DOI: https://doi.org/10.15414/2021.9788055223322

CASEE
Central and South Eastern Europe

CASEE Online Winter School 2021

Food Environment and Health Risk Assessment in Danube Region (DanubeFEHRA)

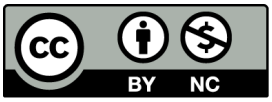
BOOK OF ABSTRACTS

25th January - 5th February 2021

CASEE Fund 2020-3

CASEE ONLINE WINTER SCHOOL
Food Environment and Health Risk Assessment in Danube Region (DanubeFEHRA)
Book of Abstracts

Approved by the Rector of SUA in Nitra on 20. 04. 2021 as an Online Proceedings of Abstracts.



ISBN 978-80-552-2332-2

DOI: https://doi.org/10.15414/2021.9788055223322

Content

DOI: https://doi.org/10.15414/2021.9788055223322

DOI: https://doi.org/10.15414/2021.9788055223322

DOI: https://doi.org/10.15414/2021.9788055223322

Preface

Why have we organized winter school? We believe everyone should be able to understand how important is **Food Environment and Health Risk Assessment in Danube Region.** The environment plays a crucial role in people's physical, mental and social well-being. The degradation of the environment, through air pollution, noise, chemicals, poor quality water and loss of natural areas, combined with lifestyle changes, may be contributing to substantial increases of civilisation diseases. The production and consumption of sufficient, affordable and nutritious food, while conserving the natural resources and ecosystems on which food systems depend, is vital. Food systems play a central role in all societies and are fundamental to ensuring sustainable development. Sustainable food systems are critical to resolving issues of food security, poverty alleviation and adequate nutrition, and they play an important role in building resilience in communities responding to a rapidly changing global environment.

13 students from around the world joined our 2- week Winter School Programme in Slovak republic, Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences. CASEE Online Winter School was **multidisciplinary**, encompassing chemistry, environment, microbiology, nutrition, quality assurance, sensory analysis, management, food engineering and manufacturing and also about very **actual problematic Covid-19** and its impact on agri-food sector. The Winter School gave our participants an idea of how **interesting** these topics really are. Online lectures were provided by **experts** in agri-food sector from Slovak University of Agriculture in Nitra, **professional** lecturers from **prestige** universities all over the world, state authorities, research institutes and SMEs as well as **representatives from CASEE universities**.

DOI: https://doi.org/10.15414/2021.9788055223322

INVITED LECTURES

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Phytonutrients in functional foods and Target group profile

Simona Baldovská, Silvia Jakabová
University address: Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic

The role of phytonutrients and their application in functional foods are a growing agrifood-industry trend; however, getting functional foods to market requires an understanding of the target group. The aim of the first practical seminar of the international online winter school CASEE (Danube FEHRA) was to introduce selected biologically active compounds that exert direct biological effects on an organism and to design innovative food products with added value for the target customer group. Bioactive phytonutrients, including acemannan, β-glucans, folate, amygdalin, punicalagin, rutin, berberine, caffeine, and capsaicin, their plant sources, chemical structure, potential uses, side effects, and biological and pharmacological properties were presented. The task for students was to create the profile of the target customer and design personalized specific food products with health-promoting effects that fit the customer. Jamboard was used as a tool to define the family background, education, interest, and life motto, but also health problems, diet restrictions, specific needs, preferences, and limitations regarding the food, as well as to measure the food neophobia level of the target customer. In the further step, the students selected plant sources of biologically active phytonutrients, which could be used as a base for design functional food suitable for target customers and could meet the needs of consumers such as nutritional and health needs, health-promoting potential, and health restrictions. Finally, students suggested the following products with health benefits: non-alcoholic beer containing oats and pomegranate for the elderly man and a functional oat bar with high folate content for the pregnant woman.

Key words: phytonutrients, functional food, innovative product, customer, health

Acknowledgment: The work was supported by the educational grant KEGA no. 017/SPU-4/2019, APVV-18-0312, and the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund.

Biography: Ing. Simona Baldovská, PhD. is a scientific researcher in AgroBioTech Research Centre of the SUA in Nitra. Her current research work is focused on biologically active substances and their effects on human reproductive functions. She co-investigates in numerous national and international projects and assists in educational activities. She has published several papers in reputed journals and participated as a facilitator of workshops in the innovative project EIT Food RIS Consumer Engagement Labs 2020.
PaedDr. Silvia Jakabová, PhD. works since 2018 at the Slovak University of Agriculture in Nitra, Slovakia. In her professional life she has been focused on research of bioactive substances especially

DOI: https://doi.org/10.15414/2021.9788055223322

in plant matrices, as well as on occurrence and elimination of toxic elements in environment and food. She is author and co-author of several original papers in the journals within the Web of Science and Scopus databases, co-author of university textbooks, monograph and student textbooks. She has been involved as a co-worker in numerous research and educational projects.

Presenting author details

Full name: Ing. Simona Baldovská, PhD., PaedDr. Silvia Jakabová, PhD.
Contact email: xbaldovská@uniag.sk, silvia.jakabova@uniag.sk
ORCID: 0000-0002-6981-0509

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Pesticide residues in food and responsible use of plant protection products (PPS)

Renata Bažok
University of Zagreb Faculty of Agriculture, Svetošimunska cesta 25, 10000 Zagreb, Croatia

Crops are susceptible to attack by diseases, pests and weeds. The use of plant protection products (PPPs) is necessary to prevent damage, maintain yield and exploit the full genetic potential of the crop. PPPs can be either chemical or biological in origin. Regardless of their origin, they may have some toxicity to humans and non-target organisms, either after direct application or when they enter the body via plant residues. Therefore, their marketing and use are regulated by legislation. According to the Directive 1107/2009 of the European Commission as part of the registration process, manufacturers must submit the results of various toxicological and ecotoxicological studies. Some of them determine the No Observed Adverse Effect Level (NOAEL), which is used to set the Maximum Residue Level (MRL) for each product. The MRL is the maximum amount of the active substance and its metabolites, expressed in mg/kg of food that could be present in the product. This is an administrative rather than a biological limit, which ensures that even the most sensitive population will not suffer health consequences if they consume a product containing PPP residues at the MRL. Farmers must use PPPs responsibly only when absolutely necessary, respecting the legal safety period for each product and crop. As part of the EU program, each member state is required to implement a pesticide residue monitoring program in its territory. In addition, residues are checked during controls on food imports. EU legislation on PPPs is very demanding and is considered the strictest in the world.

Key words: maximum residue level (MRL), no observed adverse effect level (NOAEL), pesticides, residues, safety period

Biography: Prof. Renata Bažok, PhD is working 28 years in high education. She is head of the Department for Agricultural Zoology. She coordinates MS program in Plant Medicine. From 1993 she conducted research on integrated control of Colorado potato beetle, wireworms, sugar beet pests, oilseed rape pests, western corn rootworm and other maize pests. List of her publications is available at: http://bib.irb.hr/lista-radova?autor=200140**.** Her current research interests are integrated pest management (IPM) in field crops (maize, sugar beet, potato…) and insect resistance development. The overall research emphasis is focused on the development of safe, effective, and economical methods of IPM, and the biological/ecological interactions relating to insect species and their environment.

Presenting author details
Full name: Renata Bažok
Contact email: rbazok@agr.hr
ORCID: 0000-0003-1655-8140

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Coffee (botany, growing, processing, chemistry)

Mateus Bonato
Padre Antonio Vieira street 98, Campinas, SP, 13087-300, Brazil

From seed to cup of coffee pass through various processes like planting, germination and growing, flowering, maturation, harvesting, processing, drying, storing, hulling, selection, cupping, commercialization, roasting, grinding, and extraction methods. To begin, seeds wrapped by parchment and minerals such as potassium and nitrogen are vital for planting. A humid and shaded ambient is essential for germination and growth. Pollination preserves genetic diversity and it can occur through insects and wind. During fruits maturing, many chemical reactions occur triggering sweetness, softness, and fruit color change. Harvesting is divided into 4 types: picking, stripping on the cloth or on the ground, and mechanical. Each type will be adequate to the geographic, climatic, and economic conditions of the farm. Machines will separate fruits from leaves, stones, and twigs before processing. To prevent losing quality, processing has to be done as quickly as possible, and it consists of separating the seed from the pulp, being performed in 3 ways (natural, semi-washed, and fully washed). Afterward drying is done to avoid the proliferation of microorganisms, consequently seeds moisture must be between 11-12%. Later they are stored in 60 kg jute bags or silos. Hulling will separate the seeds by size, color, density, defects, and impurities. Cupping is done to gauge its quality, so a small sample is roasted. The last steps will be commercialization, roasting, grinding, and extraction. Finally, caffeine is considered an adenosine receptor antagonist, which means that it blocks adenosine receptors and one of its effects is to keep us awake.

Key words: coffee, flowering, maturing, harvesting, processing

Biography: Mateus Bonato is a biologist, barista, speaker, researcher and honorary member of Medzinárodný Kávový Inštitút. Author of the projects “Specialty coffees, agronomic and sensorial aspects”, “Specialty coffees, taxonomic classification”, “Specialty coffees, from seed to cup” and “The work of farmers”. He has also conducted studies, articles, and researches with the themes, coffee genetic improvement, the effects of caffeine on the human body, and the importance of the Jacú in the production of exotic coffees.

Presenting author details
Full name: Mateus Henrique Bonato
Contact email: mateusbonato2014@gmail.com
ORCID: 0000-0001-6654-181X

DOI: https://doi.org/10.15414/2021.9788055223322

Title: How to build your personal brand during recruiting process?

Adam Brocka
Slovak University of Agriculture, Trieda Andreja Hlinku 2, 949 76 Nitra-Chrenová

During the panel with students, we discussed the importance of the personal brand building process before the official beginning of their career development. It is necessary to acquire practical experience in order to understand your strengths, skills and focus of your expertise. Thus, we looked at the initiatives and projects of involved students. In order to better understand, what is their motivation and personal brand potential? Personal branding is the process of developing a mark around your name or your career. You use this mark to express and communicate your skills, personality and values. It is an on-going process, which requires good understanding of core values and visions of a student. Only then you can start to build upon it. As Simon Sinek wrote in his book Start With Why: "People don't buy what you do, the buy why you do it." We talked about the concept of Golden Circle, a framework, which can help you better understand what drives your motivation, how you differentiate from others and what is your particular offer. We spoke also about the potential of experimentation with student projects, where students need to manage and practice not only expert point of view, but also skills such as project management, marketing communication, leadership, sales etc. It is unique opportunity to understand the complexity of projects, innovative thinking and entrepreneurial spirit. Student projects, new products, services or community initiatives can bring you possibilities to improve your skills, new opportunities for collaboration and also experience you can build your personal brand upon. In this process you can use Pyramid of your personal brand, concept which displays your values, beliefs, reputation, behaviour, skills and image of young professionals.

