIES

E. E. Tanase[1], M. E. Popa, O. Popa, M. Rapa

Developments in food packaging have evolved in response to the need for protection of the food product from both external and internal environments and in response to consumer expectations for convenience and safe products. Furthermore, there is also an increased awareness on sustainability, which can in general be achieved on different levels.

Sustainability of food packaging materials has to be approached from a holistic perspective (environmental, social and economic dimensions). During the last decade great efforts have been made in order to produce biodegradable polymers as alternatives to petroleum-based polymers.

Food packaging is becoming increasingly important in the food industry, where advances in functionality such as convenience and portioning are gaining more attention.

Food packaging is designed not only to contain and protect food, but also to keep food safe and secure, to retain food quality attributes and freshness, and to increase its shelf-life. In addition, packaging should be affordable to consumers worldwide and, more importantly, it must be naturally biodegradable upon disposal.

This study aims to present current trends in food packaging materials, functionalities, food matrix interactions and sustainability.

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Keywords: *food packaging, packaging materials, packaging functionalities, sustainability, footprint.*

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POLYPHENOLS EVALUATION OF SOME *ROSMARINUS OFFICINALIS* L. EXTRACTS WITH POTENTIAL USE IN FOOD INDUSTRY

D. Hanganu[1], N.-K. Olah, R. F. Campean, F. R. Furtuna, O. Raita, A. Mărculescu, D. Benedec

Introduction The Rosemary (*Rosmarinus officinalis*) is a well-known medicinal and culinary herb with tonic and wellbeing effect due also by the polyphenol content. The purpose of this study was to compare the polyphenol profile of different Rosemary extracts obtained from dry and fresh herb and the evaluation of their antioxidant effect for highlight the potential preservative quality of these extracts in food industry.

Materials and methods There were studied the polyphenols extracted into hydroalcoholic extracts (1:5–dry plant:solvent) obtained from fresh respectively dry plant and the gemmotherapic extract obtained from fresh plant (1:20 – dry plant:solvent). The polyphenol profile was evaluated by UV-Vis spectrophotometry, TLC and HPLC. The total polyphenol respectively flavonoids content were determined by UV-Vis spectrophotometry. The antioxidant effect was evaluated by DPPH, ABTS, FRAP, CUPRAC, EPR and silver nanoparticle (SNP) methods.

Results The results show the identification by TLC of luteoline, luteoline -7-glucoside and caffeic acid in all these extracts. The rosmarinic acid was identified and quantified by HPLC in all these extracts. The hydroalcoholic extract obtained from fresh plant contains the higher concentration of total polyphenols, expressed in rosmarinic acid (0.601 mg/ml), total flavonoids, expressed in luteoline (0.270 mg/ml) and rosmarinic acid (0.350 mg/ml). The less concentrated is the gemmotherapic extract, but also the extraction ratio is higher than the hydroalcoholic extracts. The high content in polyphenols of the fresh plant hydroalcoholic extract was confirmed also by highest values of antioxidant activity: 39.1 □l (DPPH), 7.7 □l (ABTS), 698 □M ET/100 ml (FRAP), 1947 □M ET/100 ml (CUPRAC) respectively 4570 □M ET/100 ml (SNP).

Conclusions. These differences in the polyphenols profiles show the importance of use the fresh plants for obtaining the good quality food supplements. The high antioxidant potential observed at fresh plant hydroalcoholic extract proposes it for used as good quality preservative in food industry.

Keywords: *Rosmarinus officinalis, polyphenols profile, HPLC, TLC, antioxidant effect, dry plants, fresh plants.*

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GC-MS ANALYSIS OF SOME *ROSMARINUS OFFICINALIS* L. EXTRACTS USED AS FOOD SUPPLEMENTS

D. Hanganu[1], D. Benedec, S. Socaci, C. C. Toma, C. Morgovan, N. K. Olah

Introduction. The Rosemary (*Rosmarinus officinalis*) is a well-known medicinal and culinary herb. The purpose of this study was to compare the volatile oil profile of different Rosemary extracts obtained from dry and fresh herb, highlighting the differences between the extracts used as food supplements due by the tonic and wellbeing effect.

Materials and methods. There were studied the volatile oil separated by hydrodistillation from dry plant, the hydroalcoholic extracts (1:5 – dry plant:solvent) obtained from fresh respectively dry plant and the gemmotherapic extract obtained from fresh plant (1:20 – dry plant:solvent). The volatile oil profile was evaluated by GC-MS using headspace injection at 85^0C, for 15 min, ZB-5MS 50 m x 0,32 mm x 0,25 □m capillary column respectively helium as carrier gas. The separated compounds were identified using an MS spectra library. The quantitative determination was performed by normalization respectively by calibration curve method for eucalyptol, alpha-pinene and D-limonene.

Results. The results shown the identification of 22 compounds from volatile oil, 27 from fresh and 13 from dry plant hydroalcoholic extracts respectively 23 from the gemmotherapic extract. The main separated compounds were alpha-pinene, 1,8-cineol, camphene, camphor, d-limonene and cymene. It could be observed a significant difference between the 4 volatile oil profiles. Generally, the fresh plant extracts contain more 1,8-cineole, cymene, d-limonene, bornyl acetate and less camphor and borneol than the dry plant extracts. The highest 1,8-cineole content, determined by calibration curve method, is in volatile oil, the hydroalcoholic extract obtained from fresh plant has more alpha-pinene and D-limonen.

Conclusions. These differences in the volatile oil profiles of the studied extracts are due by the degradation processes that occurring during the drying of plants or extraction. This shows the importance of use the fresh plants, with undestroyed active compounds, for obtaining the good quality food supplements.

Keywords*:* *Rosmarinus officinalis*, volatile oil profile, GC-MS, dry plants, fresh plants.

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THE INFLUENCE OF WHEAT PROPERTIES ON THE GRINDING PROCESS: A REWIEW

M. I. Lupu[1], V. Pădureanu, I. Pantea, C.M.Canja

The relation between wheat kernels properties and the grinding process have been carried out since the beginning of the cereal processing industry.

The course of wheat disintegration depends on its physical and mechanical properties.

This review provides information about the application of the most important physical and mechanical properties of wheat kernel such as kernel size and shape, mass and bulk density, hardness, stress and strain, grinding energy, modulus of elasticity, Poisson ratio.

After analyzing all the wheat properties, can be concluded that all the properties have a great influence on the grinding process but the most important properties are moisture content and the hardness of the grains which influence directly the grinding process.

Keywords: *physical and mechanical properties of wheat, hardness, grinding process.*

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BEHAVIOR OF SEVERAL POTATO (*SOLANUM TUBEROSUM L.*) VARIETIES WITH DIFFERENT STARCH CONTENT TO POTATO TUBER NECROTIC RINGSPOT DISEASE

C. L. Badarau[1], F. Damsa, G. Olteanu, S. Chiru

Introduction Obtaining good quality for potato impose the improvement of identification's techniques of pathogen agents, knowing the biochemical composition, especially the components that could affect its health status. The goal of this research was to evaluate the starch content of 10 potato samples (varieties with different resistance to potato virus Y) and the behavior of these samples to the disease caused by PVY^{NTN}.

Material and methods The potato varieties tested were Christian, Roclas, Productiv (roumanian cv.) and Red Fantasy, Jelly, Desire, Bellarosa, Red Lady, Hermes (foreign cv.). After emergence, the material has been mechanically inoculated, using an Y^{NTN} source (secondary infected plants from Hermes variety). After the inoculation, disease symptoms were observed and ELISA tests have been made. The percentage of tubers with necrotic symptoms was estimated at harvesting time and after 3 months. The starch content was made using Evers method.

Results Excepting the cultivars Christian and Riviera wich were very resistent and resistent to mechanical inoculation, all the other varieties presented 69-100% infected plants. After 3 months from harvesting, the frequency of tubers with symptoms was between 3.3-20.8% for varieties Roclas, Red Fantasy, Bellarosa, Jelly and for varieties Productiv, Desire, Red Lady, Hermes this percentage was higher (69-100%). Regarding the varieties Christian and Riviera, after 3 months from harvest, the stored tubers didn't have visible tuber necrotic ringspot disease symptoms.

Conclusions There is a positif correlation between the starch content of the samples and their resistance to PVY^{NTN} inoculation.

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Keywords: *potato virus Y, necrotic strains, starch.*

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NMR QUANTIFICATION OF THE MAJOR COMPONENTS OF THE ROMANIAN BASIL ESSENTIAL OILS

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Basil is an annual plant native to Asia and Africa. Plant polymorphism is responsible for a large number of subspecies and varieties, from which essential oils with very different compositions are obtained.

On the market there are three chemotypes of basil oils: "linalool" (sweet basil oil, European type), "methyl chavicol" (exotic basil oil, "Reunion" type) and "methyl cinnamate".

In this study were compared essential oils from Romanian basil varieties, commercial basil essential oils and a standard basil oil from Sigma Aldrich. For the identification of the major components of the oils composition were used standards from Sigma Aldrich. The NMR analyses was conducted on a Bruker Ascend spectrometer 400 MHz.

Markers for the major components known from literature (linalool, methyl chavicol, methyl cinnamate) were identified. Well defined peaks, easy to integrate, without any overlaps were selected for each major component. Based on an internal standard all major components identified were quantitatively measured. The NMR result were complemented by the GC-MS and IR analyses.

In conclusion the analyzed essential oils obtained from the Romanian basil varieties belong to the chemotype "methyl chavicol". The chemometrical analyses of the spectral data combined with quantitative measurements offer a good alternative for quality assessments of essential oils.

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Keywords: *essential oil, basil, composition, NMR, spectroscopy.*

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ACTION OF *GALIUM VERUM* EXTRACT ON THE HYPOTHALAMIC - PITUITARY – ADRENAL AXIS MORPHOLOGY UNDER ANAKINETIC STRESS CONDITIONS, IN RATS

I. Roman[1], C-tin Puica

Introduction *Galium verum* L. (Lady's Bedstraw) has multiple therapeutic properties due to its phytochemical compounds: irdoids (asperuloside), flavonoids, phenyl propanic compounds, tannins, citric acid, minerals, enzymes. This therapeutic properties include those which we have been concerned in for this study, such as: a slight sedative effect; nervous system diseases: anti-stress activity, neuroprotective and anticonvulsive, epilepsy, insomnia, etc.

Materials and Methods Experiments were performed on white female Wistar rats, weighing 120 ± 10 g during 15 days. Animals were divided into 4 groups of 6 animals each, as follows: 1 - control group (C); 2 – hydro-alcoholic *Galium verum* extract (1:1) treated group (E), (25 mg extract/100 g bw); 3 - anakinetic stressed group (S), (3 h of immobilization and dark conditions); 4 - anakinetic stress + *Galium verum* fluid extract treated group (SE).

Results The vegetal extract administration, in accordance with the conditions of exposure to stress, resulted in a significant increase in the serum cholesterol level in E and SE groups. Also, histological appearance of the adenohypophysis and adrenals, as well as an increased serum cholesterol levels in SE group suggests a stimulation of secretory activity at the adenohypophysis and adrenal glands level. In S group, the effects of stress were oposite to those of E and SE groups.

Conclusions Histological results of the study proved that the administration of *Galium verum* vegetal extract in condition of anakinetic stress exposure induced important morphological changes on all constitutive assembly of hypothalamo-hypophyseal-adrenal axis. These results justify the stimulation of secretory activity of the axis.

Key words: *Galium verum extract, rats, hypothalamo-hypophyseal-adrenal axis, anakinetic stress.*

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BIOSURFACTANT PRODUCING *LACTOBACILLUS* SPP. STRAINS ISOLATED FROM ROMANIAN TRADITIONAL FOOD PRODUCTS

C. P. Cornea[1], O. A. Sicuia, C. Voaides, M. Zamfir

Biosurfactants are surface-active molecules produced by different microorganisms, including *Lactobacillus,* with emulsifying properties. For their emulsifying activities as well as for antimicrobial, the inhibition of some pathogenic microorganisms, biosurfactants produced by lactobacili could find important applications in food industry. The aim of this study was to screen for biosurfactant production in several LAB strains.

Ten LAB strains selected previously for antifungal activities were used in experiments. They were cultivated in MRS and the biosurfactant production was evaluated both in supernatant and in cells. Cell-bound biosurfactant was extracted in PBS pH 7.0, while the excreted biosurfactant was recovered after acidifying with hydrochloric acid (1M) to pH 2.0. Oil spreading test (on kerosene and edible oils), emulsification activity and drop collapse methods were used for evaluation the biosurfactant production. Antimicrobial action of biosurfactants against *Escherichia coli, Bacillus cereus, Staphylococcus aureus* and *Candida parapsilopsis* was also examined. Molecular analysis of selected strains was performed by PCR (with species-specific primers) and repPCR.

Three out of the tested LAB strains (26, 35 and 61) exhibited clear biosurfactant production. The emulsifying action of kerosene was detected both in extracts from supernatants and from cells, proving that in the selected strains the biosurfactants are cell-bound and excreted.For the strains designated as 26 and 35, the levels of cell-bound biosurfactant production were higher than the excretedones; for the strain 61 the emulsifying activity was higher in supernatant, mainly against edible oils.The antimicrobial action of extracted biosurfactants suggests that these compounds could be one of the mechanisms of inhibitory action of LAB.

The study demonstrates that two strains of *L. plantarum* and one strains of *Lactobacillus spp.* were able to produce cell-bound and excreted biosurfactants. High emulsifying activity was detected on edible oils, giving stable emulsions, suggesting the possible use of these biosurfactants in food industry.

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Keywords: *biosurfactants, Lactobacillus spp., edible oils.*

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IMPACT OF LAB AGAINST *STAPHYLOCOCCUS AUREUS* IN DAIRY PRODUCTS

D. S. E. Vatuiu[1], M. E. Popa

Brief introduction Microbiological quality of milk and dairy products are critical for the conformation with standards and specifications, and regulatory compliance in food industry.

Like other pathogens, contamination of milk and milk products with *Staphylococcus aureus* involves many risks, from altering the product itself to human diseases development (entero- intoxication etc) which implicitly leads to consumer uncertainty.

Staphylococcal enterotoxin is resistant to the action of digestive enzymes specifically acting on the centrals nervous it leading to peristaltic and antiperistaltic contractions of the digestive tract with related symptoms; in severe cases enterotoxin causes vascular collapse, hypotension, cyanosis, and it is very easily confused with symptoms of chemical poisoning.

Materials and methods Microbiological laboratory, culture media and reagents, reference strains, reference standards, samples.

Results The research objectives were aimed at tracking the inhibition level of coagulase-positive staphylococci pathogens by using LAB (lactic acid bacteria - *L. delbrueckii* subsp. *Bulgaricus*, *Streptococcus thermophilus* and *Lactococcus lactis* subsp. *Lactis*) going through a series of stages: from determining pH value and determining the microbial load at t_0 time to incubation for 24h, 48h, 72h periods.The experiments carried out for this purpose had as study material samples of fresh milk, yogurt and cheese.

L. delbrueckii subsp. *Bulgaricus* - significant inhibition after 48h and 72h - **fresh milk.**

Streptococcus termophillus - minor inhibition after 24h and 48h; total inhibition after 72 h - **yogurt**.

Lactococcus lactis subsp.*Lactis* - in all stages, level of inhibition was increasing without obtaining total inhibition - **cheese**.

Conclusions The performed work demonstrated a good inhibition rate of LAB on pathogenic bacteria, depending on used lactic strains or targeted food matrix.

Keywords: *milk pathogens, LAB, dairy products, degree of inhibition.*

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COMPARATIVE *IN VITRO* STUDY OF THE CHITOSAN APPLICATION METHOD EFFECT ON *ASPERGILLUS BRASILIENSIS* GROWTH

A. L. Mihai[1], E. E. Tanase, M. E. Popa

The aim of this study was to investigate the *in vitro* antifungal activity of medium molecular weight chitosan and chitosan film obtained by solvent casting method against *Aspergillus brasiliensis* ATCC 16404. To analyse the antimicrobial effect of medium molecular weight chitosan were used five methods: by incorporation of the *Aspergillus brasiliensis* in Potato dextrose agar (PDA) and puncture of solution of chitosan in acetic acid 1% in the centre of Petri plate (1), by spreading the spore suspension on the entire agar surface of Petri dish and placement of chitosan solution in the centre of the plate (2), by inoculation of suspension of spores in the centre of the agar Petri dish and applying the chitosan solutions on 6 mm diameter disks placed onto the agar surface (3), by spreading of spore suspension on agar media followed by making bores which were loaded with chitosan solutions (4), by incorporation of chitosan solutions in PDA media followed by the puncture inoculation in the centre of Petri plate (5).

As control were used plates without chitosan with 1% acetic acid solution. For the chitosan films the method used consist in inoculation of media with spore suspension in the centre of the dish and then the film was applied on the surface of it in contact with the spore inoculum. Control samples were realized using the same inoculation method, but without films. Plates were incubated at 25°C and the growth was monitored for 7 days.