Key words: personal brand, career development, expertise, values, golden circle, student projects, community initiatives

Biography: Adam Brocka is the co-founder of the innovation studio Kiuub, which helps its clients to find new business opportunities and improve their products, services or overall customer experience. Adam is responsible for the whole business design team with focus on the improvement of client-wide and company-wide innovation capabilities.

Presenting author details
Full name: Adam Brocka
Contact email: adam@kiuub.com

DOI: https://doi.org/10.15414/2021.9788055223322

Title: The use of male ZDF rats as animal model in diabetes research

Marcela Capcarová
Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, 949 76 Nitra, Slovak Republic

The investigation in the area of natural substances as supporting treatment of diabetes mellitus is very useful. Suitable animal model similar to human form of DM2T is Zucker diabetic fatty (ZDF) rats. ZDF rats that are homozygous recessive have non-functional leptin receptors (fa/fa; -/-) and develop obesity, hyperlipidaemia, hyperglycaemia and hyperphagia. Animals that are homozygous dominant (+/+) or heterozygous (fa/+) remain lean with normoglycaemia are involved in the studies as age match reference controls. The bee bread is the fermented mixture of bee pollen, saliva of bees, digestive enzymes and honey stored in the comb in the hive. The cornelian cherry (Cornus mass L.) is a traditional plant grown often in former times in Slovak Republic. The aim of our studies was to analyse the effect of bee bread and cornelian cherry on DMT2 complications on male ZDF rats. ZDF rats in the age of 2.5 months were involved in the experiments that lasted 12 weeks. Animals were provided with water and diet ad libitum. Obese diabetic rats without any additives served as controls and diabetic bee bread/cornelian cherry group (bee bread/cornelian cherry in a dose 700/1000 mg.kg-1 of body weight daily using sterile oral rodent gavage). After overnight fasting rats were monitored for blood glucose level by a FreeStyle Optium Neo Glucose and Ketone Monitoring System (Abbott Diabetes Care Ltd., UK) using test stripes once every two weeks. The water consumption, body weight and feed intake were monitored once per week.
In conclusion, the application of both compounds caused significant reduction in water intake and decrease in blood glucose level when compared to the control group. We recommend the therapy with bee bread or cornelian cherry in pre-diabetes or early diabetes state for individuals with predisposition on T2DM.

Key words: diabetes mellitus, therapy, natural substances, bee products

Acknowledgment: This study was supported by APVV grant no. 19/0243 and VEGA grant 1/0144/19. This publication was supported by the Operational program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund.

Biography: prof. Marcela Capcarová is a teacher and researcher at Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra. Her professional field of study is focused on investigation in the area of effect of natural substances in therapy of diabetes mellitus 2. type on animal model ZDF rats, internal milieu of animals, blood biochemistry, immunological parameters and antioxidant status of blood. In the year 2005 she was awarded by Ministry of Education of Slovak Republic as “Scientist of the Year”.

Presenting author details
Full name: Marcela Capcarova
Contact email: marcela.capcarova@uniag.sk

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Can we safely consume insect products? Are consumers willing to eat insect products?

Ángel A. Carbonell-Barrachina[1], Jesús Clemente[1], Hanán Issa-Issa[1], Aarón Carbonell-Pedro[1], Mauricio Castro[2], Armando Burgos-Hernández[3], Edgar Chambers IV[2]
[1] Department of Agro-Food Technology, Universidad Miguel Hernández (UMH), Orihuela, Alicante, Spain. [2] Center for Sensory Analysis and Consumer Behavior, Kansas State University, Manhattan, Kansas, USA. [3] Departamento de Investigación y Posgrado en Alimentos, Universidad de Sonora, Hermosillo, Sonora, México.

Insects are a fantastic source of proteins, vitamins, and minerals and their use in the preparation of new foods could help in providing these scarce nutrients to a growing world population. The willingness to try new products containing insect powder and the impact of adding insect-based products to a brand portfolio were studied. In most of the countries (~70%), most of the consumers not only rejected the consumption of such products but will stop buying all products from those companies using insect ingredients in some of their products. Besides, in approximately 60% of the countries, consumers completely rejected eating these products. However and even though most of the consumers worldwide were not willing to try insect-based products now, there is still a small segment of consumers willing to enjoy new experiences and they represent a great opportunity for companies developing new products, but new companies must be created to avoid jeopardizing the current reputation of well-established companies. These new companies must be aware of the main reasons for the rejection of such type of foods, mainly (i) the perception that insects carry diseases and cause allergic reactions and (ii) religion. It is hypothesized that the first insects coming into the consumers' mind were cockroaches, which are certainly disgusting for a huge percentage of population worldwide. Later it was proved that the substitution of 15% cricket powder did not negatively impact liking in chocolate chip cookies and, in fact, improved both liking and protein content.

Key words: cricket powder, chocolate chip cookies, food choices, insect-based foods, willingness to eat.

Biography: Prof. Carbonell-Barrachina is full-Professor of Food Sciences and Technology at the Miguel Hernandez University (UMH), where he leads the Group on Food Quality and Safety. He has worked worldwide (UK, USA, Poland, India, etc.) and has authored more than 300 research articles published in international journals. His main research topics are food quality and food safetyIn 2020, he was appointed as doctor honoris causa of the Wrocław University of Environmental and Life Sciences (Wrocław, Poland), and now works as General Director of Sciences and Research at the Valencian government in Spain.

Presenting author details
Full name: Ángel A. Carbonell-Barrachina
Contact email: angel.carbonell@umh.es
ORCID: 0000-0002-7163-2975

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Viticulture and winemaking of Slovakia

Vladimír Hronský[1], Peter Czako[2]
[1]EnoVia s.r.o., Bratislava. [2]Slovak University of Agriculture, Nitra

Grapevines (*Vitis vinifera* L.) are cultivated in the Slovak republic in Viticultural areas (vineyards) registered in the Viticultural land register. Pursuant to Act No. 313 on Viticulture and Wine-making of July 30, 2019, which entered into validity on December 1, 2012, the Slovak viticultural country is the largest geographical unit. It is segmented into six viticultural regions (VR), 40 viticultural areas and 702 viticultural villages. In 2018, there was a total 15,358 hectares of registered vineyards in Slovakia. The rule for recognition of the quality of a Slovak wine according to geographical indication is simple. The smaller the geographical unit listed on the label, the better the quality of wine in the bottle. The highest category of wines includes such wines as quality wines and quality wines with attribute. For this category of wine, grapes must achieve sugar content of at least 16 °NM and the maximum yield may not exceed 18,000 kg per hectare when harvested. Slovak wines with attribute are found in the categories kabinett, late harvest, grape selection, raisin selection, ice wine and straw wine. The originality of these attributes is certified by allocated state control numbers which must be used by winemakers for classified wines when introduced to the market. VR of the Slovak republic are: VR of the Small Carpathians, VR of Southern Slovakia, VR of Nitra, VR of Central Slovakia, VR of Eastern Slovakia and VR of Tokaj. Tokaj region is a closed VR with a specific compositional variety of plants and a special winemaking method.

Key words: viticulture, winemaking, quality, vineyards, geographical indication, wine, originality

Biography: Vladimír Hronský (1975) is an acknowledged enologist, advisor, lecturer and author who published 5 books. In 2000, he was a co-founder of the Association of Sommeliers of the Slovak Republic, where he worked as the director of education for 11 years. He currently works as product marketing and wine production advisor for several Slovak wineries and is executive director of EnoVia.
Peter Czako (1982) is a university teaching assistant. He teaches oenological subjects. Is a production manager at TAJNA, s.r.o. vineyard and winery company, where he is in charge of 25 hectares of vineyards in BIO mode and making wine.

Presenting author details
Full name: Vladimír Hronský
Contact email: enovia@enovia.sk
Full name: Peter Czako
Contact email: peter.czako@uniag.sk

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Malting and Brewing Trends in the Slovak Republic

Štefan Dráb
University address: Slovak University of Agriculture in NitraTr. A. Hlinku 2, 949 76 Nitra

Beer is a very popular drink around the world. This low-alcoholic drink with rich foam and carbon dioxide is made from four raw material – water, malt, hop and brewer`s yeast. The water for the beer production needs to have strict hygienic and quality parameters. In terms of quantity water is the most abundant raw material in beer. Every brewery is currently trying to reduce water consumption, which depending on the brewing technology. Water consumption can range from 4 to 11 ho pre one hl of beer. Hop as a second raw material is usually added to beer in different forms, such as hop cones, hop pellets of hop extract. Active hop substances are responsible for the aroma and bitter taste of beer and also it is an important precipitate agent of nitrogenous substances during brewing process. Malt production is very important sector of food industry in Slovakia. Nowadays the annual production of malt in Slovakia is more than 290 000 ton. Usually malt export from Slovak malthouses is more than 83 %. Slovakia is the 11th largest malt exporter in the world. The most important cereal for malting is malting barley. First step in malting technology is barley steeping. Aim is increasing the water content to 45 %. The next step is germination when the grain is modified, and very useful enzymes are synthetized. Final process is kilning or drying green malt when water content in green malt is reduced to approx. 4 %. Most Slovak malthouses use modern pneumatic malting systems with high efficiency of malting process. Beer consumption in Slovakia is very popular. Average beer consumption is 72 liters per capita per year. Technological process includes malt milling, mashing, lautering, wort boiling, hopped wort cleaning and cooling, fermenting, maturation. Nowadays lager beer is the most drinking beer in Slovakia, but number of craft breweries is increasing which causes the production of top-fermented beer with a significant hop bitterness and aroma. The dry hopping process is used very often. Currently there are more than 80 breweries in Slovakia, it should be expected, and that their number and volume of drunken beer will not change due to actual crisis.

Key words: barley, malt, beer, malting, brewing

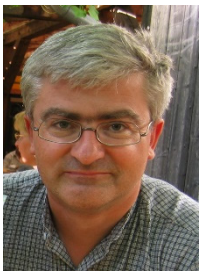
Acknowledgment: This work was supported by the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, cofinanced by the European Regional Development Fund, and AgroBioTech Research Centre built in accordance with the project Building „AgroBioTech" Research Centre ITMS 26220220180.

Biography: Štefan Dráb works at the Department of Technology and Quality of Plant Products as a teacher. His field of work is malting and brewing technology and evaluation the quality of malting barley, malt and beer. He publishes the article in this area and leading his students in bachelor and diploma thesis.

DOI: https://doi.org/10.15414/2021.9788055223322

Presenting author details
Full name: Štefan Dráb
Contact email: stefan.drab@uniag.sk

DOI: https://doi.org/10.15414/2021.9788055223322



Title: Weather related crop production risks under climate change

Josef Eitzinger
University of Natural Resources and Life Sciences Vienna (BOKU), Institute of Meteorology and Climatology, Gregor-Mendel Str. 33, A-1180 Vienna, Austria.

Agriculture globally as well as in Europe is considered as one of the main affected sectors by climate change. Agricultural production is very sensitive not only to changes in mean climatic parameters but especially to a shift or changes in the occurrence and severity of weather extremes. It was reported that climate change is leading to a shift in agroclimatic zones in Central Europe with significant consequences for crop production potential and risk due to increasing adverse weather conditions for crops. Even if weather extremes would not change in their absolute severity and frequency, seasonal shifts of their occurrence and its overlapping with critical crop phenological stages can change regional weather related crop production risks significantly. There is already good knowledge on potential shifts of heat extremes and drought over Europe under climate change scenarios and their impacts on crop production. However, when it comes to regionalized weather related risk patterns with respect to extreme events, including also all potential weather related direct (abiotic) and indirect (biotic) risks and their combined impacts on specific crops and cropping systems, the knowledge and data base is still very poor. In consequence, there is still a high uncertainty related to regionalized impacts on particular weather related risks for crops in climate change impact studies and assessments for tailored adaptation options at the farm level. For developing tailored adaptation options to be accepted by farmers the socio-economic framework needs to be considered in the whole context as well.

Key words: agriculture, climate change, weather risks, agrometeorology

Acknowledgment: This research was supported by project AGROFORECAST of the Austrian Climate Research Program (ACRP).

Biography: Univ.Prof. Dipl. Ing. Dr. Josef Eitzinger: Agrometeorologist, researcher and teacher at Universität für Bodenkultur Wien (BOKU) - University of Natural Resources and Life Sciences, Vienna, Institute of Meteorology and Climatology (BOKU-Met). He is member of the WMO expert group on “Drought”. Beside several other project participations, he was coordinator of EU-FP6 project “ADAGIO” (Adaptation Of Agriculture In European Regions At Environmental Risk Under Climate Change and leader of national projects AgroDroughtAustria, COMBIRISK and AGROFORECAST (ongoing). Many public relation activities for decision makers and end users in the field of agrometeorology and climate change impacts on agriculture.

Presenting author details
Full name: Josef Eitzinger
Contact email: josef.eitzinger@boku.ac.at
ORCID: 0000-0001-6155-2

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Importance of selenium (Se) and iodine (I) to the organisms

Mateja Germ
University of Ljubljana, Biotechnical Faculty, Jamnikarjeva 101, Ljubljana, Slovenia

Selenium (Se) is important microelement, present in bacteria, animals, humans and some algae. There is narrow range between its toxic dose and dietary deficiency. Certain countries, including Slovenia and Slovakia, have low amount of Se in soil, while i.e. USA and certain regions of China, are Se rich areas. Se plays a role in the prevention of atherosclerosis, certain specific cancers, arthritis, and altered immunological functions. The lack of selenium causes in animal diseases such as muscular dystrophy and problems with fertility. Selenium is toxic to plants and animals at higher concentrations. SeCys and SeMet can be misincorporated into proteins, replacing Cys and Met, which causes Se toxicity. Iodine (I) is an element, essential for mammals, needed for the production of thyroid hormone that regulate many important biochemical reactions, including protein synthesis and enzymatic activity, and are critical determinants of metabolic activity. Despite the extensive programme of salt iodisation, almost 40% of the entire human population suffers from inadequate iodine intake. In Slovakia, prevention of iodine deficiency disorders (IDD) with iodized salt began in 1951 and since 1966, addition of iodine has been mandatory. Selenium and iodine are essential trace elements for the proper functioning of the thyroid and the entire organism in both humans and animals. It is feasible to add Se and I simultaneously i.e. sowing the seeds in Se and I solution and soil or foliar fertilization, to enhance amount of both elements in edible parts of crops.

Key words: selenium, iodine, biofortification

Acknowledgment: This study was financed by the Slovenian Research Agency, through programme “Biology of Plants” (P1-0212) and projects J7-9418 and L4-9305.

Biography: Prof. Dr. Mateja Germ is the researcher and lecturer at University of Ljubljana, Biotechnical Faculty. She authored 80 original scientific papers, 18 in Q1 (first quartile) among SCI in last five years. She has been serving as a visiting editor in journal Plants- IF 2.67. She had many invited plenary lectures; she is mentor of numerous master thesis and doctoral thesis. M. Germ cooperates in many national and international projects.

Presenting author details
Full name: Mateja Germ
Contact email: mateja.germ@bf.uni-lj.si
ORCID: 0000-0002-4422-1257

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Introducing sustainability in public catering

Rita Góralska-Walczak
Warsaw University of Life Sciences Nowoursynowska 166 street, 02-787 Warsaw, Poland

Today's Food World is a complex paradox. Around 690 million people suffer from hunger while 2.1 billion are obese or overweight. And, at the same time, the food production only in 67% is being used for human consumption; the rest (24%) is utilized for animal feed and by industry (9%), among others, to produce biofuels. Alongside, the alarming practice of land grabbing - grabbing control of the land at the expense of peasant farmers, agro-ecology, land stewardship, food sovereignty and human rights – continues.
What's more, ultimately, as much as 1/3 of all food produced for human consumption, approx. 1.3 billion tons of food, is being wasted.
This damaged system affects our health, environment, economy, social welfare and social justice. Joined actions for a sustainability need to become common practices immediately. We have nine years to reach European Sustainable Development Goals. Thus, it is necessary to consider scale effects, and therefore engaged efforts in the sector of public procurement and catering services (PPCS).
An ongoing INTERREG-BSR StratKIT project is a noteworthy example of introducing common sustainable practices in PPCS sector within six countries of the Baltic Sea Region.
The project implements the following actions to establish sustainable canteens and build the universal BSR Dynamic Sustainability Model for PPCS: enhancing social cohesion, circular economy, organic food, Green Public Procurement criteria and introducing food and environment education to schools in Baltic Sea Region.

Key words: public catering, sustainability, green public procurement

Acknowledgment: My scientific involvement in this research and the StartKIT project (Innovative Strategies for Public Catering: Sustainability Toolkit across Baltic Sea Region, no. R088, funded by the Interreg Baltic Sea Region Programme 2014-2020) wouldn't be possible without the support of the professor Renata Kazimierczak (project coordinator) and professor Ewa Rembiałkowska who managed to involve WULS in this assignment.
All the work done in the project was coordinated with the Finnish leader partners from University of Helsinki: Minna Mikkola, Leena Viitaharju and Urszula Ala-Karvia.
Thanks to the Municipality of Rybnik, especially to Piotr Masłowski - mayor of the city and Monika Kubisz - public officer, for the opportunity to conduct research in the city's public canteens.

Biography: Rita Góralska-Walczak is a food educator, researcher, and a lecturer in food and health. She has graduated from Università degli Studi di Scienze Gastronomiche (Master in Food and Health) and Università degli Studi di Modena e Reggio Emilia (Food Innovation Program). She was awarded

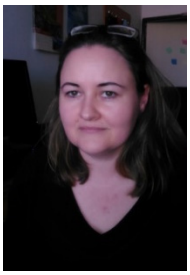
DOI: https://doi.org/10.15414/2021.9788055223322

the scholarship “Global Mission” to conduct scientific research in 7 countries around the world. Her exploration areas were “School cafeterias around the world”. She has also studied Italian philology at Warsaw University, English studies at IPWF in the USA, history of art in Firenze. Her entire scientific curriculum, from history through anthropology and literature, was connected to food. She has recently moved from Italy, where she was an educational director in Tenuta di Spannocchia (sustainable agriculture in Tuscany and educational center for Mediterranean diet) to Poland to work at Warsaw University of Life Sciences on the BSR StratKIT project to increase sustainability in public catering.

Presenting author details

Full name: Rita Góralska-Walczak
Contact email: rita_goralska_walczak@sggw.edu.pl
ORCID: 0000-0003-1665-1556

DOI: https://doi.org/10.15414/2021.9788055223322



Title: Antioxidants and their role in human body and food industry

Dorota Gumul
Department of Carbohydrate Technology, Faculty of Food Technology, University of Agriculture in Krakow, Balicka 122 Str., 30-149 Kraków, Poland

Bioactive compounds are nutritional and non-nutritional compounds, which exist in nature. These compounds are a part of food chain and could have pro-health impact on human organism. Polyphenols are the biggest group among the natural antioxidants. They have different structure, molecular mass and physic-chemical and biological properties. Cereal grains, fruit and vegetables are rich source of polyphenols. The above-mentioned compounds exhibit physiological activity, including hypoglycemic, hypocholesterolemic, anticancer, reduce postprandial glycemia and hypertension, have anti-inflammatory, antiviral, antimicrobial, anti-allergenic, anticoagulant effects and reduce the risk of diseases such as atherosclerosis and other cardiovascular diseases, cataracts, diabetes, genetic damage, bone degenerative changes, neurodegenerative diseases, including Alzheimer's disease. Fruit pomace as a matrix of pro-health compounds could be effectively utilized in one of the most popular processing technologies in modern food industry - extrusion. Such processing allows obtaining of new, innovative products with the addition of otherwise unacceptable raw materials, even regarded as wastes for example chokeberry pomace. It was found that the applied fruit pomace can be a great addition to the health-oriented corn extrudates, because they enriched the final product with of bioactive components from polyphenols group.
Particularly valuable proved to be chokeberry pomace, and as extruded corn snack with 20% addition of such pomace were characterized by the highest content of polyphenols, phenolic acids, flavonoids, flavonols and anthocyanins, and soluble and insoluble fractions of DF, as well as the most favourable sensory score, determined predominantly by extrudate hardness, and also flavour and attractive colour.