The results showed that chitosan in acid solution demonstrated no significant antimicrobial activity against *Aspergillus brasiliensis*, but chitosan films show positive effects on the fungal growth and the inhibition mechanism was evidenced at the contact surface of the culture media. In conclusion, chitosan films have the potential to be used in food industry to prevent food products spoilage.

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Keywords: *chitosan, chitosan films, antifungal activity, microbial inhibition*

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GENETIC DIVERSITY OF JERUSALEM ARTICHOKE (*HELIANTHUS TUBEROSUS*) AND USE OF GENETIC RESOURCES IN BREEDING FOR FOOD AND HEALTH SECURITY

C. Brezeanu, T. Robu, P. M. Brezeanu[1], S.Ambarus, A. Dobrescu

Brief introduction The Jerusalem artichoke species shows significant ecological and commercial importance for its strong stress tolerance, very high yield potential and suitability for application in different areas such as chemicals, pharmaceuticals and industrial applications. Its tubers are consumed as vegetable, and the inulin containing tubers can be used as raw material to produce various value-added products such as health food products, animal feed additive. The objective of this work was the characterization of four local ecotypes collected of the North East of Romania and to study their variability in order to exploit the agronomic performance and biochemical content of ecotypes in breeding.

Materials and methods The biological material: four Jerusalem artichoke genotypes cultivated in similar condition. Phenological observation, biometrical measurements and biochemical investigation were set up in order to evaluate the variability of germplasm. The potential use as food, raw material for chemicals, pharmaceuticals and other industrial applications a literature review and also a collection of traditional information.

Results Because of its high adaptability Jerusalem artichoke can be cultivated with almost no fertilization, irrigation and other field preparation, being suitable for cultivation in ecological system. The species is a valuable resource in sunflower breeding thanks to its resistance to biotic and abiotic stress. Our results revealed a good nutritional potential of this species regarding mineral composition and a good agronomic performance.

Somme of identified potential uses: (1) forage crop (2) raw material (food industry, alcohol industry (3) medicinal: reported as aphrodisiac, cholagogue, diuretic, spermatogenetic, stomachic, tonic, remedy for diabetes and rheumatism (4) summer screen, thanks to its fast growing (5) flower as decorative (6) leaves as strong sources of phenols.

Conclusions Related with morphologically and biochemically investigation valuable traits of accessions, which may be recommended for breeding as parental forms, were singled out.

Keywords: *morphology, biochemistry, tubers, minerals, yield, and multiple uses.*

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INVESTIGATIONS ON ANTIOXIDANT CAPACITY AND POTENTIAL USE OF HOT PEPPER FRUIT *CAPSICUM ANNUUM* L

P. M. Brezeanu, C. Brezeanu[1], T. Robu, S. Ambarus, T. Stan

Brief introduction In recent past, great attention is given to the nutritional value of vegetable and also to the exploration of multiple uses such as culinary, spices, medicinal and decorative. Hot pepper is an important agricultural crop, not only because of its economic importance, but also thanks to nutritional and medicinal value of its fruits. The aim of this study was (1) to evaluate the antioxidant activity of three hot pepper genotypes and to investigate the influence of ripening moment on nutritive composition (2) to screen the traditional medicinal potential use of species.

Materials and methods The biological material was represented by three hot pepper genotypes cultivated in similar technology condition and harvested in the same seasons, geographic area and climatic conditions. HPLC investigations were made in order to evaluate the antioxidant potential. The potential use as medicinal plant represents a compilation between a literature review and a collection of traditional information.

Results According to our results, the genotypes investigated have levels of phenolic constituents that contribute to a high antioxidant activity and may be considered as a good source of natural antioxidants. Present investigations revealed that hot pepper genotypes differ significantly with respect to their antioxidant potential. We demonstrated that harvesting stage represents one of the major factors that determine the compositional quality of pepper fruits.

Conclusions Hot peppers were found to be a good source of phenolic compound, carotenoids and ascorbic acid. The information presented in this study can help promote the consumption and use of hot peppers in food industry and also in medicinal propose. 'Iute delicios' genotype had the highest antioxidant capacity, which correlated with the highest levels of total phenols, flavonoids, ascorbic acid and carotenoids content present in the peppers fruits could contribute to a strong antioxidant activity.

Keywords: *phenols, carotenoids, ascorbic acid, genotype.*

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SUPERMARKET TRADE MARK AS TRUTH OR DELUSION

V. Lazarevic[1], F. Maletic

This paper will present problem of trade marks in Serbian supermarkets. Consumer on supermarket shelf can find plenty of products of each category, but in last few years we have opportunity to bay product which has supermarket trade mark.

Product with that sign is everyday product as milk, pasta, jus, cafe, tee, meat, food in can, etc.

The common elements of this product are that its price has to be lower than price of other product in same category.

Packaging and its design in unified. Design is simple, individual for each Supermarket, just with basic product information.

In this paper I will analyze haw Supermarket's packaging and design are massage, which can make misunderstanding with consumers and someone have get benefit of it. On beginning those product, branded with supermarket trade marks were a little bit chipper than other product (in same category), and consumers automatically put them in their baskets. But sometimes it's not so. Benefit of it misunderstanding or trick goes to supermarket.

Key words: *trade mark, price, packaging, design;*

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AROMATIC EMULSIONS BASED ON STARCHANDGUMARABICINFOODPRODUCTION

O. Lugovska[1], V. Sidor

Introduction Modern trends in the industry aimed at creating production with full use of raw materials and reduced energy costs. Using emulsion due to the possibility to reduce the manufacturing process at lower energy costs. This difference is particularly useful in the food industry, because of the emulsions are all necessary components of food, which greatly simplifies the production technology.

However, in the food industry, there are several problems associated with the production of food emulsions formed by mixing two liquids mixing not: oil and water. Apply forth is purpose emulsifiers, gumarabic and starch process allows for emulsification and homogenization of emulsions.

Materials and Methods Research The aim was to create a scientifically based conditions for expansion of industrial production of aromatic emulsions using emulsifiers, gumarabic and modified starch.

Based on the task of research design improvement method of preparing emulsions by introducing new technological parameters in order to obtain a stable emulsion system with the maximum number of particles as small as 1 micron. The resulting emulsions used in amounts 1-2g /l in soft drinks in food and 2-4g/ l in alcoholic beverages in mass catering establishments and restaurants.

Results The use of aromatic emulsions for soft drinks has several benefits, including: reduced duration blending, as there is no need to add pickup the colorant and flavoring. The use of aromatic emulsions drinks solves the problem of stabilizing the aroma and taste, as in this case, an emulsifier, gumarabic and starch acts as adsorbent aromaof providing fine and mild flavor.

Aromatic emulsions are used to flavor, color and aroma of alcohol that is prepared on the basis of alcohol, sugar, citric acid and adding extra juice concentrates, depending on the formulation of the finished beverage.

It follows that the emulsionis widely used in various sectors of the food industry. Getting a stable emulsion system is important and promising issue.

Keywords: *emulsion, gumarabic, starch, particlesize, stability*

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MODELING OF PROCESSES FOR FOOD SHELF LIFE DETERMINATION

D. Kulev[1]

Shelf life is a period of time during which food shall strictly comply with safety requirements, keep properties claimed in labeling and upon the expiry is unfit for consumption. Food shelf life modeling allows solving at least three tasks:

1. Determination of changes in product characteristics and properties against storage conditions. Formally differential equations system is solved as:

$$F_1 (Y, X, \tau) = 0 \quad , \qquad (1)$$

where X is the vector of external conditions, $X \in A$ (certain domain of storage conditions) ;

Y is the vector of product properties $Y \in \Psi$ (criteria of keeping through time); τ is the validity period.

The system of product state consists of equations of heat and mass transfer, radiative transfer, state for stress-deformed body with finished form. Process of the product spoilage may have chemical, physical, biochemical or microbiological nature. X components are: temperature, radiation frequency content, its intensity, active media concentration, microbiological properties.

Organoleptic, deformation, sorption, diffusion properties, content and composition of nutritional substances are taken as Y.

Priori the product is suitable (deterministically or stochastically) during the time τ upon which expiry Y point escapes from the certain domain Ψ under X condition, then deteriorating processes are evident as defects and the product's fate is sealed.

In general Ψ depends on time and on Y. Regularly some geometric body, a parallelepiped for example, is chosen as Ψ. In Ψ domain the system is solved against τ with regard to time-constant threshold components Y_i^{tr}.

2. Determination of mechanisms responsible for product structural changes (C) and its organoleptic properties (C^1) under combination of factors at its storage and realization. In this case the system of equations in partial derivatives is solved as:

$$\partial c / \partial \tau = F_2 (a_1 , C, X) \quad , \qquad (2)$$

where a_1 is the unknown variables vector (invariables of the reaction rates and stoichiometric coefficients). All physicochemical bonds and structural elements-concentration defining Y is taken as C. With mass exchange processes F_2 is the second-

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order quasilineal elliptic operator, but without mass exchange F_2 goes into polynomial in C variable.

3. Determination of principles responsible for new properties as a result of food deterioration:

$$Y = F_3 \ (a_2 \ , C, C^1) \quad , \qquad (3)$$

where a_2 is the unknown variables vector of functional, generally empirical relationship F_3.

The simultaneous solution of the above three systems allow obtaining the predictive product shelf life.

The set task is solved by variation of the X control vector-function in the certain domain of storage conditions A^i and experimental Y points removal in time τ. Regularly every point coordinates in the domain A^i are larger than those in the domain A, so the accelerated testing is needed.

Conclusion: For more precise estimate of F_1, F_2, a_1, a_2 and discrimination of some models it is necessary to use the test planning method invoking the Arrhenius model.

Keywords: *Food products, Shelf life, Predictive modeling, Storage conditions, Properties, Quality, Spoilage, Differential equations*

FOOD SYNTHETIC COLORANTS DETERMINATION FROM ROE FISH BY HPTLC

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Food dyes are widely used in different food products to offset color loss or to improve the aesthetic quality that is diminished during processing and storage. To prevent fraud in the food industry, to ensure food safety and consumer health protection, it is necessary to implement fast, accurate and reliable methods for the analysis of dyes.

A relatively fast method based on high performance thin layer chromatography (HPTLC) - photodensitometry was developed and applied for the determination of two synthetic food dyes (Sunset Yellow – E 110 and Ponceau 4R – E 124) in fish roe. The analyses were carried out on HPTLC Silica gel plates, using the mixture iso-propanol-ammonia (2:1, v/v) as mobile phase. Linear regression curves were obtained for both dyes on working concentration range (R^2>0.9935). LOD and LOQ values were 36.8 and 69.9 ng/spot for E-110 and 24.3 and 44.5ng/spot for E-124, respectively.

Due to the complexity of the matrix, sample preparation was performed into two steps: (i) analytes extraction by ultrasound assisted extraction and (ii) extract purification by solid phase extraction on LiChrolute RP-18E.

The recovery for the whole sample preparation step was determined on spiked samples at two different concentration levels and two types of fish roe. The recovery of analytes was higher than 95% and RSD value was below 3.5%.

The procedure was applied for E110 and E124 determination from a “red caviar” sample with declared content of dyes. It was found that the analyzed food stuff contained 185mg E110 and 192,5mg E124 per kg roe fish.

Keywords: *Food synthetic colorant, roe fish, HPTLC.*

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COMPOSITIONAL CHANGES IN GRAPE SEED OILS FROM TRADITIONAL AND LOCAL ROMANIAN RED VARIETIES

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Grape seed oil has many beneficial properties for the human health. Their properties are mainly due to the fatty acid profile of the triglycerides (especially the biologically active polyunsaturated fatty acids).

The main objective of this paper consists in the analysis of oils extracted from traditional and local Romanian red varieties grape seeds. Authentic grape seeds of different red varieties – both traditional (international varieties: Burgundy, Cabernet Sauvignon, Merlot, Pinot Noir and national Romainian variety: Fetească Neagră) as well as new local varieties (conceived at RCVE Mufatlar: Cristina, Mamaia) – were collected from the 2011 crop of Murfatlar vineyard (geographic region of Dobrogea, Romania).

Grape seed oils were characterised in terms of structure and composition using several methods, such as: gas chromatography coupled with mass spectrometry (GC-MS), infrared (IR) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy.

The IR and NMR spectra were recorded directly on the oil sample, and the GC-MS analysis was performed on the fatty acid methyl esters (FAME). Spectral data were processed using statistical analysis methods (Principal Component Analysis – PCA and Hierarchical Clustering Analysis – HCA).

Thus, the classification of the samples according to the type (traditional or local) of grape varieties was obtained.

In conclusion, the oils extracted from grape seeds can be differentiated according to their variety on the basis of their fatty acids profile and specific spectral fingerprint.

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Keywords: *grape seed oil, composition, fatty acids, NMR, PCA, spectroscopy.*

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A COMPARISON OF BIOACTIVE COMPOUNDS IN DRYING PURPLE-FLESHED APPLES

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Apples are quite popular consumed fresh, as well as processed into juice or dried material. Poland is considerable producer of apples in the world. Traditional apple fruits are important source of antioxidant compounds, especially polyphenols. Purple-fleshed apples are not very well known, although they contain anthocyanin pigments which could improve their nutritional and sensory values. The aim of this study was to compare the bioactive compounds contents, antioxidant activity and colour of purple-fleshed apples "Aldenham Purple" cv. after drying in different ways.

Purple fleshed apple cubes were subjected to drying with convective, vacuum-microwave and freeze-drying methods. Polyphenolic compounds and anthocyanins contents in dried cubes were measured by HPLC method. Antioxidant activity was investigated as ABTS radical scavenging. Colours were measured by spectrophotometer and results expressed as CIE L*a*b* colour coordinates.

Different drying method significantly affected on polyphenolic contents. The highest was found in free-dried apple cubes, the lowest in convective dried, 191 and 88 mg/100g DM, respectively. Chlorogenic acid, in amounts from about 25 to 55%, was the main components. Anthocyanin content in fresh apples was 15.3 mg/100g DM. The concentration of anthocyanins was significantly decreased to 2.4 mg/100g DM after freeze-drying and even to 0.5 mg/100g DM after convective drying. However the convective dried apple cubes exhibited the highest antioxidant activity (188.4 µmol Trolox/g DM), whereas the lowest vacuum-microwave sample (160.7 µmol Trolox/g DM). Considerable differences were found in the colour parameters. Compared to the others, freeze-dried apple cubes had about 15% higher L*(lightness) and +a*(redness) values. Parameter +b* (yellowness) was the highest in case of vacuum-microwave dried sample.

Freeze-dried purple-fleshed apple cubes had the highest contents of polyphenolic compounds and anthocyanins. Convective dried samples possessed the highest antioxidant activity. Compared to the others, freeze-dried apple cubes had higher L*and +a* values, whereas +b* values in vacuum-microwave was the highest.

Keywords: *purple-fleshed apples, polyphenolic compounds, anthocyanins, antioxidant activity, CIE L*a*b* colour coordinates.*

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THE EFFECTS OF RADIOFREQUENCY TREATMENT ON MICROORGANISMS INVOLVED IN FOOD SPOILAGE

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Food spoilage may be defined as a process or change which renders a product undesirable or unacceptable for consumption.

Food stability may be hampered by the contamination of a large diversity of microbial spoilers, from prokaryotes (Gram negative and positive bacteria) to unicellular (yeasts) and multicellular eukaryotes (moulds). In

some cases, spoilage is linked to a given strain, while in other cases an association and succession of microorganisms are observed, making a direct connection between observed food spoilage features and microbial metabolic trait hazardous. Effective preventive measures and intelligent preservation methods have been put into place to reduce food spoilage and to prolong food shelf life.

The primary focus of food preservation has been on controlling microbial populations, with a specific emphasis on pathogenic microorganisms. Innovative non-thermal processes for preserving food have attracted the attention of many food manufacturers.

The objective of this work is to make a short review in respect to radiofrequency treatment as an unconventional antimicrobial treatment of food. The paper presents an inventory of microorganisms involved in food spoilage inactivated by radiofrequency treatment.

Keywords: *food spoilage, preservation methods, radiofrequency and antimicrobial.*

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INFLUENCE OF ULTRASOUND FREQUENCY ON ANTHOCYANIN PIGMENTS EXTRACTION FROM PURPLE POTATO TUBER

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The recent interest on phenolic bioactive compounds has caused an increased attention for optimizing the techniques used in bioactive phytochemicals extraction from different natural sources.

In order to determine the best extraction conditions using direct sonication were varied frequency (20 kHz and 24 kHz), amplitude (20%, 50% and 80%) and sonication time (5 min, 15 min and 25 min).

The results from direct sonication were compared to an indirect ultrasonic bath system with operating frequency of 35 kHz. The controls are simple extraction in solvent with intermittent shaking.

To optimize the extraction process was performed mathematical modeling (full factorial experiments 2^2) using SigmaXL software.

The total anthocyanins content were determined spectrophotometrically by the pH differential method.

This study proves that direct sonication improves the total anthocyanins content extraction compared to indirect sonication and to the conventional solvent extraction.

Keywords: *purple potato, anthocyanin pigments, flavonoid, ultrasound frequency.*

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VERIFYING THE RED WINES ADULTERATION THROUGHT ISOTOPIC AND CHROMATOGRAPHYC INVESTIGATIONS COUPLED WITH MULTIVARIATE STATISTIC INTERPRETATION OF THE DATA

E. I. Geana[1], D. Costinel, O. R. Dinca, R. E. Ionete

Introduction The identity and authenticity of products are current topics in food science and has gained a lot of interest internationally. The wine matrix is of particular importance within the authenticity testing of foods, because it has always been subject to various fraudulent practices.

Counterfeiting of wines became in the present day more sophisticated and versatile, reason to identify reliable analytical methods for their detection.

Materials and methods In this, work sweet or medium sweet red table wines were subject of isotopic and chromatographic investigations to determine several chemical parameters significant for their quality assessment.

Therefore, exogenous addition of sugars and water in counterfeited table red wines was detected by the measurement of stable isotopes content ($\delta^{13}C$ and $\delta^{18}O$) by IRMS, while the presence of hydroxymethylfurfural (HMF) and the presence of synthetic sweeteners or synthetic red dyes used to correct deficiencies was detected by HPLC investigations.

Additionally, the nature and profile of anthocyanins was studied by HPLC, from the viewpoint of their applicability to determine the table wines authenticity. Subsequent, statistical interpretation of the data was performed.

Results Anthocyanins and the relative proportions of anthocyanins represent important tracers used to differentiate wines by category. Amongst the investigated table wines, 28% were adulterated and 17% were suspect of adulteration, indicating an alarming increase of fraudulent practices in the wine industry.

Conclusions We can conclude that the method of stable isotope ratio analysis (SIRA) is a powerful technique for authenticating the authenticity of wines. At the same time, in the case of wines with altered organoleptic characteristics, analytical investigations more accessible for many laboratories can be performed, in order to incriminate those wines.

Keywords: *adulteration, table wine authenticity, stable isotope ratio, anthocyanins, additives.*

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MEDICINAL AND AROMATIC HERBS AND THEIR IMPLICATIONS IN FOOD SUPPLEMENTS AND FUNCTIONAL FOODS

A. Marculescu[1], M. Badea

Based on the message of Hippocrates - *Food is your medicine and your medicine be food* - the current concept is very present on the idea of eating healthy food, food for the prevention, preservation of health.

In this context, considering the deficiencies of essential nutrients from ordinary food, there were found solutions to fill in these gaps and strengthen the body even further by active components in new products - *food supplements and functional food* - where medicinal and aromatic plants find a great importance.

In this work we conducted a study on the official use of medicinal and aromatic plants, starting with the first Romanian Pharmacopoeia, from where we found that they played an important role in the preparation of pharmaceutical remedies since 1862. Passing through stages of decline with the development of synthetic chemistry, medicinal and aromatic plants have again become popular, according to the Romanian tradition, by including them in products known as dietary supplements which are at food-drug limit.

With the scientific promotion of herbal food supplements it is observed a spectacular activity of rediscovery of plants traditionally used, many of which being not found in the monographs of the 10th editions of the Romanian Pharmacopoeias. Manufacturers of herbal supplements have developed their own medicinal and aromatic crops, with specific concerns of BIO-crops.

This paper makes a study on plant species with the greatest impact for food supplements in Romania and for consumers, highlighting the benefits which they bring to the modern diet.

Keywords: *medicinal herbs, aromatic herbs, food supplements, nutritional supplements, functional foods.*

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AN OVERVIEW ON THE ANALYSIS METHODS FOR TEBUCONAZOLE RESIDUE IN PLANT MATRICES

V. Niculescu[1], D. Stegarus, R. Ionete, R. Zgavarogea

Tebuconazole is a triazole systemic broad-spectrum fungicide used as a seed dressing and spray with protective and curative action. It acts as a demethylation inhibitor (DMI) of fungal sterol biosynthesis. It is absorbed into the vegetative parts of the plant and is translocated acropetally in the xylem. It provides reliable efficacy before and after infection by the pathogen.

Several multiresidue methods for the determination of pesticide residues in vegetables are mainly based on liquid-liquid extraction by organic solvents such as acetone, ethyl acetate and dichloromethane, solid phase extraction (SPE) using sorbents such as Florisil, silica gel, C18 and alumina, supercritical fluid extraction (SFE) and stir-bar sorbent extraction (SBSE). The clean-up step is based on solid-phase extraction or gel permeation chromatography.

Final determinations are carried out using liquid chromatography (LC) with diode array detection (DAD) or mass selective detection and gas chromatography (GC) with electron-capture, nitrogen phosphorus or mass selective detection. Moreover, matrix solid-phase dispersion (MSPD) procedures have been reported to determine pesticide residues in grains, fruits and vegetable matrices.

Matrix solid-phase dispersion (MSPD) procedures have been reported to determine pesticide residues in grains, fruits and vegetable matrices. These MSPD procedures used C18 or graphitized carbon black (GCB) as sorbent to extract the compounds from the matrix.

Residue trial data have shown that residues of tebuconazole in most treated crops decrease rapidly after the day of application, after what the levels seems to plateau. This study will highlight the advantages and disadvantages of the analysis methods, from sample preparation to final detection of the tebunonazole in plant matrix.

Keywords: *chromatography, fungicide, plant, tebuconazole.*

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IMMUNOMODULATING POLYSACHARIDES FROM OYSTER MUSHROOM FRUIT BODIES AND SUBMERGED MYCELIUM

B. Kolesnikov[1], O. B. Oprea, L. Gaceu, V. Konusova, M. Shamtsyan

For the centuries mushrooms were used in different civilizations not only for their nutritive value, but also for their biologically active properties. The major part of the traditional knowledge of mushrooms bio-active and medical properties originating from the Oriental countries.

Historically, mushrooms were gathered for wild as for consumption, as for medicinal use. While mushroom cultivation now spans many centuries, it is only over the last few decades that there have been major expansions in basic research and practical knowledge leading to the creation of a major worldwide industry.

In our studies aqueous extracts from hall fruit bodies, as well as, from their different parts, such as mushroom caps, stipes and stromas, and also from submerged mycelia of oyster mushroom (*Pleurotus ostreatus*) were examined for immunomodulating activity.

Major components of the extracts were water soluble polysaccharides. Studied extracts demonstrated various types of marked biological actions: activation of phagocytosis - an increase generation of reactive oxygen forms by neutrophil cells of human peripheral blood; a significant mitogenic activity; stimulation on production of inflammatory cytokines by peripheral blood cells; increase in the levels of anti-body forming cells.

Obtained results indicate the possibility of utilization of mushroom polysaccharides as food supplements with immunomodulating function and for development of functional food products.

Keywords: *immunomodulation, mushroom polysaccharides.*

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HYDROPHOBINS AND MILK-CLOTTING ENZYMES FROM SUBMERGE FUNGAL CULTURE *COPRINUS LAGOPIDES*

B. Kolesnikov[1], I. Larionov, I. Dubinina, M. Shamtsyan

Mushrooms are a source of a large variety of biologically active compounds. Fungi kingdom includes variously estimated from 100 to 250 thousand species. However, only a small part of them was studied as the source of valuable substances.

In the middle of 80s special proteins called hydrophobins have been found in the fungi. These proteins have interesting physical properties.

A unique feature of hydrophobins is their ability to self-assemble into amphipathic membranes and to convert the contact surface. Hydrophobins are a promising object for the study and application in various industries.

The range of intended application of hydrophobins include their use as surface coatings, immobilization agents, gashing indicators and others. One of the most promising applications of hydrophobins is their use as stabilizers of food foams and emulsions.

Our objective was to study the culture of fungi *Coprinus lagopides* as a source of hydrophobins. The method of submerge cultivation was used to grow fungi. Fungal culture was grown on glucose-peptone medium. After that fungal biomass was separated from the culture broth by filtration and then it was subjected to successive freeze-thaw for destruction of the cell wall of the fungus.

Native liquid was frozen for subsequent study. *Coprinus lagopides* hydrophobin forms agglomerates, which are soluble only in strong acids such as formic and trifluoroacetic acid (TFA). In this regard, the intracellular liquid was foamed with the aerator, then the resulting foam was treated with 99% solution of TFA.

A remnant of the TFA was evaporated and the residue was treated with 60% ethanol. Insoluble components and particles of biomass were separated by centrifugation at 6000 r / min.

After that, ethanol was evaporated from solution on a rotary evaporator and the remaining aqueous solution was freeze-dried. The protein concentration in the obtained extracts was determined using the method of Lowry. The presence of hydrophobins in the obtained extracts HPLC method was used.

Foam-stabilizing activity of obtained extracts was tested. For comparison we selected sodium caseinate - one of the most popular at present food foam stabilizers. 0.1% solution of the extract and 0.5% solution of sodium caseinate were prepared. In both solutions 0.5% xanthan was added as a thickener.

The two solutions were foamed with aerator and then the volume of foam was measured every week for 2 month. The use of our extracts yielded resistant foam, and

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the loss of foam in the air phase for 9 weeks was not more then 40%. In the sample, stabilized with sodium caseinate, a week later there was complete loss of air phase and the deposition of foam.

To improve the economic efficiency of the developed process, it was necessary to develop a method of effective utilization and cultivation of native solution *Coprinus lagopides*. On the 7th day of cultivation we checked the number of native fungus solution enzymatic activities (milk-cloting (MCA), laccase, collagenase, etc.) and found a high MCA.

MCA level was determined by the method of Kawai-Mukai. The protein concentration in the culture liquid was determined using the method of Lowry. The results indicates that the specific MCA of native liquid of the fungus cultivation was 24.4 U/mg. The process of concentration and purification of the native liquid was performed by ultrafiltration, resulting in increase of specific MCA from 24.4 to 84.4 U/mg.

Keywords: *hydrophobins, milk-clotting enzymes, mushrooms.*

PROGRESS IN DISCRIMINATION OF HONEY BOTANICAL ORIGIN BY $\Delta^{13}C$ AND $\Delta^{15}N$ STABLE ISOTOPES

O. R. Dinca[1], D. Costinel, R. Popescu, M. G. Miricioiu, I. Stefanescu, G. L. Radu, R. E. Ionete

The specific compounds that provide specific particularities to each honey type give its value and unicity, reason for selecting the most appropriate and highly sensitive techniques when an authenticity study is considered. The main aim of the work is to demonstrate that the combination of isotopic ratios ($^{13}C/^{12}C$ of honey and$^{13}C/^{12}C$ and $^{15}N/^{14}N$ from protein fraction extracted from honey) with multivariate analysis, can be a reliable tool to differentiate the botanical origin of honey. A set of 35 honey samples of different floral varieties, from different parts of Romania, during year 2013, were included in the study. Processed by cluster analysis, principal component analysis and discriminant analysis, the data obtained by isotope ratio mass spectrometry (IRMS) technique for $\delta^{13}C_{honey}$, $\delta^{13}C_{protein}$ and $\delta^{15}N_{protein}$ allowed a good separation of the honey samples across different botanical varieties, enabling 97% correct classification for the generated model. Significant differences were observed among the honey samples, especially for $\delta^{15}N$ ranging from -2.40‰ (multiflower honey) to +4.90‰ (acacia honey), that is strongly correlated with the area's soil composition (different types of soil which fix the soluble nitrogen compounds better than other soil types), amount of precipitation, water stress and botanical origin (plants with the ability of fixing nitrogen from air). The degree of discrimination for the botanical origin of honey is explained by the strong correlation between the stable isotopes and the specific fingerprintt of the plant-soil system provenance.

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Keywords: *Authentication of botanical origin; Honey; Isotopic tracers/markers; Multivariate statistical analysis.*

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QUEEN MARY'S FLOWERS AND FLORAL THERAPY

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Alternative therapies including herbal medicine and aromatherapy have gained more ground being often required by patients in doctors treating.

The confidance about alternative therapies is explained and proved in Dr. Wilhelm Pelikan subtle experiments presented in his book „Man and medicinal herbs". Relationship *humans - plant* and especially *humans – medicinal herb*, underlies a scientific foundation, proved by the sensitive crystallizations method, which suggests that the remedies of certain plants organs are capable of healing certain humain diseases.

Recent research on the ***floral elixirs*** - those subtle extracts prepared from flowers (collected from spontaneous vegetation or crop plants) using the sun or boiling method, according to Bach method, lead to the same sensitive human-plant relationship. This time the ***floral essence*** that imagines the plant energys footprint is acting on emotional imbalances - which according to Dr. Bach theory are at the root of all diseases. The emotional and mental balancing by floral elixirs has direct repercussions on physical bodys health.

These things led us to a more detailed research on Queen Mary's special relation with flowers and her gardens, where the yellow and purple flowers would always be found. She proposed exceptional floral gardens in her favorite places - Bran, Balchik and Sinaia. Through this study we try to emphasize Queen Mary relationship with flowers grown in her garden (for brain helth, joy and beauty), with her favorite flowers of wild flora and also the exceptional relationship with Romanian communities in which she lived. Floral therapy can find inspiration in the Queen Mary's flowers.

Key word: *floral therapy floral elixirs, Queen Mary's flowers.*

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CHALENGES IN DEVELOPING NEW FORMULATIONS FOR FOOD SUPPLEMENTS CONTAINING VEGETAL EXTRACTS

F. G. Gligor[1], C. Dobrea, C. Georgescu, M. Totan, A. L. V. Gligor

The market of food supplements has increased over the years. Milk thistle - *Silybum marianum* – standardised extracts have been intensively studied and their positive effect on liver functionality plus other health benefits have been demonstrated.

The aim of this study consists in obtaining a new lactose free tablet formulation containing *S. marianum* standardised extract in order to meet the requirements of different markets.

Materials and method The reference product is a round tablet containing *S. marianum* standardized extract equivalent to 35 mg silibin, lactose and other excipients, mean tablet weight of 140 mg. Cellulose, isomalt and dicalcium phosphate have been selected as possible substitutes for lactose. Each excipient has been primarily tested by preparing laboratory scale tablet batches (500g). Three pilot batches (5 kg) were studied for each excipient. The pharmacotechnical properties of the tablets were measured and recorded.

Results All pilot batches had pharmacotechnical properties in the desired range of values: mean tablet weight [mg] 133,00 – 147,00; height [mm] 3,3 – 3,7; diameter [mm] 6,9 – 7,1; hardness [kN] 30 – 80; disintegration time less than 30 minutes, friability less than 1 %. Comparing the results, the cellulose tablets were the most friable, the isomalt formulation needed the longest time to disintegrate and the dicalcium phosphate tablet batches had the highest hardness.

Conclusions Oral solid dosage forms containing milk thistle extracts are widely used in order to support liver functionality. Lactose is one of the most employed excipient for tablets, ensuring excellent pharmacotechnical properties. Due to the potential lactose intolerant customers, many markets require lactose free food supplements. Three new formulations for milk thistle extract tablets were created, containing isomalt, cellulose, and dicalcium phosphate as alternatives to lactose. Currently the formulations containing isomalt and dicalcium phosphate that made the subject of this study are being produced on industrial scale.

Keywords: *milk thistle, silibin, tablet formulation, lactose, cellulose, isomalt, dicalcium phosphate.*

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GASTROREZISTENT COATING FOR FOOD SUPPLEMENTS IN ACCORDANCE TO EUROPEAN LEGISLATION

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Oral solid dosage form food supplements have a series of advantages over liquid forms for adults regarding stability, taste. Coated tablets ensure the highest degree of stability, offering also a tool for controlling content release. For example, food supplements containing pancreatin should only release the active ingredient into the intestine. Several gastrorezistant pancreatin tablets are being marketed in Europe. Most of them had lauryl sulphate in the film forming agent. In the present, regulations enforced by the European authorities do not allow lauryl sulphate in food supplements.

The aim of the study is to develop a gastrorezistant coating formulation suitable for pancreatin tablets, in accordance with the European Union legislation, Commission Regulation (EU) No 816/2013.

Materials and method Pilot batches 1 to 5 used polyvinyl alcohol mixture as a subcoat. The enteric coating was obtained using an ethylcellulose mixture. The weight gain for the second coating was kept in the range 6 – 1,5 %. Pilot batches 6 to 10 used a subcoat containing hydroxypropyl methylcellulose. The enteric coating was obtained by using different ratios of water soluble shellac salt, glycerin and hydroxypropyl methylcellulose (weight gain 3%). The gastroresistance test was performed according to the European Pharmacopoeia 7th edition.

Results For the first four pilot batches gastrorezistance was obtained, but the tablets failed to disintegrate in the required time when placed in alkaline solution. The fifth batch (enteric coating - 1,5 % weight gain) disintegrated in the acid solution. Batches 6 to 10 had results each time closer to the desired standards.

Conclusions. Pancreatin tablet food supplements demand gastroresistant coating. A two steps system using a subcoat (hydroxypropyl methylcellulose) and an enteric coating (water soluble shellac salt: glycerin: hydroxypropyl methylcellulose at specific mass ratios) ensures the gastroresistance of the tabets. All ingredients are in conformity with the international regulations. The formula has been approved by the Romanian authorities and is now used in production.