Key words: extrusion, fruit pomace, polyphenols, role, structure

Acknowledgment: This Research was financed by the Ministry of Science and Higher Education of the Republic of Poland

Biography: Dorota Gumul works in the Department of Carbohydrate Technology in Faculty of Food Technology, University of Agriculture in Krakow, Balicka 122 Street, 30-149 Krakow in Poland. Dorota Gumul is interested in acrylamide and bioactive compounds i.e. phenolic acids (chlorogenic, neochlorogenic and cryptochlorogenic, gallic, ferulic, protocatechic, caffeic, cynnaminic, synapic and p-coumaric acid), flavonoids (catechin, epicatechin, kempferol, naringenin, rutin), and especially anthocyanins in cereal, vegetables and fruits and also by-product and changing these compounds during the food processing. Dorota Gumul's field of research is also starches from different sources and their modification and application in food industry.

DOI: https://doi.org/10.15414/2021.9788055223322

Presenting author details
Full name: dr hab. inż. Dorota Gumul, prof. UR
Contact email: rrgumul@cyf-kr.edu.pl**;** ORCID: 0000-0002-8217-5992

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Presentation of the Master programme "Sustainability in Agriculture, Food Production and Food Technology in the Danube Region"

Barbara Hinterstoisser
University of Natural Resources and Life Sciences, Vienna
Gregor Mendel Str. 33, A-1180 Vienna, Austria

The presented Master study programme give students the opportunity to improve their knowledge and grow their skill set with regard to the intercultural and social aspects, anthropic landscape and natural resources of sustainability in agriculture and the food industry in the Danube region. Understanding the intercultural and regional aspects of sustainable agriculture and food technology is crucial in finding viable pathways to long-term success in Central and Eastern European agriculture. This Joint Master´s programme will give students the opportunity to improve their knowledge and grow their skill set with regard to the intercultural and social aspects, anthropic landscape and natural resources of sustainability in agriculture and the food industry in the Danube region. The international Joint Master program in Sustainability in Agriculture, Food production and Food technology is implemented as a joint degree offered by the University of Natural Resources and Life Sciences, Vienna (Austria) and Szent István University (SZIE), Gödöllő (Hungary) with contributions (courses, MSc thesis supervision, summer schools…) from the following partner universities: Corvinus University Budapest (HU), CULS Prague (CZ), WULS (PL), University of Zagreb (HR), University of Novi Sad (SR), Slovak Agricultural University Nitra (SK) USAMVBT Timisoara (RO). Graduates receive a Joint Master Degree in Sustainability in Agriculture, Food production and Food technology from BOKU and SZIE.

Key words: master programme, sustainability, agriculture, food technology

Biography: Barbara Hinterstoisser is Professor for Physical Chemistry of Wood and Wood Materials at the Department for Material Sciences and Process Engineering, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria (Institute of Physics and Materials Science) and former Vice-rector for Teaching and International Affairs at BOKU.

Presenting author details
Full name: Barbara Hinterstoisser
Contact email: barbara.hinterstoisser@boku.ac.at
ORCID: 0000-0002-9517-8084

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Less known and non-traditional food sources and their using in food industry

Eva Ivanišová
Slovak University of Agriculture in Nitra, SK- 949 76, Nitra, Slovak republic

Less-known, neglected and non-traditional species have also been the subject of world-wide interest. In this sense, many plant species that were widely consumed in the past are no longer consumed and are considered ruderal, being known as unconventional food plants. In the last decade, the consumption of these plants has increased. They grow spontaneously and free of chemical additives, and some studies have shown higher nutritional value, often more significant compared to other common food plants. Fruit and vegetable consumption have become increasingly important due to its potential beneficial health effects related to its nutritional composition, such as the presence of vitamins, phenolic, anthocyanins, flavonoids, tannins, among others. Most of these compounds have the ability to prevent cancer, cardiovascular disease, diabetes, neurodegenerative diseases and osteoporosis. The consumption of flowers in ancient time is known, on one hand, for being a part of traditional culinary practices, while being also used in the field of alternative medicines. Edible flowers possess nutritional value – being rich in moisture, carbohydrates and protein, and being low in lipids. They also contain interesting amounts of ash, including dietary minerals such as calcium, iron, potassium, magnesium, phosphorous or zinc. Furthermore, they contain bioactive components, such as phenolic compounds, which contribute to their high antioxidant activity, while also conferring color and aroma. The rising demand for functional food free from synthetic chemicals indicates the awareness of people on quality food. The excellent texture and unique flavour of edible and medicinal mushrooms makes them universally accepted by all age groups. Due to the production of a large variety of secondary metabolites with exceptional chemical structures and interesting biological actions they are reservoir of valuable chemical resources. However, there is very little awareness on mushrooms as a healthy food and as an important source of biological active substances with medicinal value. Wild mushrooms have long been considered as highly nutritious tasty food items from ancient time. Besides nutritional importance wild edible mushrooms are now well known for their pharmaceutical constituents. Currently 14,000 mushroom species are known to exist. Out of these, about 50% species are reported to possess varying degrees of edibility and almost 3000 species spread over 31 genera are regarded as prime edible mushrooms. To date only 200 of them are experimentally grown, 100of them are economically cultivated, approximately 60 are commercially cultivated, and about 10 have reached industrial scale production in many countries. Furthermore, about 2000 are medicinal mushrooms with variety of health benefits and 270 species are now considered as potential therapeutic or preventative agents that are ensured for human health perspective.

Less-known and non-traditional food sources, rich for various bioactive compounds are considered to be promising, economically and ecologically advantageous raw materials for the food industry.

DOI: https://doi.org/10.15414/2021.9788055223322

Key words: fruit, flowers, mushrooms, bioactive compounds, gastronomy

Acknowledgment: This work was supported by the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund, and AgroBioTech Research Centre built in accordance with the project Building „AgroBioTech" Research Centre ITMS 26220220180.

Biography: Eva Ivanišová is an assistant professor at the Department of Technology and Quality of Plant Products, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture Nitra, head of Laboratory of Fats and Oils in Research Centrum AgroBioTech in SUA Nitra. She is the author, resp. co-author of 6 scientific and professional monographs, resp. chapters issued in domestic and foreign publishers; totally 350 publications, from which 19 publications in the Current Contents, 56 domestic and foreign Impacted journals in the Web of Science or SCOPUS. Totally 213 citations, in which Web of Science and the SCOPUS presented 173. She is the co-author of 2 patents.

Presenting author details
Full name: Eva Ivanišová
Contact email:eva.ivanisova@uniag.sk
ORCID: 0000-0001-5193-2957

DOI: https://doi.org/10.15414/2021.9788055223322

Title: How to market your product

Tomáš Jambor
University address: Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences, Centre BioFood, Tr. A. Hlinku 2, 949 76 Nitra

Oral presentation skills have been applied in many professions such as engineering, business, physics or academic but little is known about how these skills are learned. Many researchers are tasked with solving increasingly complex and interdisciplinary problems requiring succinct communication and presentation skills. Presenting research at an academic or business meeting can be intimidating but can also be a rewarding experience that gives a deeper understanding of one´s own analyses while developing communication skills. The growing body of research has confirmed that entrepreneurs' communication skills and personal attributes influence investor decision making. Level of investor interest was significantly related to their evaluations of the quality and content of the entrepreneurs' presentations: the higher an entrepreneur's overall presentation score, the greater the likelihood that investors would be interested in pursuing that investment opportunity. Based on these facts, we design a seminar called “How to market your product” to determine the current abilities regarding the oral presentation as well as knowledge about different types of business presentations. In summary, students learn oral presentation by trial and error rather than through teaching of an explicit rhetorical model. This may delay the development of effective communication skills and result in the acquisition of unintended professional values. Teaching and learning of oral presentation skills may be improved by emphasizing that context determines the content and by making explicit the tacit rules of presentation.

Key words: presentation, product, business pitch deck,

Acknowledgment: This work was supported by the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund, and AgroBioTech Research Centre built in accordance with the project Building „AgroBioTech" Research Centre ITMS 26220220180.

Biography: MSc. Tomáš Jambor is a young scientific researcher specialized in molecular biology from BioFood Centre at Faculty of Biotechnology and Food Sciences, SUA in Nitra.
He has published more than 30 papers CC/WOS/SCOPU in reputed journals and currently is member of Society of Environmental Toxicology and Chemistry, Slovak National Platform for 3Rs and Chair for National Committee for the Protection of Animals used for Scientific Purposes.

Presenting author details
Full name: MSc. Tomas Jambor, PhD.
Contact email: tomas.jambor@uniag.sk
ORCID: 0000-0002-1947-1529

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Minimal processing technologies in the food industry – use of high hydrostatic pressure and sous-vide technology for meat products

Kenesei Gyorgy
Hungarian University of Agriculture and Life Sciences (former Szent István University), Institut of Food Science and Technology. 1118 Budapest, Ménesi út 45. Hungary

The target of all minimal food processing technology is to preserve food with the least invasive method and at the lowest possible level of treatment. Extending shelf life of meat based food products is still a major concern for food researchers.
The sous-vide mild (LTLT) heat treatment is becoming more and more popular and it is already applied on a daily basis as a routine. The literature on this topic also states that there is a significant risk concerning food safety when producing and marketing mild heat treated products. As a novelty, sous-vide meat products appeared in retail, is therefore controversial. Sous-vide treatment applies a combination of three hurdles (vacuum packaging, heat treatment, refrigeration), a combination of preservation methods, which is a good example of using Leistner's hurdle theory. High hydrostatic pressure when the food is pressurized in the range of 300-600 MPa may be another barrier in this technology line so that these products of preferred sensory properties pose a lower risk. How does this two-step technology affect the properties of pork chops chosen as a raw material? Are there new effects compared to single treatments? Beside the single heat treatment and the single pressure treatment (300 and 600 MPa), the application of these treatments in combination results a longer shelflife product with less weight loss and stable organoleptical properties.

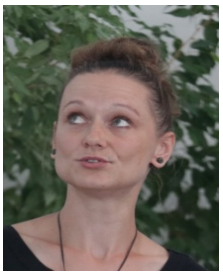
Key words: minimal processing, high hydrostatic pressure, sous-vide, combined treatment, meat

Acknowledgment: The authors also wish to thank - for making the HHP treatments possible- for TÁMOP 4.2.1/B/09/1/KMR/-2010-0005 program of the National Development Agency, Hungary.
I wish to thank István Dalmadi, PhD., Márta Nemes-Csuka and the Department of Refrigeration and Livestock Products Technology.

Biography: György Kenesei is a trained chef, food engineer with a PhD in food science and has a degree in economics. He is a senior lecturer of the Hungarian University of Agriculture and Life Sciences, Institute of Food Science and Technology. He is dedicated to the research of food engineering and gastronomy.

Presenting author details
Full name: György Kenesei
Contact email: Kenesei.gyorgy@uni-mate.hu

DOI: https://doi.org/10.15414/2021.9788055223322



Title: Quality of honey from Slovak production

Vladimíra Kňazovická
National agricultural and food centre (NPPC), Research institute for animal production Nitra,
Institute of apiculture Liptovsky Hradok, Dr. J. Gasperika 599, 033 01 Liptovsky Hradok, Slovakia

The aim of the contribution was to describe the Slovak honey and honey research through the influence of wax comb colour and age of honey to its quality. Typical Slovak unifloral honeys are from rapeseed (*Brassica napus*), false acacia (*Robinia pseudocacia*), sunflower (*Helianthus annuus*) and linden (*Tilia cordata*). Large group of multifloral as well as honeydew and blended honeys are also widely spread in Slovakia. They have diverse properties and originate in our gardens, orchards, meadows, forests, villages and towns. Most Slovak blossom honeys have lighter colours. Rapeseed honey crystallizes very quick to cream-white colour. False acacia honey is typical of liquid consistency for a long time. Honeydew honeys have darker colour, higher mineral content, electrical conductivity, polyphenols and oligosaccharides comparing to blossom honeys. The origin is a basic factor, which influences the honey properties. However, the origin is affected primarily by nature (soil, climate, weather, plants, live organisms, including their interactions) and by the hive environment. Dark combs can be the source of pathogens on the one hand, but beneficial agent for bee immunity on the other hand. We found that honey from darker combs had lower water content and free acidity and also higher pH, electrical conductivity and microbial counts. Age of honey could influence the bacterial diversity. We found that fresh honeys contained DNA mainly from lactobacilli and the older ones contained DNA of various human bacteria with dominance of *Prevotella* sp. Bee world is still full of secrets and we can discover some of them.

Key words: hive, nature, bee, blossom, honeydew, storage, bacteria

Acknowledgment: I am grateful to organizers for invitation to the CASEE Online Winter School 2021 and also to all my co-workers in field of bees, beekeeping and laboratory analyses.

Biography: Vladimíra Kňazovická is a researcher at the Institute of apiculture Liptovský Hrádok, NPPC. Formerly, she worked as an assistant professor at SUA in Nitra. She has published more than 25 papers in reputed journals as the first author or co-author. She has worked with bee products in laboratory for 13 years. Her research activities have been focused mainly on honey and other bee products quality. She is active beekeeper for last 6 years.

Presenting author details
Full name: Ing. Vladimíra Kňazovická, PhD.
Contact email: vladimira.knazovicka@nppc.sk
ORCID: 0000-0002-3911-9856

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Natural substances and their impact on female reproductive functions

Adriana Kolesárová[1], Simona Baldovská[2], Aleš Pavlík[3], Petr Sláma[3]
[1]Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, [2]AgroBioTech Research Centre, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, [3]Department of Animal Morphology, Physiology and Genetics, Faculty of AgriSciences, Mendel University in Brno, Zemědělská 1/1665, 613 00 Brno, Czech Republic

The area of nutritional research has an increasing focus on the study of plant substances, which can effectively modulate the human female reproductive processes. Such substances are phytonutrients, bioactive substances, or antioxidants that protect the organism against oxidative stress. Inhibitory and stimulatory action of tea tree (*Camellia sinensis* L.) and its constituents on the female reproductive state, effects on the ovarian cells, reproductive hormones, as well as possible modulatory activity on extra- and intracellular mediators of physiological and reproductive processes were found. Apricot seeds (*Prunus armeniaca* L.) contain abundant compounds like carbohydrates, polyphenols, flavonoids, fibre, and amygdalin. The results demonstrated the potential of apricot seeds including amygdalin in the control and treatment of civilization diseases especially cancer, and exert the potential in the clinical applications. Elderberry (*Sambucus nigra* L.) is promising as a modulator of female reproductive processes through endocrine regulators in human ovarian cells such as steroid hormones. Grape (*Vitis vinifera* L.) is one of the "most-produced fruit" in the world and contains various phenolic compounds including resveratrol, which influence physiological processes and ovarian functions at various regulatory levels via extra- and intracellular signaling pathways regulating secretory activity, proliferation, and apoptosis. Pomegranate fruits (*Punica granatum* L.) have a beneficial impact on the reproductive system and affect several physiological processes including female reproduction, steroidogenesis, cellular viability, and induce apoptosis in ovarian cancer cells. Sea buckthorn (*Hippophae rhamnoides* L.) contents a lot of beneficial phytosubstances such as kaempferol, isorhamnetin, quercetin, and others with potential protective effects on ovarian cell functions.

Key words: tea tree, apricot seeds, elderberry, grape, pomegranate, sea buckthorn, phytonutrients, antioxidant, ovary, reproduction

Acknowledgment: This work was supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic projects APVV-0304-12, APVV-18-0312, DS-FR-19-0049, VEGA 1/0266/20, APVV-16-0170, The Excellent scientific team "Center of Animal Reproduction (CeRA)", the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and inovative food, Drive4SIFood 313011V336, cofinanced by the European Regional Development Fund, and AgroBioTech Research Centre built in accordance with the project Building „AgroBioTech" Research Centre ITMS 26220220180.

DOI: https://doi.org/10.15414/2021.9788055223322

Biography: prof. Ing. Adriana Kolesárová, PhD. (h-index 15) is Vice-dean for Science, Research and Foreign Relations, Faculty of Biotechnology and Food Sciences, a professor in Agrobiotechnology. She is a member of ESFRI Strategy Working Group on Health and Food (from 2021), a member of the Commission for the Coordination of Activities of the Slovak Republic (SR) in ESFRI Research Infrastructures in the field of Health, Food and the Environment, a coordinator of the National Platform AgroBioFood Nitra for food and biotechnology research and development, a member of the FOODforce consortium and the Excellent scientific team Center of Animal Reproduction CeRA. She is coordinating national and European projects including EIT Food Hub in Slovakia (2019-2020), EIT Food RIS Consumer Engagement Labs (2020-2021), DS-FR, CASEE DanubeFEHRA (2020-2021), Erasmus+ K2 EuroDisBioFood and a member of the research team in Horizon2020 project COMFOCUS.

Presenting author details

Full name: Adriana Kolesárová
Contact email: adriana.kolesarova@uniag.sk
ORCID: 0000-0002-1272-9099

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Risk Factors of Food Chain

Peter Massányi[1], Marcela Capcarová[1], Iveta Urbanová[1], Drahomír Galbavý[2], Jaroslav Kováčik[1]
[1]Slovak University of Agriculture, Tr. A. Hlinku 2, 94976 Nitra, Slovak Republic
[2] Avelane Clinik, Krčméryho 2B, 949 01 Nitra, Slovak Republic

The impact of risk elements released by human activities on the environment and on ecosystems has been the subject of numerous studies. The contamination of food chain with risk elements negatively influences the health status and animal production. Unfavorable effects on the animal health may depend on the kind of element and its dose as well as on the utility orientation. Soil, air and water analyses alone are inadequate for the assessment of the availability and potential toxicity of contaminants to humans and wildlife. The study focuses on the data from WHO, FAO and EFSA related to food contamination and risks related to animal and human health. Some specific diseased are reported. General outcomes and suggestion are supported by original results of authors showing estimation of risk substance in different animal tissues, feed and food chain.

Key words: risk factors, food chain, health, toxicity

Acknowledgment: This publication was supported by the Operational program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund.

Biography: Peter Massányi is the head of Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Slovak Republic. He has 209 records in Web of Science with more than 1000 citations and h-index 25.

Presenting author details
Peter Massányi
Contact email: peter.massanyi@uniag.sk
ORCID: 0000-0002-4216-0948

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Virtual kitchen: customer-oriented functional food design (seminar)

Jaroslav Michalko[1], Patrícia Martišová[2]
[1]Research and Innovation Center Biofood, Faculty of biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia
[2] AgroBioTech Research Centre, Department of Technology and Quality of Plant Products, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia

The concept of the use of food as medicine has its origin in ancient India, traditional Chinese medicine, and other ancient civilizations. Over the past few decades, our understanding of the relationships between foods, physiological function and disease have progressed greatly with the advances of biotechnology and nutrigenomics. The concept of 'functional food' has been established in Japan in the early 1980s. Functional food is typically considered any food or ingredient that has a positive impact on an individual's health, physical performance, or state of mind, in addition to its nutritive value.
For our virtual seminar we have developed and followed a consumer-oriented functional food design process during which students of food sciences worked in groups to modify and improve characteristics of conventional food products on market to make them most appropriate for their target consumer group. For this we developed a set of virtual brainstorming exercises during which students worked on the characteristics, nutritional value, composition and appropriate nutritional and health claims of their novel food concepts.
As a result, novel functional food concepts containing biologically active components (beta-glucans, folates and punicalagins): "enriched non-alcoholic beer" and "nutritious protein bar", have been developed. These concepts could be used as a starting point for the development of real marketable value-added products in food science labs of the research center AgroBioTech.

Key words: functional food, consumer-oriented food design process, novel food concept, virtual kitchen, online seminar

Acknowledgment:
This work was supported by the Operational program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, cofinanced by the European Regional Development Fund and thanks to AgroBioTech Research Centre built in accordance with the project Building Research Centre "AgroBioTech" ITMS 26220220180 and by the EIT Food, the innovation community on Food of the European Institute of Innovation and Technology (EIT), a body of the EU, under the Horizon 2020, the EU Framework Programme for Research and Innovation.