Keywords: *gastrorezistent coating, food supplements, pancreatin.*

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GELATINE PRODUCTION OBTAINED FROM AQUACULTURE FISH WASTE AND THE QUALITY OF GELATINE

Y. Orhan, O. Ozden[1]

The collagen is available in the muscles, bones, tendons and ligaments of mammalian. Gelatine is a protein substance produced by the hydrolysis of collagen under controlled conditions.

Mainly, gelatine is used in the food industry. In this regard, pharmaceutical and medical sector is the second place. The production of gelatine is about 350000 tons in world and this is produced from bone and skin of cattle and pig. In 1986, the detection of mad cow disease in cattle has aroused concerns in gelatine manufacturer. $ 15 million annually for gelatine in Turkey is building expenses, and it is supplied by imports of almost all of the gelatine needs. Gelatine consumption is show 8-10% increase for each year. On the other hand, 30-33% of the waste from the fish processing plant consists of fish skin and bones. The amount of daily waste of fish processing plants is approximately twenty-two tons. The evaluation of this waste as value added products is the most important for the country's economy.

The purpose of this study, the production of gelatine from fish waste of aquaculture origin fish and to determine the quality of gelatine. The quality of produced gelatine were determined by different tests (proximate and amino acid composition, heavy metal content, pH, colour, bloom, foaming capacities and stability, melting and gelling points, net yield).

Fish wastes was treated for 24 hours with 0.05 M citric acid concentration. Gelatine was obtained by hydrolysis at 65°C for 6 h. The fish odour and flavour not detected in dried gelatine. Slightly yellowish colour and transparent was observed in gel form of gelatine. According to results of analysis, the final product was found to be suitable for human consumption, additionally these products has been found to comply with the international standard.

Keywords: *Fish Gelatine, Aquaculture, Quality, Sea bass, Sea bream, Trout.*

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THE EFFECT OF OXYGEN ABSORBER ON THE SHELF LIFE AND QUALITY OF TRADITIONAL SALTED DRIED FISH "CIROZ"

N. Ercan[1], B.Tepik

Salted-dried fish is one of the most important processed products for the economy of Iceland, Norway, Portugal and Spain. These products are generally produced from cod. In Germany, this product is called "klippfisch".

These products in Turkey are termed as "ciroz". This products were packaged in vacuum and modified atmosphere. Usually, this products were packaged in vacuum and modified atmosphere packaging. The present study investigated the effect of packaging with oxygen absorber on quality and shelf life of çiroz and was compared with vacuum and air packaging. Çiroz was prepared from frozen Atlantic mackerel (*Scomber scombrus*). The process of çiroz is as follows: Thawing at 4°C, gutting, fillet and washing, dry salting (with salt 15% of the total fish weight at 2°C for 7 days, fish: salt ratio=1:2) , drying (at 2°C for 24 days).

The products was placed in low density polyethylene/low density polyamide pouch. Three lots of samples were prepared: The first lot comprised the control samples (aerobic packaging (AP)). The second lot were vacuum packaged (VP). In third lot (OP) was added inside the package three OxyFree 504 type iron based O_2 absorber. The first and third group pouches were heat sealed using vacuum sealer and all samples kept at 2 ±2°C. Sensory attributes (colour, texture, odour and taste), total volatile basic nitrogen, trimethylamine nitrogen, TBA index values, peroxide value, free fatty acids value of çiroz were evaluated.

The shelf life of 12 weeks was obtained for aerobically-packaged samples, 14 weeks for vacuum packaged samples, and 16 weeks for samples containing the oxygen absorber. Present results are based primarily on sensory evaluation and secondarily on chemical analysis. The fatty oxidation parameter of OP samples had the lowest compared with other groups. As a result, the packaging containing oxygen absorber showed effective in the quality and shelf life of çiroz.

Keywords: *Atlantic mackerel, Çiroz, Oxygen absorber, Aerobic packaging, Vacuum packaging.*

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INVESTIGATION REGARDING INFLUENCE OF DIFFERENT FOOD INGREDIENTS ADDITION ON THE ACRYLAMIDE LEVEL IN BREAD

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Brief introduction Acrylamide (AA) is a process chemical contaminant, which is formed when food products are roasted or baked at temperatures above 120°C, being the result of chemical reactions between specific amino acids and carbonyl groups containing compounds.

Materials and methods Influence of three food ingredients (nuts, olives and dehydrated onion) addition on the acrylamide level formed in different types of bread: "Simple bread stick", "Nut bread stick", "Olive bread stick"and "Onion bread stick", made of 2 types of flour (white flour 480 and black flour 1250) was studied. Chromatic parameters,*CIELab, L*, a*, b**,were measured for each type of bread, in order to obtain a correlationbetween the final product color and the acrylamide content.

Acrylamide analysisin bread samples was performed by gas chromatography coupled with tandem mass spectrometry (GC/MS/MS) using a gas chromatograph TRACE GC ULTRAcoupled with a triple quadrupole mass spectrometer, TSQ Quantum XLS(Thermo Fisher Scientific, USA).

Results The results revealed that the lowest values of acrylamide content (26.92 to 33 mg/kg) were foundin "Simple bread sticks" and the highest values (79.22 to 88.5 mg/kg) were found in "Onion bread sticks" for both types of flour used. Acrylamide level doesn't correlate with the color, but with the carbohydrate content of the ingredients.

Conclusions This paper represents a valuable effort in acrylamide content assessment for a category of products with a significant contribution in consumer's diet.

Keywords: *acrylamide, bread, black flour, CIELab parameters, GC/MS/MS, olive, onion,nuts,white flour.*

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DRINKING WATER AND ITS EFFECTS ON HEALTH

I. Pantea[1], V. Padureanu, I. Brezean

Introduction It is extremely important for drinking water to be "wholesome", and in order to insure this, there is a large number of standards in law for a wide range of substances, organisms and properties of drinking water. These standards are needed to protect public health, and they underline the importance of the quality of water for consumers.

Purpose: the evaluation of drinking water in rural areas

Material and method

165 sources of drinking water have been evaluated by monitoring the conformation of microbiological and physical-chemical parameters. According to the laws in force (The Law of Waters, 458/2002), the following parameters have been analyzed:

1. Microbiological parameters: Escherichia coli, enterococci;
2. Indicating parameters for: coliform bacteria, number of germ colonies at 22ºC, number of germ colonies at 37ºC, ammonium;
3. Chemical parameters: nitrites, nitrates, total conductivity, hardness (Clark degree), oxidability, PH and turbidity.

Our research showed that all the analyzed samples fall in the drinkable water chemical parameters.

From the microbiological point of view, 123 (74,5%) of the total of the analyzed samples are unconformable. These samples are unconformable due to the presence of either a germ category (43%), of the association of two germ categories (33,3%) or three germ categories (23,5%).

Conclusions:

1. The captation of the water sources is insufficiently protected and supervised.
2. The lack of disinfection or the inappropriate disinfection of the water.
3. Disinfection without the monitoring of residual chlorine.
4. Exposure of the population in the respective area to an increased risk of diseases transmitted by hydrological means.

Keywords: *drinking water, microbiological parameters, chemical parameters.*

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IODIZED SALT BETWEEN MYTH AND REALITY

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Iodine is a trace element that is essential for the synthesis of thyroid hormones by the thyroid gland. Iodine can only enter the food through the addition of this nutrient to the salt, a crystalline product consisting predominantly of sodium chloride. The spectrum of iodine deficiency disorders includes goitre; impaired mental function; hypothyroidism . These can be prevented by ensuring that the population has an adequate intake of iodine. Both insufficient and excess iodine can have negative effects on thyroid functioning. Monitoring of salt intake and salt iodization at country level is needed to adjust salt iodization over time as necessary to ensure that individuals consuming the recommended amount of sodium continue to consume sufficient iodine.

The aim of this study was to estimate the iodisation level in the form of potassium iodide in mg/kg of salt.

Materials and Methods The study group included 101 salt samples analysed for iodine content.In order to provide 150µg/day of iodine via iodized salt, iodine concentration in salt should be within the range 42-67,2 mg/kg salt.

An iodometric titration method was used for analyzing the iodine content of the salt samples.

From our study group 69% samples have adequate iodine content according to law of Roumania and 31% have inadequate iodine content no iodine could be detected in 16% of the samples; 71% were below the minimum iodisation level required and 13% exceeded the specified rang.

Samples containing no iodine were obtained from Romania and samples below the minimum iodisation were from other country (Ukraine; Greece; Belarus).

Conclusion:

1. From the samples of salt analysed a great proportion 30% do not meet accepted standards regarding iodine concentration.
2. Non standard concentration of iodine in salt can have severe consequences on the health of the population.
3. So there is the possibility of failure prevention programs for iodine deficiency disorders(IDD)
4.

Keywords: *Iodized salt, iodine deficiency disorders (IDD).*

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THE CONTENT OF PHENOLIC SUBSTANCES AND SUNFLOWER PROTEIN FUNCTIONALITY

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Introduction Sunflower seeds are very important source of vegetable oil in Ukraine and some other countries. In addition, these seeds have high content of proteins with significant biological value thatis determinated by their essential aminoacidscors. But sunflower proteins using is complicated by the presence of such polyphenol substances as chlorogenic and coffee acids. They can oxidate and form bond with proteins under some conditions causing darkening of protein products.

The aim of our work was to estimate the influence of phenolic substances on the functionality of sunflower proteins.

Materials and methods The protein isolates, obtained at different pH (6.5 and 11.0), and protein samples partly hydrolysated with proteases were analysed in this study.

The common content of phenolic substances was determined by photometrical methodafter their threefold extraction by 70 % (v/v) ethanol solution. The water and oil holding capacities of proteins were measured as mass of water or oil bounded by protein samples. The emulsifying capacity was determined as maximum volume of oil that was emulsified by 1 g of protein isolates. The foaming capacity of the proteins was calculated as foam to liquid volume ratio after blending of 1 % protein solution in deionized water (pH 7.4) for 3 minutes.

Results The content of free polyphenol substancesin analyzed protein samples were from0,04to 0,52 %.We did not detect correlation between the content of free polyphenol substancesand the protein samples color and their functional properties.Using of alkaline solution for protein extraction resulted in their dark green color. Partly hydrolysated proteins had higher functionality and preferable color.

Conclusions. Thus it is obviously, that sunflower protein color and functionality are determinated by bonded polyphenol substances.

Keywords: *sunflower, protein, polyphenols, hydrolysis, functional properties.*

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POTENTIAL OF USING BIOMASS RESOURCES IN PYROLYSIS SYSTEMS TO OBTAIN HEATING IN RURAL COMMUNITIES FROM ROMANIA

A. Filipovici[1], D. Tucu, M. Adam

The paper presents original solutions (concepts) for valorization of biomass resources as agricultural waste or wood exploitation, from rural areas of Romania, by pyrolysis systems.

The aim is to create a technical-social-economical concept for energy production.The paper also, defines general aspects regarding the possibilities to use pyrolysis products for district heating and electricity, in simple and cogeneration systems, valorising the biomass resources in rural area of Romania.

For finding the amount of dedicated biomass resources from agricultural and wood exploitation, that can contribute to energy production, in this study is presented the theoretical yeald potential, achievable energy content and will estimated a heating power necessary and consumption based on a scenario, using the products from pyrolysis biomass process.

Based on application of an original input-output model for the analysis of local potential in Romania, the final objective of the paper is to develop a small capacity system for conversion of biomass in energy, able to transform the biomass energy into syngas, bio-oil and char.

The results of present analysis will be used for designing, manufacturing and testing of new pyrolysis equipment for different biomass resources.

Keywords: *pyrolysis, biomass, bio-oil, equipment, achievable energy.*

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ECOLOGIC AND ECONOMIC EFFICIENCY COMPARISON OF LANOLIN EXTRACTION METHODS

N. Oseiko[1], I. Levchuk, T. Romanovska, V. Olishevsky

Lanolin is a unique product that shows both hydrophobic and hydrophilic properties. For example, it is possible to retain water up to 300 % of original mass without dissolving. This feature is used in drug and cosmetics production. Lanolin is a natural complex lipid, which is produced from wool using wool grease purification. Nowadays, processing wool for fiber production is performed using water and detergents. During such a processing, a huge amounts of water are used – up to 800 – 1000 % of wool weight. Used water contains wool grease, concomitant mineral and organic substances, pesticides, herbicides etc. Wool grease, however, now contains detergent particles as well. During lanolin production wool grease is additionally purified.

There are extractive wool processing methods, which are used for testing lipid amount in it. Using fractional wool grease extraction lanolin extraction is possible as well. It is also worth noting, that most of known pesticides, herbicides and drugs for sheep dermatologic treatment are better soluble in lipids and nonpolar organic solvents than in polar ones. Speaking of environmental protection, extractive method of obtaining wool grease is the most effective, since solvents are regenerable, and wastewater amount is minimal.

During the testing of Ukrainian and some foreign wool grease samples eleven fat-soluble composites were found, which were identified as pesticides and phthalates. The main purpose of our research is searching for extragents which can retrieve lanolin without extracting concomitant lipids. Preliminary conclusion is that washing wool using water is costly both ecologically and economically, whilst wool grease extracting is much more advantageous. A main aim for further research is improving the techniques of wool processing in terms of ecologic purity of the final product, its quality and safety indexes.

Keywords: *lanolin, wool grease, wool processing, pesticides, ecological and economical method comparison.*

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THE PROPERTIES OF WOOL GREASE

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Wool grease is received during the primary wool processing. Purified and processed wool grease is called lanolin. According to few sources, its exact ingredients are defined by a number of factors – genetics, age, shearing frequence, feeding, climate (temperature conditions), keeping etc. The quality of wool grease is affected by veterinary drugs use, pasture and soil state. The chosen method of wool purification is important as well. The methods of producing wool grease determine its form – a technical wool grease and lanolins (anhydrous, hydrous, hydrogenated). Lanolins can be used both in pharmacology, cosmetics, food industry etc.

The purpose of our research is the analysis of Ukrainian and foreign lanolin samples, as well as the laboratory-produced wool grease samples.

Some sources point out that wool grease is classified as animal wax, since it contains higher alcohol esters and fatty acids, hydroxy acids and sterols. Amongst lanolin sterols, a larger part is taken by isocholesterol and oxycholesterol than by cholesterol and metacholesterol. In lanolin cholesterol esters and its analogs with fatty acids are dominant. Since free fatty acids, free higher alcohols, hydroxy acids and cholesterol and its derivatives contain hydrophilic groups, it is indeed these components that allow to adsorb water up to 300 wt. % to the mass of dry lanolin. Lanolin is not water-soluble, rather it can be dissolved in organic non-polar solvents.

According to our research, in lanolin, that is produced for cosmetic industry only the liquid amount differs – from 0,66±0,12 up to 42,36±0,12 wt.%. There were no notable difference in other lanolin quality indexes, particularly, free fatty acids amount (acid number), free radicals amount (peroxyd number), melting temperature and refractive index.

The main purpose of our further research is complex studying of the impact of physical and chemical methods of processing wool to the lanolin quality and safety indexes.

Keywords: *lanolin, wool grease, liquid amount, quality indexes, hydrophilic compounds, water absorbtion.*

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TOURISTIC RESOURCES WITH GASTRONOMIC PROFILE FROM SOUTHERN DOBROGEA REGION

M. Popescu[1]

The aim of this paper is to define specific gastronomic tourism in Southern Dobrogea and identify solutions for integrating in agro-touristic circuit for sustainable development of rural tourism in this area. By its geographical position, the rural areas from Southern Dobrogea has a diversified touristic potential offered by the contrast between natural environment conditions, cultural sites and local traditions. Southern Dobrogea has an ethnic and confessional diversity, being a territory of interference of culture and behaviors: Western and Eastern, Christian and Muslim, Latin and Slavic. Being a multicultural geographical area, local cuisine of diverse ethnically population can be exploited for tourism.

The research methodology is represented by bibliographic documentation, local research, achievement and implementation a questionnaire to identify villages with majority ethnic of population, with specific customs and traditions, opportunities of capitalization of local cuisine for tourism. Along ethnic and confessional criteria, morpho-structural differences and aspect can identify villages with majority ethnic community (Turkish, Tatar, Lipovan, Aromanian) and various aspects of daily life. The ethno-cultural particularities occur on the habitat components, the architecture and cult, the typology of organization and functioning of peasant farm and handmade crafts. Being a multicultural geographic area, Southern Dobrogea contributes to enrichment and diversity of local and national cultural heritage.

According to dominance of ethnic group within a village, will highlight a touristic regionalization with gastronomic profile in this region. By association between local cuisine and other touristic resources, it can be polyvalent touristic routes, which will contribute to socio-economic development and sustainable agro-tourism in rural area from Southern Dobrogea.

Keywords: *Dobrogea, gastronomy, multicultural geographic area, sustainable tourism.*

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CONSIDERATION REGARDING FOOD TEXTURE ANALYSIS AND NEW CONTRIBUTION TO THE METHODOLOGICAL BASES ON FOOD MICROSTRUCTURE ANALYIS

L. Luca[1], R. Gruia

Introduction Microstructure is one of the major controlling factors of texture (firmness, softness, cohesiveness, rubberiness, elasticity, pastiness, crumbliness) and functional properties of food products, also affecting physicochemical, transport and nutritional properties. As texture and functional properties are significant quality requirements for consumers, microstructure analysis plays an important role in the quality evaluation of dairy products: better quality usually brings higher revenues and consumer satisfaction.