DOI: https://doi.org/10.15414/2021.9788055223322

Biography: Jaroslav Michalko works as an independent researcher at the Research and Innovation Center Biofood of the Faculty of Biotechnology and Food Sciences at SUA in Nitra. He is a founder and CEO of EcoDish – compostable tableware made of local agri-food residues. He is author and co-author of several published studies in reputed journals (H-index 5) with over 100 citations. In the CASEE online winter school he acted as a member of seminar organizing committee which was also responsible for evaluation of the final seminar outcomes.
Patricia Martišová works as a researcher at the AgroBioTech Research Centre at SUA in Nitra. She is also an external PhD. student at Faculty of Biotechnology and Food Sciences at SUA in Nitra with major in Food Technology and specializing at sensory analysis of food and foodstuffs and e-systems measurements (e-eye, e-nose, e-tongue). She is author and co-author of 30 scientific studies, with 22 citations excluding self-citations, H-index 3. In the CASEE online winter school she participated as a member of seminar organizing committee and was also responsible for final evaluation of the participants.

Presenting author details
Full name: Jaroslav Michalko
Contact email: michalko@uniag.sk
ORCID: 0000-0002-5659-0228
Full name: Patrícia Martišová
Contact email: patricia.martisova@uniag.sk
ORCID: 0000-0001-7810-6858

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Distilled beverages - technology and characteristic

Sumallika Morakul
Kasetsart University, Bangkok Thailand

Distilled spirit has long been concerned for containing many contaminants with potential implications for human health for example methanol, higher alcohol, ethyl carbamate, acetaldehyde. Some of these contaminants might come from raw materials, some are process induced and some might come from microbiological activity. However, the problem could be overcome by tightly control raw material storage condition to avoid spoilage and thus reduction of unwanted enzymatic hydrolysis of pectin and low methanol synthesis. Very simple modification of production process during stone fruit-spirit can minimize ethyl carbamate. Distillation unit design and the distillation cut technique can be the effective way to remove the spirit contaminant.

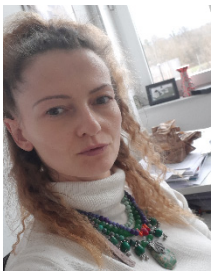
Key words: spirit; safety; distillation technique

Acknowledgment: Thanks to report from many researchers who worked on the spirit production and safety around the world for giving valuable information.

Biography: Sumallika Morakul is an Asst. Prof of Biotechnology in Thailand who is moving from fermented beverage to distilled spirit.

Presenting author details
Full name: Sumallika Morakul
Contact email: fagiskm@ku.ac.th
ORCID: 0000-0002-4745-454X

DOI: https://doi.org/10.15414/2021.9788055223322



Title: Traditional food as a source of a new generation of food additives

Mirna Mrkonjić Fuka
University address: University of Zagreb Faculty of Agriculture, Svetosimunska 25, 10000 Zagreb, Croatia

The consumers demand organic food of specific taste that is minimally processed and with fewer, or preferably no preservatives. During the last years, the application of functional starter cultures in food production has gained increasing relevance regarding the safety and standardization of the product. This trend has also provoked the need for having new starters containing powerful microbial strains with defined properties. However, in the context of microbial metabolic diversity, it must be remembered that the use of commercial starter cultures can lead to the loss of diversity and the generation of different metabolic activities which consequently directly influence the sensorial properties of food. The majority of starter cultures applied nowadays contains lactic acid bacteria (LAB), due to their recognized key role in food fermentation, positive influence on food sensorial properties, and a long history of safe use. However, not all LAB are equally efficient in all food types and compared to commercial starter cultures, indigenous strains isolated from traditional fermented products often express higher metabolic activity. However, to be considered as a part of the starter culture, native strains should fulfil many requirements. As such, besides proven antimicrobial and technological properties, it is essential that they show no pathogenic or toxic activities and with their application, the typical sensory properties of traditional food need to be preserved. Against this background, wild-type LAB isolated from artisanal Croatian cheese and game meat sausages were investigated for their potential use as native functional starter cultures.

Key words: lactic acid bacteria, artisanal cheese and sausages, functional starter cultures

Acknowledgment: Croatian Science Foundation and Croatian Ministry of Science, Education and Sport.

Biography: Mirna Mrkonjić Fuka is associate professor in the field of microbial ecology and food microbiology. Coordinator of seven courses at undergraduate and graduate study programmes at Faculty of Agriculture University of Zagreb and visiting teacher at BOKU Austria and Huazhong University China. Research work: functional and structural diversity of bacterial communities in complex ecosystems (especially artisanal food), molecular typing of lactic acid bacteria and analysis regarding to sources of antibiotic resistance in food chain and inhibition of growth of spoilage and pathogenic microbiota. She published 41 original scientific papers, two book chapters and two university handbooks.

Presenting author details
Full name: Mirna Mrkonjić Fuka
Contact email: mfuka@agr.hr
ORCID: 0000-0002-8494-8805

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Food packaging trend for monitoring safety and quality of food products

Adriana Pavelková
Slovak University of Agriculture in Nitra, Department of Technology and Quality of Animal Products, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic

Food packaging is used to protect food from environmental contamination and other influences (such as odors, shocks, dust, temperature, physical damage, light, microorganisms, and humidity), and it is key to ensuring the quality and safety of food, while also extending shelf-life and minimizing food losses and wastage. Oxidation, microbial spoilage, and metabolism are the main causes of deterioration of many foods during production, transport, processing, storage, and marketing. These processes are directly related to the loss of food quality (including safety), influence consumer buying decisions, and impact consumer health. To delay oxidation, control foodborne pathogens, and meet the growing demand of consumers for safe and high-quality products, considerable effort has been devoted to development of new active food packaging technologies. New food packaging trends includes active and intelligent packaging. Active packaging refers to the incorporation of certain additives into packaging film or within packaging containers with the aim of maintaining and extending product shelf life. The systems of active packaging applications include use absorbers of oxygen, carbon dioxide, moisture, ethylene; emmitors of carbon dioxide, flavour; anti-fogging packaging; microwave subsectors; self-heating or cooling packaging. Intelligent packaging can be stated as system that by using of indicators, monitor the condition of the package food to provide information about the quality during production, transporting, storage, distribution and sale. Time-temperature indicators, freshness indicators, microbial and pathogen indicators, packaging leak indicators, sensor for fruit ripeness are used to control conditions and monitor food quality.

Key words: food quality, food packaging, active packaging, intelligent packaging

Biography: Mgr. Ing. Adriana Pavelková, PhD. is lecturer on Department of Technology and Quality of Animal Products. In her work she focuses on food packaging and the food quality of animal origin. She has published more than 30 papers registered in WOS and Scopus.

Presenting author details
Full name: Adriana Pavelková
Contact email: adriana.pavelkova@uniag.sk
ORCID: 0000-0002-8275-8557

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Methods for detection and evaluation of risk factors

Aleš Pavlík1, Petr Sláma[1], Adriana Kolesárová[2], Simona Baldovská[3]
[1]Department of Animal Morphology, Physiology and Genetics, Faculty of AgriSciences, Mendel University in Brno, Zemědělská 1/1665, 613 00 Brno, Czech Republic, [2]Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, [3]AgroBioTech Research Centre, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic

There are more than ten million chemicals in our environment, whether organic or inorganic, and at least half a million of these affect us in some way during our lives, so that means we are exposed to their effects. Of course, this does not only mean negative influences, many of them are essential for an individual's life. On the contrary, some of them, arising either naturally or artificially by human activity, can have negative effect on the physiological functions of individual tissues and organs. In terms of these negative effects, only thousands of the huge amounts of substances were till now tested for their biological effect, that means, they were used experimentally. Hundreds of these are included in the list of carcinogenic substances. This lecture would lightly recall which risk factors occur in our environment, consequently small mention of their sources from which they are produced into the environment. A few general words about the detection methods that are used to determine them - the direct determination of specific risk factors and finally a few words about evaluation, that means indirect analysis of their effect on the animal organism.

Key words: risk factor, detection, evaluation

Acknowledgment: This presentation was supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic project DS-FR-19-0049 and by the Ministry of Education, Youth and Sports of the Czech Republic project 8X20023.

Biography: Ales Pavlik (male) is an Associate Professor at Mendel University in Brno (MENDELU) at the AgroSciences Faculty. In 2004, he defended his Ph.D., habilitated in 2021. Ales Pavlik is the author or co-author of 26 publications in impacted and Scopus database periodicals, many articles at conferences registered in the Web of Science database, 2 certified methodologies, and one utility model. According to the Web of Science database, these works have a total response of 77 citations. His work deals mainly with the use of analyzes of the animal internal environment for the evaluation of health and nutritional status.

Presenting author details
Full name: Assoc. prof. Aleš Pavlík, Ph.D.
Contact email: ales.pavlik@mendelu.cz
ORCID: 0000-0003-1004-4835

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Heavy metals in water and soil: Overview and examples from the Danube floodplain

Markus Puschenreiter, Franz Zehetner
University of Natural Resources and Life Sciences, Vienna (BOKU)
Institute of Soil Research, Peter-Jordan-Str. 82, A-1190 Vienna, Austria

Heavy metals occur as trace elements in soils, surface water, ground water and living organisms. Some of these metals (e.g., Cu, Zn) are essential micronutrients for plants, animals and microorganisms, whereas others are environmentally important as frequent pollutants (e.g., Cd, Pb). Mobility and bioavailability in soil largely depends on binding capacities of the soil solid phase (clay minerals, organic matter) and on binding strength, largely determined by the soil pH. Only the soluble fraction is available for plant uptake via roots. Mobility in soil solution and groundwater mainly occurs in dissolved form (as free metal ions or metal-organic complexes), whereas transportation in surface waters is dominantly in particulate form, i.e., bound to suspended clay minerals.
A case study from the Danube floodplain near Vienna, Austria, showed that soil development strongly affected the soils' buffer-filter function. Soil organic matter accumulation during 600 years of pedogenesis resulted in increased retention capacity and strength for Cd and Cu. These effects can be actively influenced by land use and soil management.

Key words: bioavailability; cadmium; copper, heavy metals; solubility; sorption.

Biography: Dr. Markus Puschenreiter is Senior Scientist at the Institute of Soil Research, BOKU. As a soil ecologist his work focuses on root-soil-interactions in the rhizosphere and their effect on element dynamics.
Dr. Franz Zehetner is Associate Professor at the Institute of Soil Research, BOKU. As a pedologist his work focuses on soil formation and its effects on soil functions.