Food processing operations affect food microstructure: existing structures are destroyed and new ones are created. The food microstructure is essential during the procesing operations to produce high quality food. In particular, consumer demands for enhanced nutritional quality (composition), sensory quality (texture, internal defects) and safety (absence of foreign materials) are driving manufacturers to optimize products and processes with respect to microstructure.

Material, Methods The food industry requires food structure analysis methods that are less invasive and that is very close to human sensory perceptions. Currently are used non-invasive sensors for characterising food microstructure:

- Tomography: magnetic resonance (micro) imaging (MRI), X-ray nano and micro computed tomography (mCT), and high-resolution optical coherence tomography (OCT)
- Spectroscopy: time and space resolved NIR spectroscopy, NMR spectroscopy and multidimensional relaxation and diffusion methods

Results The new analysis methods are more close to the human sensory system and are less invasive for food structure.

Conclusion The new technology is at a point where food structure may be studied at almost any dimensional level, often in real time and with minimal intrusion.

Keywords: *microstructure, food processing, methods, human sensory.*

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MOVEMENT LOAD MODELING IN TECHNOLOGICAL EQUIPMENT

V. Goots[1], O. Koval, O. Gubenia

Introduction Modeling load movement at the working surfaces of technological equipment (packing, cutting and other processes of mechanical proceeding) was conducted for purpose of minimization of charges of energy on moving, reduce of negative action to the product.

Materials and methods Modeling the movement was conducted by analyzing of mechanism of load movement on different surfaces at constant and variable driving force in various technological processes. Differential equation of second order of load movement was determined based on forces analysis of load movement.

Results It is determined mathematical models on the basis of differential equalizations of the second order, which allow to count the rate of movement, distance of moving, power charges on moving of load - work and power, depending on inclination of surface and it state, duration of motion, construction of motive mechanism and character of change of motive force.

Data about the modes of motion of load allow to define the work, which is spent on implementation of operation of moving, and necessary power of technological equipment. It allows to choose optimal power descriptions of drive mechanism, provide durability of details and mechanisms of equipment on the stage of design, its minimum metal consumption at the observance of durability and wearproofness terms.

Design results allow at design to choose a moving mechanism, provide such modes of motion, at which a load will not be damaged, and a process will take place with the minimum energy charges.

A scientific novelty consists in way for receipt of mathematical models of moving of load and its analytical researches. Expense of energy and power for moving of load is presented as mathematical dependences on character and duration of motive force action. It allows to expect them on any stage of motion.

Conclusion. The results can be used in the design of conveyor equipment production lines, as well as energy saving modes improve the movement of goods and food technology.

Keywords: *moving, packaging, energy, power, modelling.*

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COMPETITION AND TECHNOLOGICAL LEVEL OF TECHNOLOGICAL PROCESS

V. Goots[1], O. Gubenia

Introduction It is suggested to estimate efficiency of work of equipment and quality of processes on the basis of comparison of indexes of quality of the finished product.

Materials and method It was used methods of expert estimation and profile analysis of indexes of quality.

Result The equipment technological level is defined by relative performance of its quality which is grounded on comparison of indexes of technical perfection by corresponding indexes of analogues. At equipment maintenance profitability and safety indexes are important. Economic indexes - the equipment price, level of expenditures for maintenance service and repair. Safety indexes - level of a possible traumatism at service, presence of harmful factors: vibration, noise, high or low temperature and another which influence health of the worker. The new method of an estimation of competition and equipment technological level is offered. The profile analysis is put in the fundamentals. At first the area of a profile (polygon) of the is conditional-ideal equipment on indexes is defined: functional exactitude, profitability in maintenance, an index of level of safety, automation, patent-legal protection, an index of expenditures on maintenance. For the conditional-ideal equipment each of indexes of separate function is taken as a unit. For analogue they will be less units, and the polygon area will be smaller. Stages of estimation: determination of indexes of quality of products or process, estimation of change depending on to the parameter of optimization, construction of petalous diagrams of high-quality indexes, calculation of areas of separate diagrams. Quality of process (technical level of equipment) is determined by the area, which is limited to the petalous diagram, or its attitude toward maximally possible area. Experts estimate the indexes of quality. They can be measured in the real units, or parts of unit. Every estimation is transferred in a dimensionless value. At achievement minimum of possible index of quality of equipment it is necessary to conduct middle repair. The index of quality of the prepared products is rises. At achievement minimum (critical) period of repair cycle it is necessary to conduct major repairs of equipment.

Conclusion The offered method allows to select the most qualitative equipment, to evaluate change of its quality during maintenance, to consider a deterioration and to establish duration of maintenance between flowing and capital repairs.

Keywords: *process, equipment, quality.*

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RESEARCH ON THE MICROBIOLOGICAL QUALITY OF DRINKING WATER USED IN SOME ESTABLISHMENTS SLAUGHTERING AND PROCESSING OF FOODS OF ANIMAL ORIGIN FROM BRASOV COUNTY

G. Puchianu[1], V. Necula, D. V. Enache

The water used in food processing must be sanogenous and clean, ie free of microorganisms, parasites or substances that the number and concentration, constitute a potential danger to human health.

Because of this, the processors must take action at all stages of production to ensure food safety and wholesomeness of food are not compromised.

The most important way of assessing the potential dangers of contamination in the global application of HACCP principles consists in taking water samples in order to determine the most suitable measures to reduce, eliminate or, where appropriate, preventing microbiological contamination of water used in food processing.

In this respect for determining the microbiological quality of water used in some establishments slaughtering and processing of foods of animal origin during the period 2013 -2014 we analyzed a total of 127 water samples.

Analyses were performed in Brasov Laboratory Sanitary Veterinary and Food Safety, using approved methods: counting microorganisms culture (cfu / 1 mL) at 22 ° C and 37 ° C, detection and enumeration of E. coli and coliforms, and intestinal enterococci identification and cash Pseudomonas aeruginosa (membrane filtering method).

Laboratory test results revealed that water can be a source of microbiological contamination of foodstuffs which incorporated.

Keywords: *aeruginosa, intestinal enterococc, sanogenous, coliform;*

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ANTIMICROBIAL RESISTANCE OF *STAPHYLOCOCCUS AUREUS* AND *E. COLI* TO ESSENTIAL OILS

J. T. Rosnes[1], L. Shinde, M. Sivertsvik, C. Vasile, M. A. Brebu

Introduction Determination of bacterial resistance to antimicrobials is an important part of the development of packaging materials. The disk diffusion method has been standardized and is a viable alternative to broth dilution methods for laboratories without the resources to utilize the newer automated methods for broth microdilution testing.

Material and methods Gram negative *Escherichia coli* (CCUG 10979) and Gram positive *Staphylococcus aureus* (CCUG 1828) were used in the experiments to measure inhibition of natural oils. The inoculum was prepared from a primary culture plate by swabbing on the surface of 4 mm thick Plate Count Agar. Sterile filter discs with 10 mm diameter were added 20 µl of essential oils and placed on the agar surface together with a control disc. The natural oils tested were thyme, clove, rosemary, ti tree and cold pressed rosehip and grape seed oils. The plates were incubated at 37°C and the inhibition zones were measured after 24 and 48 h using a calliper. It was used 5 parallel plates for each type of oil and these parallels were packaged in separate plastic bags in order to avoid eventual volatile components to influence on the others plates.

Results Different types of zones (clear, diffusive) were observed after treatment with essential oils. There were approximately no inhibition zones using extracts from grape seeds, rosehip seeds rosemary. The inhibition zone (diameter) of *Staphylococcus aureus* from thyme was 57.2 (SD 9.9) mm, tea three 16.8 (SD 1.0) mm and clove 27.4 (SD 4.6). The inhibition zone of E.coli from thyme was 51.1 (SD 0.7) mm, tea three 14.7 (SD 0.9) mm and clove 35.6 (SD 1.7) mm.

Conclusions The results showed that there were inhibition zones for thyme, tea tree and clove. The inhibitory effects were quite similar for *Staphylococcus aureus* and *E. coli* although the zones varied individually between the oils. Thyme gave the best inhibition, followed by clove and tea tree.

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Keywords: *food packaging, polylactic acid, polyalkanoate, natural oils.*

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^{1}H AND ^{13}C NMR CHARACTERISTICS OF SOME NATURAL CONSTITUENTS OF FOOD: SPHINGOSINE, CERAMIDE, GALACTOCEREBROSIDE, SPHINGOMYELIN, AND THEIR LYSODERIVATIVES

S. S. Gitman[1], D. P. Iga

Glycosphingolipids are consecrated constituents of food materials notwithstanding their origin: animal, vegetal, microbian. Brain, liver, kidney, testis, egg-yolk, milk products, soybean, are especially rich in glycosphingolipids. These amphiphilic compounds are predominantly localized in membranes with their ceramide inserted in the lipophilic membrane and their saccharidic part protruding above and forming the so-called glycocalyx. It has been demonstrated that glycosphingolipids, due to their quality of ceramide generators, play a protecting role against some types of tumours, preferentially colon tumors. In this paper a series of glycosphingolipids have been isolated and characterized chemically and spectrally by NMR. Moreover, their lysoderivatives were prepared.

Materials and methods. Beef brain and egg-yolk served as sources for our sphingolipids. Their separation consisted in extraction, Folch partition, alkaline hydrolysis and column chromatography on Florisil and silica gel. After separation of sphingolipids, chemical constituents were determined: sugars with anthrone, sphingosine and lysoderivatives with ninhydrin, fatty acids as ferric hydroximates, phosphorus by Brigs method. Lysoderivatives were prepared by a controlled heating in an alkaline (KOH) solution of butanol. Chemical and chromatographical results were finally compared with NMR (^{1}H and ^{13}C) spectra.

Results. All compounds purified by us presented a single band by TLC in three or four different solvent systems. There was a good agreement between chemical data and the spectral ones. Ceramide, cerebroside, sphingomyelin had two hydrophobic tails quantifiable *via* fatty acids and by numbering the terminal methyl groups and methylene ones; lysoderivatives were different.

Conclusions. Repeated column chromatography on Florisil and silica gel produced pure sphingolipids and lysosphingolipids.

Keywords: *sphingolipid, cerebroside, lysosphingomyelin, ceramide, thin layer chromatography (TLC), NMR spectroscopy.*

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USING OF SOME FOOD CONSTITUENTS AS PRECURSORS FOR THE SYNTHESIS OF ANTIGENIC, ANTIALLERGIC AND ANTIINFLAMMATORY COMPOUNDS OF FATTY GLYCOSIDES CLASS

D. P. Iga[1]

Five types of well-known constituents of food materials – vitamin E (α-tocopherol), cholesterol, cerebroside, sulfatide and carbohydrates (D-galactose, D-glucose, D-mannose and L-arabinose) – have been used as precursors for the synthesis of some amphiphiles with antigenic, antiallergic or/and antiinflammatory actions. Carbohydrates were locked, by using suitable conditions, as furanosic or pyranosic ring. All intermediates as well as final products were characterized chemically as well as by ^{1}H and ^{13}C NMR spectroscopy.

Materials and methods Cerebroside and sulfatide were from beef brain. The following materials and substances of analytical purity were used: α-tocopherol, cholesterol, D-galactose, D-glucose, L-arabinose, acetic anhydride, benzoyl chloride, pyridine, hydrogen bromide in glacial acetic acid, $BF_3{\cdot}OBu_2$, cadmium carbonate, ready-to-use plates and silica gel for chromatography and organic solvents. Cerebroside was tritylated, acetylated and detritylated; in this way, sugar C-6 was selectively unprotected. Sulfatide was peracetylated, and then desulfated; in this way, a protected cerebroside having a free sugar C-3 was prepared. Glycosylation agents were protected peracetylated derivatives (promotor $BF_3{\cdot}OBu_2$) or 1-bromo-perbenzoylated sugar (cadmium carbonate as promotor), either in furanosic or pyranosic ring.

Results Chemical analysis of the glycoconjugate was confirmed chromatographically and by ^{1}H and ^{13}C NMR spectroscopy. Cholesterol and α-tocopherol, as acetic esters, as well as peracylated sugars, constituted reference compounds for spectral analysis. Notwithstading the glycosylation agent, the following new compounds were synthesized and characterized, near the known isomers: α-D-mannofuranosyl- and β-D-galactofuranosyl-α-tocopherol, α- and β-D-galactofuranosyl cholesterol, α-L-arabinofuranosyl-cholesterol, β-D-galactofuranosyl-3- and 6-β-D-galactopyranosyl-ceramide.

Conclusions Koenigs-Knorr synthesis is a suitable method for the preparation of glycolipids.

Keywords: *α-tocopherol, cholesterol, glycoside, cerebroside, sulfatide, NMR spectroscopy.*

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PHENOTYPIC AND GENOTYPIC CHARACTERISATION OF SOME FACTORS INVOLVED IN THE VIRULENCE AND SURVIVAL OF BACTERIA ISOLATED FROM FOOD AND FOOD PROCESSING SURFACES

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Introduction Species of the *Enterobacteriaceae* family are frequently involved in various gastrointestinal infectious diseases, including food poisoning that without proper treatment and medical supervision can be fatal for some patients, particularly for those with weak immune systems. **Purpose** To characterize the virulence factors of some strains from the *Enterobacteriaceae* family isolated from food and food processing surfaces at the phenotypic and genotypic level in order to assess the microbiological risk for the public health. **Materials and methods** The strains were identified using conventional biochemical methods. The expression of virulence soluble markers was investigated by spotting fresh cultures on solid culture media containing specific substrata and incubated at 37°C for 72 hrs. The ability of the enterobacterial strains to adhere to the cellular substrate was assessed on HeLa cells using Cravioto's adapted method. The capacity to develop biofilms on inert substrata was quantified using a microtiter method. At the genetic level the presence of some genes involved in adhesion and virulence was also investigated by PCR. **Results.** The tested strains revealed a different capacity to adhere both the inert and cellular substrata and also to develop biofilms. Regarding enzymatic factors, esculin hydrolysis and the production of esculetin as iron chelating agent and caseinase were most expressed. C**onclusions.** *Enterobacteriaceae* strains isolated from food could represent a microbiological risk factor for consumers' health, contributing also to the setting up of the reservoir virulence and resistance genes.

Keywords: *food control, Enterobacteriaceae, virulence genes reservoir, surveillance, public health.*

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INFLUENCE OF MICROWAVE STERILIZATION ON THE LIGNOCELLULOSIC BIOWASTE STREAMS CONVERSION PROCESS USING PLEUROTUS SP.

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Introduction Rainwater actions transforms hydrogen sulfide released from free decomposition process of lignocellulosic residues (forestry, agriculture, municipal or industrial waste) into sulphuric acid, an environmental pollutant.

Fungi have the ability to metabolically decompose lignocellulosic substances to assimilable proteins for both animals and humans. Through this controlled destructuring of organic matter from waste, the pollutant feature of this lignocellulosic residues is converted to a profitable economically aspect. **Purpose** Development of lignocellulosic waste capitalizing technologies in transition to a green economy and also increase of raw materials usage for obtaining culture substrates for food and medicinal mushrooms, soil fertilizers, feed and for ecologically production of composite materials and biofules. **Materials and methods** Biological material was represented by mushroom cultures of a *Pleurotus ostreatus* strain grown on malt agar medium, incubated at 20-25 °C for 7 days, The mushroom cultures were used to inoculate a barley grains buffer medium with 2% CaCO3. Incubation was performed at 20-25 ° C for 30 days. The culture obtained was inoculated on coarse lignocellulosic substrate previously moistened and microwave treated for 5-6 minutes, 65-80 ^{0}C. **Results** Fructification was vigorous, suggesting that microwave treatment initiated preliminary thermal transformations in the substrate which facilitates or speeds the decomposition of lignocellulosic substances by fungi into proteins. The substrate was not contaminated with competing fungi, the time and cost for obtaining the substrate decreased by 20% compared to the classical method. **Conclusions** Lignocellulosic waste recovery can lead to new sources of food raw materials, but can also be used in industrial processes oriented to obtaining organic products for different fields: constructions and environment, agronomy and zootechnics, remaining an inexhaustible source of research.

Keywords: food raw materials, lignocellulosic waste, *Pleurotus ostreatus*, green economy, microwave treatment.

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CERRENA UNICOLOR MUSHROOM – A NOVEL PRODUCER OF MILK-CLOTTING ENZYME

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A rennet (rennin, chymosin), produced by young ruminant animals was traditionally used for milk-clotting for cheese-making. The quality of enzymes, used for chease making influence as the process of formation of milk curds, as the taste of final dairy product.

In recent decadess microbial proteolytic enzymes, with the properties resembling those of rennet have become widely used.

The main disadvantage of this microbial substitutes of rennet is that usually they have high general proteolytic activities, which is leading to the formation of a curd with bitterness.

Submerged cultured higher basidial mushroom *Cerrena unicolor* appears to be a producer of highly active milk-clotting enzyme.