Presenting author details
Full name: Dr. Markus Puschenreiter
Contact email: markus.puschenreiter@boku.ac.at
ORCID: 0000-0002-7298-4163
Full name: Dr. Franz Zehetner
Contact email: franz.zehetner@boku.ac.at
ORCID: 0000-0002-8848-9650

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Introduction to fruit and vegetable drying

Milivoj Radojčin
University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21000 Novi Sad

Drying is one of the oldest methods of food preservation which removes the water from fruit and makes it available all year in deficiency of fresh fruit. The term drying usually means an operation by which the moisture present in the material evaporates as a result of heat and matter exchange between the product and the working medium. Fresh fruit have high moisture content, it is classified as highly perishable commodities and storage technologies are required. The drying is alternative for preservation nutritional value of fruit, which increase relative concentration of nutrients, enhance shelf-life, and minimize packaging, handling and transportation costs. Drying of fruits by conventional methods, such as sun drying or open air drying lead to poor quality and contamination. Lack of this methods developed the new technologies such as oven drying, microwave, vacuum, infrared, freeze and different hybrid drying which being used successfully for different kinds of fruits. Dried fruits can be produced by small or big scale processors what make it quite popular. Drying cause different level of quality changes: physical, sensory, nutritional, chemical and microbiological. Dried fruit quality and energy consumption required for drying process are most important parameters in selection of drying techniques. Proper selection method and optimization of drying process are essential moments in achieving of high quality and energy efficiency. Except drying techniques such as osmotic dehydration, vacuum drying, freeze drying and different combination of drying, treatment like ultrasound, pulsed electric field or high pressure treatment can have a big impact on production of high quality dried fruits, cost and energy efficiency.

Key words: drying, fruit, vegetable, quality

Biography: Assoc. Prof. Milivoj Radojčin is a teacher at Department of Agricultural Engineering, Faculty of Agriculture Novi Sad. As a member of Laboratory of Biosystem Engineering he worked on topics such as drying of biomaterials, physical characterisation, energy, nanofluids etc. He published in reputed journals, serving as a co-editor and as editor of Journal on Processing and Energy in Agriculture.

Presenting author details
Full name: Milivoj Radojčin, Assoc. Prof.
Contact email: milivoj.radojcin@polj.uns.ac.rs
ORCID: 0000-0002-2864-7872

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Organic food quality and impact on human health

Ewa Rembiałkowska
University address: Warsaw University of Life Sciences, 02-787 Warszawa, Poland

Organic food is produced in accordance with the European Union legal acts 834 / 2007 and 889 / 2008. The basic principles are the prohibition of synthetic pesticides, mineral fertilisers and growth regulators as well as GMOs. Only natural organic fertilisers such as manure, compost and green manures as well as biological plant protection products are used.
The cultivation method affects the composition of the plants produced, which contain only trace residues of synthetic pesticides and heavy metals. However, they contain significantly more bioactive substances than conventional raw materials - primarily polyphenols, but also vitamin C and carotenoids.
Organic livestock products contain only traces of antibiotics, but much more valuable omega 3 fatty acids and vitamins E and D than conventional products.
Regular consumption of organic food is correlated with a lower incidence of psychomotor impairment, allergy and hypospadias in young children and of pre-eclampsia in pregnant women. Organic consumers also showed, compared to conventional consumers, a lower incidence of metabolic syndrome, cardiovascular disease, obesity and cancer with a special focus on non-Hodgkin's lymphoma.
In conclusion, organic food can be confidently recommended to all consumers regardless of gender or age.

Key words: organic food, conventional food, pesticides, antioxidants, human health.

Acknowledgment: I want to thank very much the organizers of the CASEE winter school in Nitra, Slovakia. Perfect work! Congratulations.

Biography: Prof. Ewa Rembiałkowska works at the Institute of Human Nutrition Sciences at Warsaw University of Life Sciences, Poland. In her research activity she deals with the sustainable diets, nutritional value of raw materials from organic and conventional production and the impact of organic food on human and animal health. She has published over 250 scientific papers in this field, 89 of them in highly scoring journals. She has been running many projects related to organic food and farming. She is a member of the boards of several Polish, European and world organizations promoting this subject (FOA, FQH, OFSP, ISOFAR, ENOAT).

Presenting author details
Full name: prof. Ewa Rembiałkowska
Contact email: Maria_rembialkowska@sggw.edu.pl
ORCID: 0000-0002-4109-5486

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Oxidative Stress and Male Reproductive Function

Shubhadeep Roychoudhury
Department of Life Science and Bioinformatics, Assan University, Silchar 788011, India

Life depends on electrons that often get stranded at the top of the 'energy hills' - waiting to roll downhill toward a low-energy resting place. Humans depend on these environmental redox gradients created by the autotrophs. The rearrangement of the electrons along the energy scale is tightly controlled. In the entire process, electrons finally move toward a new resting place - terminal acceptor (i.e. molecular oxygen), yielding water. On their way from fuel molecules to the terminal acceptor, electrons drive both oxidative and reductive processes. However, the incomplete reduction of molecular oxygen leads to oxygen species that seek complete reduction and hence play roles as oxidants. Oxidative stress is the imbalance between the oxidants and the antioxidants in favour of the former, leading to a disruption of redox signalling and control &/or molecular damage. Apart from the endogenous factors that may cause oxidative stress, environmental and lifestyle factors such as smoking, alcohol consumption, exposure to radiations and environmental toxins may also contribute towards elevation of ROS levels in the reproductive system of the male ultimately leading to aberrant sperm function and/or death, and subfertility. High levels of oxidative stress are observed in 40-80% of infertile men, and the male factor is contributory in up to 50% of infertility cases. Hydroxyl radicals are largely deleterious. Hydrogen peroxide (H_2O_2) also acts as a signal mediator which is moderately reactive, membrane permeable and oxidize limited numbers of functional groups. The amino acid chain most sensitive to ROS is cysteine sulphydryl (SH) which is involved in the catalysis of some enzymes. Phosphatases contain highly reactive SH groups at their catalytic centres and are oxidatively inactivated by transiently elevated H_2O_2 levels finally resulting in the oxidative modification of bases in DNA, base substitution and strand breaks, and even transmission of adverse genetic information to the offspring. Sperm cells also have a significant ability to generate ROS, however, they contain extremely high concentration of polyunsaturated fatty acids and lack the capacity for membrane repair due to the limited amount of cytoplasmic defensive enzymes. Supplementation of herbal natural products is believed to possesses the potential to reduce oxidative stress in the reproductive system of the male and pose a low-cost alternative that may uplift the health of reproductively compromised men.

Key words: ROS, sperm dysfunction, infertility, environment, lifestyle, herbal management

Biography: Dr. Shubhadeep Roychoudhury has completed Doctoral and Master degrees at Biotechnology from Slovak University of Agriculture in Nitra, Slovakia and Postdoctoral research from Cleveland Clinic, USA. He works on reproductive health, reproductive and environmental toxicology, oxidative stress within the context of male pathophysiology and reproductive dysfunction, and herbal applications in management. He has published over 100 papers in scientific journals, over 25 book chapters, 5 books and presented over 50 papers at national and international

DOI: https://doi.org/10.15414/2021.9788055223322

meetings. He has conducted several research projects including collaborative projects in Poland, Slovakia and Czech Republic and guided more than 25 master and doctoral students.

Presenting author details

Full name: Dr. Shubhadeep Roychoudhury, Assistant Professor, Department of Life Science and Bioinformatics, Assam University, Silchar 788011, India
Contact email: shubhadeep1@gmail.com
ORCID: 0000-0003-4174-1852

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Cereals and their role in human nutrition

Peter Sipos
University of Debrecen, Institute of Nutrition, Egyetem ter 1. 4032, Debrecen, Hungary

Cereals are one of our staple foods, providing especially energy for the human body, but it also a valuable source of proteins, minerals, and, if we consume them wisely, fibers and different physiologically active components. Their valuation has changed a lot over the centuries: while the white flour was a status symbol for a long time and the whole grain flour was food for poor people, nowadays there are plenty of accusations of endosperm rich flour based fine bakery products for its high calorie content, and the fiber rich products are found much healthier.
It is important to know that the separation of bran from white flour strongly decreases its nutritional value – it results an average 10% decrease in protein, even 90% decrease in fiber, and 50 to 90% decrease in mineral content. Fibers have the highest interest from these components: this removal is outstandingly important not only due to the amount, but the composition: cereal brans contain several important soluble fibers and high antioxidant activity compounds. Researches focus on the increase of fiber concentration, what raised the interest in the resistant starch content and operations increase its concentration and therefore the nutritional value.
The consumption of cereal products has several nutritional effects and impact on diseases – both in causing and prevention, like different cardiovascular diseases, high blood pressure, diabetes digestive health and colon cancer, so it is important to know the effect of the use of different forms in nutrition to follow a healthy diet.

Key words: cereals, nutrition, chemical components, health

Biography: Péter Sipos, associate professor at Institute of Nutrition, University of Debrecen, has been working in the scientific issues of cereal qualification and processing for nearly 20 years. Previously he was the head of the Institute of Food Technology of University of Debrecen, and worked as the head of production and technical department of a milling, pasta manufacturing and vegetable oil production plant. He evaluated the possibilities of reducing the salt content of bakery products, worked on the development of biscuits with high antioxidant activity, pasta with high-protein content and similar research topics. Besides technological developments, do research on the rheological investigation of food materials.

Presenting author details
Full name: Peter Sipos
Contact email: siposp@agr.unideb.hu
ORCID: 0000-0002-8168-850X

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Effect of biologically active substances on the immune cells

Petr Sláma1, Aleš Pavlik[1], Simona Baldovska[2], Adriana Kolesarova[3]
[1]Department of Animal Morphology, Physiology and Genetics, Faculty of AgriSciences, Mendel University in Brno, Zemědělská 1/1665, 613 00 Brno, Czech Republic
[2]AgroBioTech Research Centre, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic
[3]Department of Animal Physiology, Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic,

Diet with high amount of fruits and vegetables is important to reduce risk of chronic diseases as cancers, diabetes, and cardiovascular diseases. Fruits and vegetables contain a lot of phytonutrients. Phytonutrients are classified into three main groups: polyphenols, terpenoids, and alkaloids. Polyphenols are the largest group of phytonutrients with anti-inflammatory effects including scavenge free radicals, inactivate pro-oxidants, and inhibiting the action of nuclear factor-kappa B (NF-κB) which is important way how to regulate of the programmed cell death (apoptosis). Biologically active substances have an important effect on neutrophil adhesion on epithelial cells and subsequent migration of those cells. Those phytonutrients also affect phagocytosis, cytokine and reactive oxygen species release. Biologically active substances are also important regulator of physiological functions in all immune cells including dendritic cells as antigen-presenting cells. It is necessary to study these substances more deeply to reveal the effects which have the potential for treatment of serious diseases as cancer.