The native liquid of cultivation of Cerrena unicolor demonstrates high milk-clotting activity, while having relatively low general proteolytic activity, and thus by its properties resembling natural renun. Optimization of growth media composition and ultrafiltration of the native liquid leads to increase of the targeted enzymatic activity and of the ratio of milk-clotting and proteolytic activities. The Enzyme was purified and characterized.

Keywords: *milk-clotting enzyme, submerged cultivation, mushroom.*

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STUDY OF AWARENESS OF FOOD LABELING AMONG CONSUMERS IN NORTH-WEST RUSSIA

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A survey among the consumers of North-Western region of Russia (St. Petersburg and Leningradskaya oblast) was carried out, to determine awareness and understanding of food labeling, as well as usefulness of various elements of food labeling.

Detailed, honest and accurate labelling is essential to inform the consumer about the food product, enabling them to make a more informed and better choice.

While food shopping, consumers often look for distinguishing features of products to select among the many items available. Brands, labels, store signs, distinctive packaging, and other recognizable features help consumers distinguish one product from another (Schupp and Gillespie, 2001)

The objective of this study was to determine if consumers adequately understand information on labeling currently presented on foodstuffs, as well as the efficiency of such labels to assist them make informed and correct purchasing choices.

We have carried out our survey to understand:

1. Whether consumers in the region of survey consult labels before purchasing food;
2. If information presented on labelling is sufficient for informed purchasing;
3. To determine if labels influence consumers' purchasing decision-making processes, and in which extend;
4. To ascertain whether or not consumers accrue benefits from the labels;

A survey was carried out with 738 consumers, aged 16 years and older, across St. Petersburg and Leningradskaya oblast in North-Western region of Russia in March and April, 2015. Respondents were almost evenly spread according to gender, social class category and covered households which did and did not have children. Survey results are demonstrating, that Consumers in the region of North-Western Russia consult labels before purchasing food and find information presented on labelling useful, important and in many cases sufficient for informed purchasing. Decision-making process of the consumers is usually influenced by product cost and information presented on the food labeling, as well as by their previous positive experience.

Key-words: *food labeling, consumers, survey;*

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STUDY ABOUT PERCEPTION OF FOOD LABELING AMONG CONSUMERS IN ROMANIA

L. Gaceu[1], V. Sukmanov, M. Shamtsyan, A. Birca, B. Kolesnikov, D. Mnerie, D. Tucu

Fulfilling the nutritional labelling criterions related to European regulation no 432/2012, 1169/2011, 1333/2008, 1924/2006 is a high level task studied by numerous researchers from different locations in the European Union. The project no. 318946 FP7 IRSES - NUTRILAB (NUTritional LABeling Study in Black Sea Region Countries) is looking forward to the accomplishment of the mentioned criterions in the countries around the Black Sea. In this direction, those regulations were fully studied and identified. After analyzing regulations, there were identified a number of categories of information that have a very clear specification and can be statistically analyzed.

These types of information are: the name of the product, the list of ingredients, substances or products causing allergies or intolerances, the quantity of certain ingredients or categories of ingredients, the net quantity of the food, (g, ml, kg), the date of minimum durability or the 'use by' date, any special storage conditions and/or conditions of use, the name or business name and address of the food business operator, the country of origin or place of provenance, instructions for use where it would be difficult to make appropriate use of the food in the absence of such instruction, language, font size, the energy value, per portion or %, kcal and kJ, fat, protein, carbohydrates, saturates, sugars, salt, poliols, starch, fibers, vitamines, minerals, etc.

For a unified approach to the study in all the involved countries, the chosen working methodology provides additionally identification for each product label with a specific code, result a set of 28 information categories. These can be studied statistically in the excel application in various ways, by considering the most important criteria.

The fields corresponding to each category of information were provided for each product, with binary character 1 or 0 depending on the presence or absence of information on the label, or character Y or N, depending on the compliance or non-compliance. By summing up on vertically the results of interviews conducted horizontally, it will obtain the number of products that fully comply with the mandatory labelling requirements. By reporting the total number of products, **determine the percentage of products that fulfil simultaneously all the criteria for labelling.**

Acknowledgement: The study was performed as part of the European project «NUTritional LABeling Study in Black Sea Region Countries» (NUTRILAB) of the Seventh Framework Programme for Research and Technological Development FP7-PEOPLE-2012-IRSES, no. 318946.

Key words: *food labelling, survey, consumers, legislation;*

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OPINION SURVEYS OF CONSUMERS FOR MANNER OF LABELING THE FOOD PRODUCTIN THE REPUBLIC OF MACEDONIA

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The consumer should be informed about the quality and characteristics of the food product that wants to buy, and that is possible only if the product is properly labeled. We conducted a study to examine the opinion of the consumers for the manner of labeling the food in Republic of Macedonia.

The review is realized with electronic surveys of 200 people from 13 different cities in Macedonia. Interviewees are divided into five groups according to age: under 19 years, 19-25 years, 26-32 years, 33-50 years and over 50 years.

When choosing the right foodstuff majority of respondents, regardless of age read labels that marked products. Another problem emphasize the use of many numbers and signs with unknown relevance to them, as well as "E" mark on the packaging. For all respondents, the shelf life of the product has more influence in selecting the products that they buy than the product cost.

The energy value of the products and the content of salts in them, were not really important when choosing a product. All respondents agree that if the food product contains components that could endanger the human health, it should be properly labeled. Respondents believe that it would be better if the label by which the product is labeled, emphasize the intended customer group.

Keywords: *opinion, consumer, food product , labeling*

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INNOVATIVE APPROACHES TO SOLVING THE PROBLEM OF INCREASING THE BIOLOGICAL VALUE OF DRINKING MILK

V. Sukmanov[1], V. Kiiko

Milk is the balanced, difficult polydisperse system and remains to one of the most popular and consumed food. Any change of components of milk under the influence of different factors can lead to destruction of all equilibrium system and the loss of firmness of its components. The main objective of the existing traditional technologies of pasteurization of milk is the inactivation of the available microflora, in order to increase the terms of its storage. However,the use of high and ultrahigh temperatures leads to change of biochemical properties of a product and, as a result, the nutrition and biological value of drinking milk decreases. In this regard, indisputable interest represents the use of the innovative biotechnological methods allowing to prolong periods of storage of drinking milk and to improve its functional properties without breaking their nativity. One of such technologies is the application of a high pressure, as potential method of preservation. Started being interested in technology of a high pressure more than 100 years ago and today there is a large number of the researches testifying big prospects of this way of processing. In this work we presented results of research of biological value of the drinking milk received by application of innovative biotechnology of a high pressure - a pascalization.

The assessment of biological value of pascalized milk was carried out by research of index invitro.

Invitro test was based on the research of influence of water extracts of pascalized milk (high pressure processing) on survival of freshly prepared culture of lymphocytes of blood of the person and determination of speed of the proteolysis enzymes (pepsin and pancreatin). The method of determining the rate of protein digestion with pepsin and pancreatin is the quantification of protein accelerated by the Kyeldal's method.

The obtained results of research didnot reveal any statistically significant influences of water extracts of milkpascalizedon survival of suspension of the isolated lymphocytes of blood of the person. The degree of digestibility of proteins (invitro) of pascalizedmilk enzymes pepsin and pancreatin increased by 2%, concerning control (rawmilk) and made 98,7%, in pasteurized milk, this indicator increased only by 0,6%, made 97,2%. Based on these data we can testify that milk processing by a high pressure in comparison with high-temperature processing, has a sparing effect on a protein complex of milk and is the perspective direction in production of products of the increased nutrition and biological value of long-term storage.

Keywords: *high pressure, milk, biological value.*

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THE SEUROP PIG CARCASSES GRADING SYSTEM – A VALUE-BASED PAYMENT FRAMEWORK

M. Rotaru[1], R. Savescu

The grading system implemented in Europe has become a strategic instrument of competition in differentiated product markets. According to the European Union regulation, pig carcass classification effectively started as a compulsory activity in all slaughterhouses, regardless their size.

The purpose of this paper is to highlight and analyse the measures developed by the EU and Romania to ensure fair payment for farmers, producers of pig populations, according to the weight and quality of the animals delivered for slaughter and to ensure price transparency in the market.

Research methodology applied to the present work consisted of: analysis of normative acts regulating the activity of pig carcass classification and payment systems related to the EU and Romania; investigation of other secondary sources in the form of scientific studies and reports from public and private organizations working in the field; depth interviews with Commission representatives classification of carcasses in Romania, Classifiers Association of Romania, with classifiers and classification inspectors Romanian market and software simulations.

In conclusion the main purpose of animal carcass classification system implementation was, for all EU country: i/ to perform a unitary, qualified animal carcass quality evaluation; ii/ to mark (number) carcasses for commercial purposes; iii/ to solve the payment problems among producers and buyers and iv/ to encourage animal breeders to breed more productive (muscular) animals, according to the needs and trends on the consumers' market.

This paper advances the concept that SEUROP grading system will lead to a significant desirable change in the value-based payment framework. The system will be sustainable if more factors are considered.

Keywords: *prices, grading, SEUROP, pig carcasses classification.*

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STUDY REGARDING THE EFFICIENCY OF THE GF 3XO-101 EQUIPMENT, IN OZONE DECONTAMINATION OF TURKEY CARCASSES

I. E. Popa, D. V. Enache, Ghe. Puchianu[1], M. Babii

In the food industry, especially in slaughtering and processing the turkey meat, the risk of contamination with various microorganisms exists: bacteria (especially those of the Salmonella genus), viruses, moulds or other pollutants of biological nature or otherwise.

In slaughtery technology, for decontamination, are generally used more chemicals, such as chlorine and its compounds, lactic acid, as well as many other alternatives.

These substances have remanence, can generate changes in organoleptic, physicochemical and microbiological properties of the meat, even if their use is in accordance with the rules and regulations. A great "disadvantage" of using them is that they are expensive and require special handling and storage procedures, operations with major impact on production costs.

In large units, which slaughter quantities of over 1500 tons of meat per month and process turkey meat only, grown natural and organic, it is very important to ensure decontamination by other means, without the use of chemicals. This can be done using ozone, reason why a complex installation was designed, GF 3XO-101, which was put into slouterhouse, turkey slaughtery unit, authorized for extra community shifts and export.

This paper presents the method and the results through which the effectiveness of using this equipment was studied.

The study showed that the decontamination using the ozone equipment is more efficient and economical than other solution that uses consumable chemicals. The result is that after using this equipment, the specific smells of a slaughterhouse and the operators' working conditions have improved considerably. In addition to the study, other advantages were found: the meat maintains its state of freshness longer; has increased the warranty period of the fresh product; the meat's appearance and aspect for sale is much better; decreased by 99.98% unwanted microbiological load of fresh meat and meat preparations.

Using GF 3XO-10 ozone equipment, in terms of design and professional production gives predicted and expected results and can be applied with minimum investment and production costs.

Keywords: *ozone, microbiological decontamination;*

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CRITERIA FOR SAFETY AND CONTROL THE MEAT GAME BIRD HUNTING FUNDS OF BRASOV COUNTRY

V. Necula[1], G. Puchianu, V. D. Enache

The purpose of these more research was to determine the biological potential of nutritional meat of game birds hunting funds of Brasov County, in terms of fat and protein content but also in terms of food safety. As food safety criterion we proceeded to isolate the germ of the genera Salmonellla, Listeria and Campylobacter and that hygiene criterion determined the presence and load of bacteria of the genus E.Colli .

The objective of the first order was the enhancement of the biological potential of nutritious meats from game birds, to bring these products in the diet of modern man, thereby removing the risk of contamination with residues of antibiotics, pesticides, heavy metals or hormones found in animals raised intensively. A major objective was to meet the basic criterion of contemporary food ie food safety. Obviously besides this we considered sanitation and freshness which together covered contemporary food, thereby exploiting the full arsenal of nutrients available food. This study aims to promote rational use of feathered game meat as a food that meets the criteria of food security, bringing to the attention of nutritionists and especially the consumers of these potential biological aspects of nutrition and food safety for these meats;

Keywords: *hunting birds, protein, fat.*

THE IMPACT OF ULTRAVIOLET RADIATION ON FUNGAL LOAD OF CERTAIN SPICES, USED IN MEAT INDUSTRY

V. Necula[1], G. Puchianu, D. V. Enache, A. Macri

The paper represents a study concerning the contamination of no-heat processed meat products, with fungi from spices used for the preparation.

Compliance with all stages of manufacturing technology, from the hygiene point of view, does not exclude contamination with fungi, using contaminated spices.

A special aspect that the present paper points out is represented by the impact of UV radiations with λ wavelength of 253.7 nm upon the contaminated spices that are losing fungal load after one hour exposure.

Key words: *spices, fungi, ultraviolet radiation..*

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USING THE METHOD MASS SERVICE MAINTENANCE IN THE TOURISM INDUSTRY TO AVOID THE RISK OF BANKRUPTCY A BUSINESS PROJECT

M. A. Toma[1]

The concept of system is one of the most complex and contains a group of elements between which establishes a set of relationships. These characteristics or conditions which can suffer changes over time. A system communicates with the environment via input or output variables. General Theory of Systems can be found including in the Risk Management.

Objective approach in the systemic management is understanding and control of complex structures and evolutionary.

Current management theories and models assimilated at organic level systemic approach is not operating at limiting judgments such as "cause-effect" or "stimulus-response", but suggest new methods of analysis, problem solvers and optimization solutions for the success of a Business Project.

One is the *Method Mass Service Maintenance*, which studying the behavior of a system service and that is reflected in the Tourism Industry. Demand service, which comes from tourists, must be satisfied so that the waiting time to be as small turnover to grow and flow of tourists in a unit of time to be optimal. The theoretical model will simulate a boarding house. By using this model the probability of loss is desired to be as small and to eliminate the risk of bankruptcy.

Keywords: *System, General Theory of Systems, systemic approach, application for service, waiting time, turnover, loss probability, the risk of bankruptcy.*

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NEW COSMETICS BASED ON VEGETABLE ACTIVE COMPOUNDS FOR SKIN CARE

V. Carabela[1], S. Manea, V. Tamas, N. Ionescu (Bordei), G. Alexandru

The study shows the stages of research that were performed and the results obtained for the creation of new cosmetics based on vegetable active compounds for skin care.

Plants are selected as soon as their content in active ingredients is the highest. In order to obtain a better extraction, plants are cut immediately before soaking. We maintain strict controls over plant harvest and growing crops thanks to specifications. The extracts are made with fresh or dry seaweeds, plants or fruits treated immediately after being properly identified and rigorously controlled.

This cold process use for extraction is mild. In this way, all the active compounds presents in plants, fruits and seaweeds are preserved and Hofigal used them also in cosmetics and supplements.

As active ingredients for new cosmetic products plant extract from: sage, aloe, marshmallow, plantain, bilberry, marygold, gooseberry, chestnut, yarrow, liquorice, echinacea and vegetable oil: seabuckthorn, flax, milk thistle, hemp, safflower have been researched and used by the authors.

For the new products association between plant extract and vegetable oils, were performed in order to create a poly-active capable of having an important number of synergistic actions.

Four cosmetic formulas were developed: cleansing milk, regenerating skin oil, hydro-active day cream, anti-wrinkle cream (mature and sensitive skin.

Our cosmetics are made with high technologies, which provide the protection of phytoactive components. They support a good skin care, the maintenance of aesthetic satisfying also the ecological concept.

Keywords: *phyto-cosmetics, regenerating, vegetable oils.*

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RESEARCH REGARDING CONSUMER BEHAVIOR TOWARDS ORGANIC FOOD PRODUCTS IN ROMANIA

M. C. Draghici[1], E. E. Tanase, M. E. Popa, A. C. Mitelut

Romanian organic market and its development dynamics are influenced by the quality of the marketing practiced by economical and commercial agents present on the market. Documentary studies and empirical evidence of the consumer behavior towards organic food products are as important as the crop technologies and organic food processing methods.

Given these two major issues, this study aims to present the research conducted in order to establish the factors influencing Romanian consumer behavior towards organic food products. Based on the results, a behavioral model of the Romanian consumer was obtained in order to shape the necessary basic aspects of marketing policy elaboration of an operator in the market for organic products.

The investigation method employed was the interview method based on a questionnaire. The obtained data was processed through factorial analysis and cluster analysis. Exploratory factor analysis with Varimax factor rotation method was employed on the data collected from the 1251 participants of the study, using SPSS 17.0 software. Cluster analysis was undertaken in order to identify the organic food market segments. For this purpose, elements scores of factorial analysis were used.

From the statistical analysis, three organic food consumer segments have emerged: non-consumers, every day consumers and occasional consumers of organic food products.

Based on the results of the conducted study, a series of conclusions were revealed useful to the stakeholders on the Romanian organic food market. First of all it is confirmed the fact that the organic products market is based on a group of loyal consumers that become fully aware and appreciate the sensorial and nutritional properties of organic food products, and in the same time they are satisfied of the fact that organic food products are more nourishing and even tastier than the conventional ones.

Keywords: *consumer, organic products, behavior, marketing research.*

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FAST METHOD FOR QUANTIFICATION OF FATTY ACIDS FROM COMPLEX FOOD MIXTURES BASED ON NMR

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In the light of the new EU regulation regarding the fatty acid composition of all food products, the need of rapid, accurate and reproducible methods for quantification of fatty acid profile are required.

NMR proved to be a useful tool for fatty acid profiling in various types of fats, showing comparable outcomes with GC-MS. In previous studies we obtained accurate results regarding fatty acid profiling based on ^{1}H-NMR spectroscopy for various vegetable oils, fat extracted from cheese and fish oils. Some difficulties raised up when complex food mixtures have been analyzed, due to overlapped signals in the NMR spectra.

In this paper fat extracted from biscuit samples were analyzed. The biscuits were obtained from different amounts of flour, sugar, butter, eggs, baking soda, ammonia, citric acid, water and sesame or other types of seeds. A new computation method, based on NMR spectral information, have been developed for fatty acid composition quantification on 5 classes of fatty acids.

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Keywords: *fatty acids, composition, NMR, spectroscopy*

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THE CONTENT OF PHENOLIC COMPOUNDS AND GLUCOSINOLATES IN NOVEL BEVERAGES WITH THE ADDITION OF RED CURLY KALE AND BLACKCURRANT JUICE

R. Bieganska-Marecik, E. Radziejewska-Kubzdela, M. Kidon[1], D. Walkowiak-Tomczak

In recent years we have been observing an increased interest in health-promoting food In the development of novel foodstuffs exhibiting bioactive properties, fruits and vegetables, as well as their processed products, being rich sources of biologically active compounds, play an important role. The addition of red kale may contribute to the enrichment of beverages based on apple juice in the polyphenols, anthocyanins and glucosinolates.

The aim of this study was to compare the content of polyphenols (HPLC), glucosinolates (HPLC) and antioxidant activity (ABTS assay) beverages obtained on the base of apple juice with the addition of blackcurrant juice concentrate (7%) and red kale leaves in the fresh (17%), frozen (17%) and freeze-dried (2%) forms. Moreover, the sensory quality of obtained product was evaluated (10-point scale). Analysis was carried out in the fresh and pasteurized product, and after 1, 10, 30, 60 and 90 days of storage. The study used apples cv. Szampion, red kale cv. Redbor and blackcurrant juice concentrate (62ºBrix).

The content of polyphenolic compounds and antioxidant activity in beverages with addition of blackcurrant juice and red kale in various forms was respectively 5-7 (2300-3620 mg/L), and 4-fold higher (17110 μmol/L) in comparison to apple juice which was a base of obtained beverages (489 mg/L, 4169 μmol/L). The kale addition resulted the content of glucosinolates in the beverages in an amount 79 mg/L. During the 90 days of storage of the beverages, 25% reduction in the polyphenol and glucosinolates content and 10% of antioxidant activity was observed.

Beverage with addition of freez-dried form of kale characterized the best sensory quality (overall score of 7.0), and the highest content of bioactive compounds. The inclusion of blackcurrant juice to product resulted acceptable color during storage.

Keywords: *novel beverages, kale, apple juice, polyphenols, glucosinolates.*

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EVALUATION OF COLOUR AND ANTHOCYANINS CONTENT IN COMMERCIAL ELDERBERRY JUICES

K. Młynarczyk, D.Walkowiak–Tomczak, M. Kidon[1], R. Bieganska-Marecik, E. Radziejewska-Kubzdela

Brief introduction Due to increasing emphasis on food safety, significant in the food industry have natural plant pigments. An important group of these compounds are anthocyanins – dyes of bioactive properties. The aim of this study was to determine the effect of origin and production technology of elderberry juice on the anthocyanins content and colour parameters.

Materials and methods To study allocated were 100 % elderberry juices, differing of manufacturers, origin of raw material and production technology. The contents of anthocyanins was determined spectrophotometrically and expressed in mg/100 g of juice. The colour measurement was carried out in the CIE L*a*b* by Konica Minolta 3600d spectrophotometer, in transmitted light, the D65 light source and 10 mm optical layer thickness.

Results The highest content of anthocyanins (approximately 180 mg/100 g) was found in the juice pressed directly from organic farmed fruits. This product was characterized by the lowest values of lightness (L*) and colour components X, Y, Z, which indicates the darkest colour. The lowest value of hue (h*) points to desired purple-red color and the lowest amount of degraded anthocyanins. Juices made from concentrate contained the least anthocyanins (16-20 mg/100 g). They were characterized by the highest value of L*, the highest share of red and yellow colour (a* and b*), and the highest value of h*, which indicates a change in the colour tone towards brown-red and the highest proportion of degraded anthocyanins.

Conclusion. It was found that the anthocyanins content in studied elderberry juices influenced significantly the colour parameters. Juices containing more anthocyanins, characterized by lower value of lightness, had the lower share of red and yellow and the lowest hue value. In respect of technology, juices derived from concentrate turned out to be worse than those pressed directly and juice from organic raw material was the best.

Keywords: *elderberry, Sambucus nigra, anthocyanins, colour, juice.*

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HIGHLIGHTING CERTAIN BIOACTIVE COMPOUNDS OF MONO NUMERICAL TYPE FROM WALNUT RESOURCES IN THE CARPATHIAN AREAL

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Brief introduction The benefits for health of nut consumption, as for example of those consumed in ancient times, of internal organ fortification are motivating the present interest to highlight natural compounds with phito therapeutically potential, putting into value walnut resources with important potential qualities, situated in the Carpathian areal. In the paper there has been considered the highlighting of mono numerical phenol compounds existing in nut core, as a first stage of biosynthesis of condensed phenol structures that may present a large variability, being products of a secondary metabolism.

Materials and methods As for the material and the method, we specify that samples of nut core representative for the Carpathian areal have been drawn, and chopped nut core has been degreased in a solvent mixture (acetone; dichloride methane; oil ether 1:1:1) and then air dried at 40^0C , being then restarted with methanol and acetic nitric in 8:2 ratio and centrifuged at 4000 rotations/minute. The phenol extract has been analyzed with Shimadzu chromatograph gas GP/2010.

Results. It is however known that bio protective characteristics to stop noxious radical species are also represented by phenol compounds of mono numerical type for which there is less information. There have been identified Pyrocathechol and Pyrogallol with high covering probability at retention times (RT) of 7,325, respectively 8,855 minutes. There have also been identified tocopherols, respectively α tocopherol at RT = 27,120; δ tocopherol at RT = 23,675 and especially γ tocopherol at RT = 32,555. Based on G.C. Shimadzu's specter bookshop, there have been also identified 9 components of phenol structure, with a covering probability of 89,93 as Cycloarthenol for example.

Conclusions. Walnut resources from the Carpathian areal have superior qualitative characteristics due to the richness of the revealed bioactive compounds of mono numerical type. Research will be continued, for a quantitative determination of the components by comparison with spectral purity standards, as far as costs will be optimized.

Keywords: *mono numerical phenolic compounds, nut core, bioactive substances, tocopherols.*

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FUNCTIONAL CHARACTERISTICS AND DIGESTIBILITY OF RUSKS MADE FROM WHEAT FLOUR WITH THE ADDITION OF MILLET (*PANICUM MILIACEUM* L.)

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Rusks is bakery product characterised by long shelf life, good digestibility and low fat content. Since millet is gluten free cereal with a high percentage of fibers there is an increasing interest on functional characteristics of bakery products containing it. Here, durable bakery products – rusks were prepared from wheat flour type 400 and either millet grains or millet flour.

In rusk dough, wheat flour was replaced by 10, 20 or 30 % wt. of millet flour or by steamed whole millet grains. Contents of moisture, ash, protein and total dietary fibres as well as contents of main minerals (calcium, iron, magnesium, potassium, sodium, zinc and coper) were determined using standars (AOAC and ISO) methods, after microwave digestion. Additionally, simulated in vitro enzymatic digestion of millet and rusks has been investigated. Farinograph and Extensograph were used for studying the rheological characteristics of the wheat flour and dough. Texture of dough and rusks was studied by scanning electron microscopy (SEM); sensory characteristichs were determined as well.

Addition of millet flour/steamed grains caused a decrease in dough strength. Steamed millet grain addition has lower effect on dough extensibility which led to a more favourable resistance to extensibility ratio, while millet flour addition had only slight effect on dough resistance. With increased millet amounts, decrease in water absorption and dough development time was found, accordingly to increased dough softening. Rusk with millet flour is more fragile and less hard, especially at 30% supplementation level. Increased fracturability and lower hardness was observed in rusks made from steamed millet grains.

SEM analysis enabled information on microstructure; polygonal millet starch granules were found embedded in wheat starch and protein matrix. The data on sensory characteristics and enzymatic digestion of rusks showed that addition of millet changed these characteristics of rusks importantly.

Keywords: *Millet, durable bakery products, rusk, texture, scanning electron microscopy (SEM), rheological characteristics, sensory characteristics, digestibility.*

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SANOGENIC MEALS AS NUTRITIONAL ALGORITHM HEALTH. BASIC PRINCIPLES

T. A. Strutinsky[1], V. V. Fedash, V.N. Strokova

Despite the huge number of different theories and power systems, today about 80% of metabolic diseases caused by dietary factors, and about 30% of the world population suffer from obesity.

The current system of supply was almost exhausted its potential in terms of improving health and increasing life expectancy.

The reason for this situation is the lack of satisfaction of the individual needs of the organism in food nutrients; demand the clarification of optimal nutrient substances required broader context of the range of the physiological characteristics of the organism.

From today's perspective it becomes obvious that the solution sanogenic problems with existing power systems is completely exhausted itself and requires a radical correction of significant changes and new approaches.

The aim of the research is the development of sanogenic power in accordance with the individual somatotype, which should take into account the physiological characteristics of the digestive tract and living conditions of the individual, to provide differentiation and selective use of food, optimize metabolism, improve health, extend the active period of human life and increase life expectancy.

Sanogenic power is implemented by the following principles:

- The principle of accounting somatotypes of the individual.
- The principle features of the metabolic reactions of the body.
- The accounting principle basic physiological reactions of the gastrointestinal tract.
- The principle of differentiation of food products.

Implementation of power on the principles of individualization will develop sanogenic power system that meet the biological needs of the body energy and nutrients, prevention of diseases of the digestive system, disorders of metabolism and obesity and consequently will increase the life expectancy and active period of human activity.

Key words: *sanogenic, nutritional algorithm,nutrition;*

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THE EFFECT OF PLANT ADDITIVES AND SPICES ON SENSORY AND CHEMICAL PROPERTIES OF CHOKEBERRY SWEETENED JUICES AND DRINKS

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Brief introduction Chokeberry fruits and juices derived therefrom are a rich source of natural antioxidants, but characterized by a bitter taste, which limits their intake in the direct form. The aim of the study was to determine the effect of plant additives (leaves of cherry and elderberry flowers) and spices (cloves) on the sensory quality and chemical composition of sweetened chokeberry juices and drinks.

Materials and methods The content of phenolic compounds was determined by colorimetry with the Folin reagent and by HPLC method. Anthocyanins content was determined spectrophotometric according Francis and Fuleki and HPLC method. Antioxidant activity was determined using $ABTS^+$ cation. The sensory evaluation was performed scoring method.

Results It was found, that both the juice and drinks with the addition of cherry leaves and cloves characterized by the highest content of phenolic compounds (respectively 3077 and 947 mg/100g), the highest antioxidant activity (respectively 129 and 30 µmol Trolox/g) and the best sensory evaluation. The content of anthocyanins did not depend on the additives used. In all variants of sweetened juices and drinks the main anthocyanin was cyaniding-3-galactoside. In the juices and drinks without additives the main phenolic compound was chlorogenic acid, while in juices and drinks with plant additives and spices it was catechin.

Conclusion The significant effect of used plant additives and spices on polyphenolic and anthocyanin contents and antioxidant activity of sweetened chokeberry juices and drinks was stated. Used additives had no statistically significant effect on sensory evaluation of studied products. The best source of bioactive compounds was juice with addition of cherry leaves and cloves.

Keywords: *chokeberry, juice, elderberry flowers, cloves, anthocyanins, polyphenols, antioxidant activity.*

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ESTIMATION OF BIOLOGICAL VALUE OF LOW ERUCIC AND LOW GLUCOSINOLATES RAPE SEED PROTEINS

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Introduction The biological value of proteins depends from essential amino acids content, their ratio with unessential amino acids and their digestibility. The balanced essential amino acids content is needed for the high biological value of proteins. It is known that vegetable proteins have lower biological value than animal proteins. At the same time soy proteins have high balanced essential amino acids content. In addition, proteins of other oil seeds have also high quality.

The aim of this work was to estimate the biological value of proteins of low erusic and low glucosinolates rape seeds.

Materials and methods Rape (*Brassica napus)* seed proteins of winter (*Artus*, Lembke KG, Germany) and spring (*Calibre*, Lembke KG, Germany) varieties were analyzed. Amino acid analyzer T 339 (Czech Republic) was used for amino acid content analysis.

Results The contents of the majority of essential amino acids namely lysine, sum of sulfur containing methionine and cystine, threonine, leucine and sum of phenylalanine and tyrosine in rape proteins were higher than FAO/WHO scale (1985). The exception was valin with score 76 - 80 % and isoleucine whose score was 80- 85 %. The scores of sulfur containing amino acid methionin and cystin were 151.4 - 157.1 % that where significantly higher than these amino acids scores in soybean seed proteins. The calculated characteristics such as amino acids differences, factor of protein utilization, comparative excessiveness of amino acids have confirmed high value of rape proteins.

Conclusions Thus our data have proved high biological value of rape proteins and perspective of their using in food systems.

Keywords: *rape proteins, biological value, amino acids.*

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MATHEMATICAL AND PHYSICAL MODELING OF THE EFFICIENCY OF VIBROEXTRACTION FROM PLANT RAW MATERIALS AND THEIR WASTES

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Introduction The benefit of vibroextractors in the processing of raw materials is the creation of a secure environment for the uniform dissipation of energy in the working volume of the apparatus by vibroturbulizing devices of special design. However, the practical implementation of this broad perspective equipment is constrained by a lack of scientific information about mass exchange and hydrodynamics, accompanying the process in terms of action on interacting phases by turbulent pulsating flows.

Materials and methods Methods of mathematical modeling of processes and mathematical-statistical analysis. Study of mass transfer was carried out using the methods of control of sugar beet and brewing industries. Hydrodynamics of the streams was studied by tracing them on the basis of the diffusion model.

Results The results of experiments in the investigated range of hydrodynamic operating modes of the vibroextractor have been generalized by dependences from which we can determine the apparatus overall sizes and optimize them.

The problem of scaling of vibroextractors in the process of their designing has been solved by investigating universal space–time characteristics of pulsing two-phase jets. According to the Prandtl–Schlichting theory, the regularity of propagation of stationary submerged jets and pulsing jets and relations determining the space–time characteristics in relative quantities in the form of velocity profiles in the section of a plane turbulent wake have been established.

The developed mathematical model of the structure of real two-phase jets, the base of which is a combined model for the conditions of pulse perturbation of the hydrodynamic system of the apparatus, is used to determine rational (optimal) operating modes of the vibroextractor.

This model has enabled us to establish that vibrations of the vibromixing devices with a frequency up to 4 Hz do not provide substantial longitudinal mixing and even decrease it at small amplitudes. For the continuous process, the mechanism of counterflow phase separation, based on the effect of difference in hydraulic resistances during localization of a two-phase jet at an optimal distance from the source of vibrations of the vibrotransporting element, mechanism of sedimentation of the solid phase on the surface of the vibromixing devices, and mechanism of filtration of the two-phase system on the filtering elements of the vibromixing devices have been described.

Conclusions The obtained results of the mathematical and physical modeling of the process of external mass exchange during continuous vibroextraction from plant raw materials can be used in the design and optimization of operating modes of analogous apparatuses.

Keywords: *vibroextraction, mass transfer, scaling.*

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ISOSTATIC PRESSING AS A WAY TO INCREASE THE SHELF LIFE OF PLANT PRODUCTS (ON EXAMPLE OF CULTIVATED MUSHROOMS PLEUROTUS OSTREATUS (FR.) KUMM)

V. N. Sorokopudov[1], N. I. Myachikova

Due to the increase of requirements to quality of food and the import substitution program we develop the technology for the preservation of products of vegetable origin using the method of isostatic pressing. Studies have shown that for better ensure the purity of the semi-finished product from the mushrooms Pleurotus ostreatus (Fr.) Kumm. It is advisable to press at 400 MPa with long exposure effects (40 min. or more).

Keywords: *isostatic pressing, Pleurotus ostreatus (Fr.) Kumm*

USING THE ACTIVE PACKAGING

V.G.Lasheva[2], D.A.Todorova, S.A.Kotlarova

The active packages are different from conventional ones in that they consist of special additives for the improvement of the shelf life of the food product. The end product - the package - intentionally consists of components that would release or absorb substances that can control the content of oxygen, carbon dioxide, moisture, ethanol, antioxidants and/or other preservatives and antimicrobial agents. The majority of them are different in nature substances which are placed in its own package with certain permeability or embedded in the structure of the main container. There are several general methods for the conversion of a conventional package to the active one:

- Control of the moisture content;
- Control of smell and taste of food;
- Changing the carbon dioxide quantity;
- Reduction of the oxygen content;
- Control antimicrobial system.

The active package effectiveness mainly depends on the interaction between the special additive content and the substances detached from the food. The main advantage of the active packaging is that they preserve the quality of the packed product.

Keywords: *packaging, active packaging*

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DIRECTIONS OF IMPROVING TRAINING PROGRAMS FOR MODERN REQUIREMENTS OF FOOD ENTERPRISES

T. Mostenska[1], O. Ralko

Introduction The preparation of high quality specialists, whom would possess a high level of both theoretical and practical knowledge, always is a top task for educational institutions of countries at all levels of development.

Materials and methods The study was based on a survey of managers of food industry enterprises conducted by the University to determine compliance of training programs with requirements of employers.

Results The research allowed concluding the need to improve the educational plans as well as practical training of students.

Thus, the employers emphasized the main criteria for the success of graduates' training, such as: the ability to work with existing enterprise equipment, knowledge of the peculiarities of the technological process, communicative skills, ability for teamwork, knowledge of foreign languages, work experience, learning ability. With that, they underlined too long adaptation period of the graduates related to their lack of practical training.

On the basis of the survey of graduates, we conclude, that they felt lack of practical training and difficulties in communicating with the colleagues at the beginning.

Leading professors of the University also underlined the impossibility of quality practical training of graduates, due to the imperfection of educational plans and schedules.

Conclusions In order to improve the system of graduates' training, we suggest to: improve the schedule of the educational process in relation to the enterprises activity; increase the amount of the disciplines of universities' and students' choice and adopt their content to the requirements of enterprises; implement of case-study to the educational process in order to improve communicative skills and teamwork; strength language training students by increasing amount of ECTS as well as by implementing exchange programs; activation of the teaching staff mobility in order to ensure knowledge transfer.

Keywords: *education, knowledge, transfer, exchange.*

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ABOUT THE NEW PRODUCTION TECHNOLOGY OF BREAD AND BAKERY PRODUCTS WITH THE LONG PERIOD OF STORAGE

A. Ospanov[1], Timurbekova A. Muslimov N.

The offered production technology of bread and bakery products with a long period of storage is developed on the basis of a new way of baking of bread and the bakery products packed into a "heat-resistant" cover.

Contact of food products with working bodies of the equipment and the service personnel in the course of baking, transportations and storages is as a result excluded; and also moisture losses in a bread crumb that promotes preservation of freshness of bakery production more long, than usually decrease.

Keywords: *bread and bakery products, grain bread, production method, baking method, heat-resistant cover with micropores, storage life.*

EFFECT OF HUMIDITY OF POLY-CEREAL FLOUR MIXTURE AND SCREW ROTATION RATE ON EFFICIENCY OF EXTRUSION PROCESS

A .A Ospanov[1], N.Zh. Muslimov, A .K Timurbekova, G.B. Dzhumabekova

Following the results of study of extrusion of poly—cereal flour mixture on commercial twin-screw extruder dependencies of parameters, defining efficiency of the process, on variable value of rotation rate of the extruder screw, n (min^{-1}) and humidity of extruded poly-cereal flour mixture, W (%). Received dependencies adequately describe poly-cereal mixture extrusion process management.

The results of the research have practical significance when improving the scheme of manufacturing of poly-cereal products of high degree of preparation.

Key words: *poly-cereal mixtures, extrusion technology, extrusion, twin screw extruder, humidity, rotation rate;*

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EATING UNHEALTHY FOOD TO CHILDREN FROM RURAL LOCALITIES FROM THE REPUBLIC OF MOLDOVA

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Introduction\objectives The purpose of this study was to evaluate eating habits at students from rural areas in Moldova Republic.

Materials and methods We followed in 2014 a crosssectional study, by questioning a sample of 1236 students, aged between 13-19 years old, from VII-XII classes, from 10 schools in the Republic of Moldova, rural areas, geographically covering three regions of the country.

Results Consumption of food with high sugar content is a health risk factor met in 95.4% of the students.

Also we found a high frequency of students (73.1%) that are frequently or occasionally consuming foods with high fat content, and 82.4% of them consuming products with high content of salt. Of those surveyed, more than two thirds, were frequently consuming carbonated drinks with preservatives and dyes over the limit accepted.

Conclusion The habit of unhealthy eating, oversized or incorrect cooked foodstufs was found in more than half of the students surveyed families. This situatia underline the importance of introducing new teaching subjects related to healthy eating in schools, in order to rise the level of education and knowledge among young people and in their families also.

Keywords: *nutrition, students, risk behavior*

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CONSIDERATIONS FOR ECOLOGICAL CONSTRUCTION AND ORGANIZATION OF CONSTRUCTION

Gh.C. Spirchez[1], L. Gaceu

This paper shows the importance of insulation materials for wooden constructions.

Natural insulating materials are characterized by a number of features which if used correctly can substantially improve the energy performance of a building.

Insulation from sheep's wool is a unique material, its ability to breathe. Pratically this means it has the ability to absorb and release moisture from the surrounding air.

Wool insulation is used as heat and sound insulation. Wool is a hygroscopic material which means that is designed to absorb up to 30-40% of its own weight in moisture content.

Thermal conductivity is between 0,0356 W/mK- 0,040 W/mK. Sheep wool insulation is fire resistant.

Hemp insulation is manufactured from hemp fiber plus 10 -12% Biko fiber for optimal dimensional stability. Hemp can absorb up to 20% of its weight in moisture without deterioration of thermal performance. Hemp fiber insulation have low conductivity of 0,040 W/mK.

Thermal insulation made from wood fibers derived from wood waste.

Roofs are building elements serving the protection at the top of the building against climate action.

The paper has been taken to study three structures of insulation for passive energy house with software from German company, were mapped graphics on temperature variation profiles coefficients from moisture and heat.

Given that structure 1 heat transfer coefficient U = 2,03 W/m^{2}K, structure 2 is the heat transfer coefficient U = 0,330 W/m^{2}K, structure 3 is the heat transfer coefficient U = 0,116 W/m^{2}K.

A low U-value indicate a high level of insulation.

Key words: *wool, ecological construction, moisture, heat transfer;*

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COMBINATION OF ENZYMATIC ETHANOLYSIS AND UREA FRACTIONATION FOR UTILIZATION OF WASTE FISH OIL WITH CONCENTRATE OF POLYUNSATURATED FATTY ACID ETHYL ESTERS AND BIODIESEL PRODUCTION

A.V. Garabadzhiu, M.A. Pushkarev[1], G.V. Kozlov , M.I. Sataev, A.A. Saipov

The aim of this study was to develop an economically viable and environmentally friendly way of utilization of fish processing wastes with production of commercially attractive products. Enzymatic ethanolysis and urea fractionation methods were combined to obtain useful products - biodiesel and concentrate of omega-3 polyunsaturated fatty acids, from fish processing wastes.

The influence of certain factors (temperature, ethanol:oil molar ratio, amount of enzyme and presence of inert atmosphere) on the fatty acid ethyl esters (FAEE) production during ethanolysis has been investigated. The highest yield of FAEE was achieved after 24 hours with 20% (w/w) amount of enzyme, 9:1molar ratio of ethanol:oil, and at the temperature 25 °C.FAEE were fractionated by the multi-step urea complexation. Ten fractions of FAEE were obtained: ninewere from urea complexes and one was non-urea complex fraction (yield – 22.2% (w/w), contents of C20:5 and C22:6 in fraction were 21.23% and 33.42%, respectively).

Industrial relevance

Enzymatic transesterification of oils has many advantages: low reaction temperature, low sensitivity to free fatty acids, glycerol obtained during this process is without alkaline or acidic impurities, and immobilized enzyme is easily separated from the reaction mixture. Consequently, the use of enzymatic transesterification in industrial scale allows to reduce the number of process steps and to reduce the requirements for the process equipment.

Keywords: *fish processing waste, fish oil, PUFA, ethanolysis, urea fractionation, biodiesel.*

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DECLINE OF MATERIAL AND POWER RESOURCES IN BREAD PRODUCTION

V. Telychkun[1], Y. Telychkun, M. Desyk, O. Kravchenko

Introduction Modern scientific developments allow to reduce the consumption of material and power resources in process of bread production on the stage of preparation of dough and baking of bread.

Materials and methods Experimental researches are conducted for the processes of mixing, fermentation, forming of wheat flour yeast dough by extrusion method. All processes are incorporated in one aggregate. An analysis and ways of decline of consumption of energy at baking is certain on the basis of analysis of the heat balance of the stove aggregate.

Results The aggregate, which combines processes of intensive dough mixing, dough fermentation at high pressure, forming dough by extrusion directly on the floor of the stove furnace can reduce the duration of the dough fermentation process to 20-30 minutes, to abandon the sophisticated equipment for dough processing - division, rounding, rolling up, proofing, transfer of dough pieces between devices. Significantly reduced the number of staff and production facilities.

The heat of baking, which is using effectively, is 15-20% of the total amount of heat. The greatest losses are for heat from exhaust gases (40%) and steam, which is fed into the baking chamber for hygrothermal dough processing (35%). It was determined that only 20-25% of the total vapor involved in the process of hydrothermal treatment.

More efficient using of steam in the area of hydrothermal treatment, and regeneration of the used steam can reduce energy consumption for production of steam and even refuse to install a steam generator.

Conclusion Research results using allow to reduce the consumption of energy and material resources in bread production, reduce production areas, reduce amount of equipment, improve productivity and profitability.

Keywords: *bread, dough, mixing, extrusion, baking.*

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EXPERIMENTAL STUDIES INTO THE REGULARITIES OF ICE FORMATION ON VERTICAL PIPES

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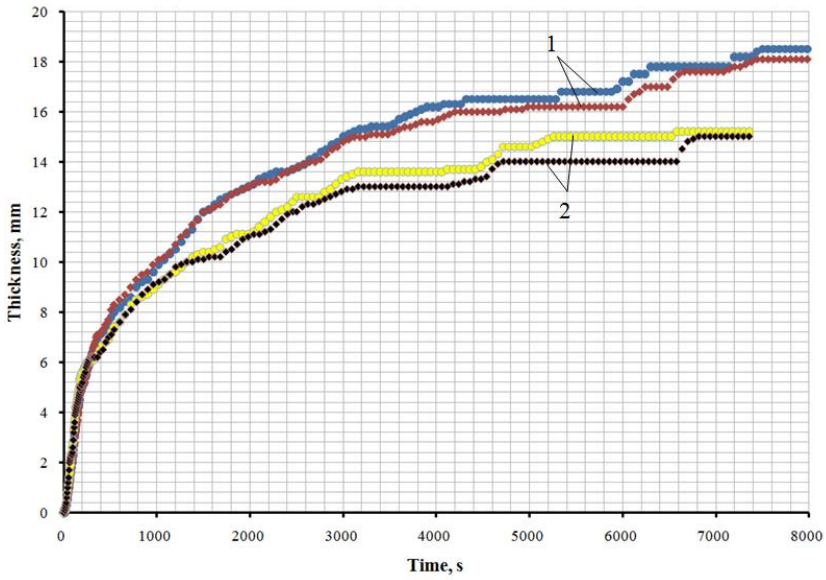
Food manufacturing plants are characterized by significant fluctuations in hourly thermal loads. Therefore application of cold accumulators is a promising way to reduce these fluctuations and thus to optimize energy consumption. Design calculations should be based on the available time periods of ice generation between the peaks of thermal load as well as on the available time periods of accumulator "discharge". The set of experiments aimed at the studies of ice generation on the vertical tubular surface cooled down by evaporating Freon and further ice melting has been carried out at the National University of Food Technologies, Kyiv, Ukraine. The major novelty of the experiments is such that in contrast of earlier studies, in which an intermediate coolant has been pumped through the cooled pipe, thus providing a nearly constant heat flux from the cooled surface, in the present project the cooling effect has been achieved by direct refrigerant cooling. This arrangement is more efficient, since there is no need to heat transfer from cooling surface to intermediate coolant and then to refrigerant. The boiling heat transfer coefficient is extremely sensitive to the level of heat flux. As the layer of ice is being built up, the heat flux goes down, since the thermal resistance increases. This results in intensity lowering of the refrigerant boiling inside the pipe. In the process of experiments the following regime parameters varied: -temperature of water (1…15^{0}C), pressure of evaporation (temperature of boiling refrigerant (-5…-25^{0}C), types of Freon. The data obtained have shown that in every regime an asymptotic value of the attainable ice layer thickness exists, thus giving ground for determination of an optimal parameters of ice accumulators operation. The data obtained are shown in picture. Based upon these data an engineering design methodology of optimal accumulator calculations is being developed.



Picture –Experimental data at : 1 - t_0 = -20 ºC, t_w = +1,5 ºC;2 – t_0 = -15 ºC, t_w = +1,5 ºC

Keywords: *ice accumulation-refrigerant-heat transfer coefficient.*

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COMPARATIVE CHARACTERISTICS OF ANTIOXIDANT ACTIVITY OF CAROTENE-CONTAINING VEGETABLE SUPPLEMENTS IN ICE CREAM

G.V. Deinychenko[1], I.M. Byelyayeva

Antioxidant activity (AOA) value of food systems can be used to asses the quality and compliance with technology during manufacture and storage. AOA of soft ice cream based on protein and carbohydrate milk raw materials with carotene-containing supplements was tested. Mashed pumpkin and apricot were used as carotene-containing supplement.

AOA of ice cream samples were determined by method of $ABTS^+$-reducing activity. The method is based on the antioxidants power to reduce $ABTS^+$-radical. AOA is evaluated on the basis of radical coloring intensity reduction. The results can be presented in values, equivalent to TROLOX or in % of coloring inhibition within a certain period of time (determined on the basis of kinetics of $ABTS^+$-radical reduction with rested substance).

$ABTS^+$-radical is soluble both in water and organic solvent, irrespective of ionic force, therefore it is sensitive to hydrophilic and lipophilic antioxidants. With help of $ABTS^+$-radical the contribution to antioxidant activity of preparations of slowly and quickly reducing centers can be determined can be determined and evaluated. It is known, that antioxidants, responsible for quick reduction, include ascorbic and uric acid, containing SH-groups, reducing glutathione, phenolic compounds and ubiquinones, protein antioxidants are mainly responsible for slow reduction,.

AOA was analyzed in course of ice cream preparation and storage. Ice cream samples were stored at the temperature of – 33 ºC for 12 months.

It was found out that carotene-containing supplements from pumpkin and apricot increase AOA of ice cream. During preparation AOA of ice cream without the supplement was 31,3 %; with the apricot supplement- 38,2 %; with pumpkin supplement – 46,7%. Ice cream with apricot supplement is stored better (AOA 45,4 %), than the ice cream with pumpkin supplement (AOA 19,2 %).

Key Words: *Antioxidant activity, antioxidants, ice cream, carotene-containing supplement;*

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SYNTHESIS AND CHARACTERIZATION OF NEW ENZYMATIC SUBSTRATES FOR QUANTIFICATION OF EXOGLYCOSIDASES INVOLVED IN THE METABOLISM OF CARBOHYDRATE CONSTITUENTS OF FOOD

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Carbohydrates are important constituents of food materials and they can be found in a large variety of forms: as free molecules, inorganic or organic esters, oligo- and polysaccharides, glycoconjugates. The latter derivatives constitute a vast, specific group: glycoproteins, glycosphingolipids, glycoglycerolipids, glycosterols, etc. Two types of enzymes, both of the class of hydrolases, play an esential role in the metabolism of glycoconjugates: exo- and endoglycosidases. Exoglycosidases cleave the sugar monomeric units, one by one, from the nonreducing end. A comfortable and sensitive instrument for exoglycosidases identification and isolation are chromogenic and fluorogenic substrates. In this paper, a new group of chromogenic substrates, based on 4-nitrocatechol, have been synthesized and characterized, and their usefulness for chemistry and biochemistry demonstrated.

Materials and methods 4-Nitrocatechol was synthesized by the reaction of 4-nitrophenol with potassium persulfate in a strong alkaline environment conferred by potassium hydroxide. Monosaccharides were closed to pyranoses by percetylation or perbenzoylation. Three methods of glycosylation were used: Michael, Koenigs-Knorr and Helferich. The synthesized glycosides have been isolated either *per se* or preceded by Zémplen saponification. The structure of synthetic glycosides was confirmed by ^{1}H and ^{13}C NMR spectroscopy. An important step was enzymatic assay of substrates. Exoglycosidases of animal, vegetal and microbial origin have been used. The acetate esters of 4-nitrocatechol, α-tocopherol, estrone , DOPA, as well as peracylated sugars constituted the reference compounds in NMR spectroscopy.

Results The following glycosides of 4-nitrocatechol have been synthesized and characterized: α-D-glucopyranose, α-D-mannopyranose, β-D-galactopyranose, β-D-xylopyranose, α-L-rhamnopyranose, β-D-N-acetylmannopyranose, α- and β-arabinofuranose.

Conclusion All three glycosylation methods led to the envisaged chromogenic glycosides.

Keywords: *4-nitrocatechol, glycoside, chromogenic substrate, NMR spectroscopy.*

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