Key words: phytonutrients, phytochemicals, immune cells, neutrophils, dendritic cells

Acknowledgment: This work was supported by the Ministry of Education, Youth and Sport of the Czech Republic, project of Multilateral scientific and technological cooperation in the Danube region "Impact of the digestion and absorption processes on the final biological activity of diet phytonutrients: real health added-value" number 8X20023. This work was also supported by Ministry of Education, Science, Research and Sport of the Slovak Republic projects APVV-18-0312, DS-FR-19-0049.

Biography: Ing. Petr Sláma, PhD. is head of Department of Animal Morphology, Physiology and Genetics at Faculty of AgriSciences Mendel University in Brno. He graduated with a master's degree in General Agriculture at the Faculty of Agronomy. In 2002 he started as a full-time student of the postgraduate study in General Zootechnics at the Faculty of Agronomy; in 2006, he defended his Ph.D. He is the author or co-author of 40 publications in impacted periodicals (Web of Science Core Collection), 16 papers in the Scopus database, 19 articles at conferences registered in the Web of Science database, 2 certified methodologies, 4 utility models, 32 papers from national and international conferences. According to the Web of Science database, these works have a total

DOI: https://doi.org/10.15414/2021.9788055223322

response of 112 citations (h-index 8). Petr Sláma is the author and co-author of 3 e-learning educational presentations, 3 scripts, and 2 university textbooks. As part of his scientific career, Petr Slama has collaborated or is currently collaborating on 11 international, national, and internal grants.

Presenting author details

Full name: Petr Sláma
Contact email: petr.slama@mendelu.cz
ORCID: 0000-0003-0570-259X

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Mycotoxins and their producers in crops and foods: risk and benedits

Dana Tančinová
Slovak University of Agriculture in Nitra

Mycotoxins are secondary metabolites produced by microscopic filamentous fungi that in small concentrations can evoke an acute or chronic diseases in vertebrate - animals and humans, when introduced via a natural route. Several hundred different mycotoxins have been identified. According to EU legislation are observed in food and feed the following mycotoxins: aflatoxins, ochratoxin A, patulin, deoxynivalenol, T-2 toxin, HT-2 toxin, fumonisin and zearalenone. Mycotoxins appear in the food chain as a result of mould infection of crops both before and after harvest. The most known mycotoxins are produced by species in the genera *Aspergillus, Penicillium* and *Fusarium*.
In our laboratory, we have isolated producers of: aflatoxin from poultry feeds, wheat, grapes and ground pepper; ochratoxin A from poultry feeds, wheat, wheat bran, oilseed rape and grapes; patulin from poultry feeds, wheat, wheat bran, oilseed rape, grapes, apples; trichothecens (deoxynivalenol, T-2 toxin and HT-2 toxin) from poultry feeds, wheat and grapes; fumonisins and zearalenone from poultry feeds, wheat and wheat bran. The presence of some mycotoxins (deoxynivalenol, T-2 toxin, HT-2 toxin, fumonisins and zearalenone) has been found in poultry feeds. Some toxic mold´s metabolites, including mycotoxins have medical use. For example, griseofulvin is an antifungal medication used to treat a number of types of dermatophytoses. Some ergot derivatives are used for the treatment of migraine headaches, as prolactin inhibitor, in the treatment of Parkinsonism, and in cases of cerebrovascular insufficiency. The therapeutic use of these agents may be accompanied by undesirable side effects.

Key words: *Aspergillus, Penicillium, Fusarium*, mykotoxins

Acknowledgment: This work was supported by KEGA 015SPU-4/2018.

Biography: prof. Ing. Dana Tančinová, PhD. works at the Department of Microbiology. She focuses on the occurrence of microscopic fungi and their secondary metabolites in food, raw materials for food production and feed. She has been involved in solving 24 research assignments of partial tasks (of which 2 international projects), 5 research tasks as responsible investigator and co-researcher, respectively. She is the author and co-author of 252 publications, of which 21 are registered in CC, 19 in WOS or SCOPUS, 3 scientific monographs and 3 professional monographs. Her h-index according to the WOS database is 9 and according to the SCOPUS database is 10.

Presenting author details
Full name: Dana Tančinová
Contact email: dana.tancinova@uniag.sk
ORCID: 0000-0001-6790-8169

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Synthetic and natural substances and their impact on fertility

Eva Tvrdá
University address: Department of Animal Physiology, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 94976 Nitra, Slovakia

Low sperm concentration and vitality have been identified as significant contributors to the inability of a couple to conceive offspring. Moreover, oxidative stress as an imbalance between reactive oxygen species (ROS) production and the ability of the innate antioxidant system to prevent oxidative damage, is currently well-accepted as either a primary cause or a secondary complication to male reproductive dysfunction. High amounts of polyunsaturated fatty acids are found in the sperm membranes, making them a primary target to lipid peroxidation. Spermatozoa lack cytoplasm as an important source of antioxidant molecules, which may also contribute to their lower ability to sustain oxidative insults. At the same time, external or internal factors such as infection, inflammation or environmental pollution may play a significant role in a defective spermatogenesis or sperm function. Evaluation of oxidative damage to reproductive structures has become an important step in the assessment of male sub- or infertility, while in vivo or in vitro supplementation of exogenous antioxidants represents a suitable strategy in the prevention, management or treatment of male reproductive dysfunction. Notably, antioxidant such as vitamin E and C and carnitine have been found beneficial in restoring a proper oxidative balance. Additionally, an emerging body of evidence points out to the potential of numerous biologically active compounds isolated from natural sources in the protection of spermatozoa against oxidative stress. Biomolecules such as resveratrol, curcumin, lycopene or kaempferol could become suitable alternatives to traditional antioxidants in the preservation of the sperm vitality under increased oxidative insults, mainly because of their high bioavailability, low toxicity, intricate chemical properties and their ability to interfere with numerous complex intracellular pathways.

Key words: antioxidants, biomolecules, male fertility, reactive oxygen species, spermatozoa

Acknowledgment: This review represents a collection of results gathered from the execution of the APVV-15-0544 and VEGA 1/0239/20 projects and it is supported by the Research Centre AgroBioTech built in accordance with the project Building Research Centre, AgroBioTech ITMS 26220220180, as well as by the Center for Animal Reproduction (CeRA) Team of Excellence.

Biography: MSc. Eva Tvrdá, PhD. is as a senior research scientist at the Department of Animal Physiology, Slovak University of Agriculture in Nitra. She is Head of the Laboratory for Andrology and Molecular Toxicology at the AgroBioTech Research Center. She has published over 100 articles and 8 book chapters on the topics of male reproduction, reproductive toxicology, oxidative balance and antioxidants. Dr. Eva Tvrdá is a former Sciex MNS^{ch} and Fulbright fellow, member for the European Federation of Animal Science and the Association for Applied Animal Andrology.

DOI: https://doi.org/10.15414/2021.9788055223322

Presenting author details
Full name: Eva Tvrdá
Contact email: evina.tvrda@gmail.com
ORCID: 0000-0003-2895-1249

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Possibilities of application of new approaches in the development of innovated cereal products

Veronika Valková, Lucia Gabríny
AgroBioTech Research Centre, The Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 94976 Nitra, Slovakia

Recently, consumer demands in the field of food production have been modified radically. Their preferences are focused on sensory-attractive foods, which also have a rich nutritional profile and health benefits. In this regard, functional foods play an outstanding role. Generally, functional foods are considered as food products identical in all aspects to conventional foods except for the fact that they contain certain biologically active compounds as added ingredients. Bakery and pasta products, being the most widely consumed food products all over the world, are the best sources for incorporation of functional ingredients. However, the enrichment of products with bioactive compounds is a technologically demanding process and it is necessary to face many problems that may occur during baking such as the influence of high baking temperature, pH of ingredients and dough moisture. For this purpose, microencapsulation of the bioactive compounds can be used to increase the nutritional and qualitative characteristics of food. Moreover, using of these progressive nanotechnological processes can have a positive effect on product stability during storage. We deal with the mentioned scientific research activities in the Laboratory of Cereal Technologies of the AgroBioTech Research Centre. The laboratory is focused mainly on the production of bakery, confectionery, extruded products and pasta. To increase the production capacity of innovative products the research centre is extending its capacity with the Food Incubator which will serve not only as a semi-production but will also provide a support for the start-ups and small enterprises in terms of shared costs in terms of investment and operational costs.

Key words: bakery products; innovative approach; bioactive compounds; microencapsulation

Acknowledgment: This publication was supported by the Operational Program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, co-financed by the European Regional Development Fund

Biography: Msc. Veronika Valková is research assistant at Research Centre AgroBioTech. At present, she is working in the Laboratory of Cereal Technologies and the Laboratory of Sensory Analysis. She participates in the research and development of value-added foods, in optimization of bakery technological processes and also on the evaluation of selected qualitative and quantitative characteristics of food samples, including their nutritional composition. She is currently an external PhD. student, focusing on the antifungal activity of plant essential oils. The topic of her PhD. thesis is: Antifungal activity of essential oils and their application in food models of plant origin.

DOI: https://doi.org/10.15414/2021.9788055223322

Presenting author details
Full name: Msc. Veronika Valková
Contact email: veronika.valkova@uniag.sk
ORCID: 0000-0001-7048-6323

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Sensometrics and sensory analysis overview

Vladimír Vietoris
Slovak University of Agriculture, Faculty of Biotechnology and Food Science, Department of Technology and Quality of Plant Products, Trieda A. Hlinku 2, 94976 Nitra, Slovakia

Sensory analysis is a type of analysis that uses the human senses to evaluate food and non-food products. Used for quality assessment, new product development, or market mapping. Sensory analysis can be divided according to approaches for affective and effective testing. The first is focused on measuring the intensity and uses its own methodologies and statistical procedures. The second focuses on the attractiveness and acceptability of consumers. A very important task is placed on the selection and training of evaluators and the conditions of the laboratory in which the products are analyzed. According to the aim of the evaluation, we know the discrimination testing, scaling, TI/TDS methods, descriptive methods, or various modified techniques according to profiles, including instrumental approaches (electronic tongue, nose, and image analysis). The lecture will deal with the most used sensory methodologies and their statistical processing of the results, even the application of deep learning and its future in the food quality segment.

Key words: sensory analysis, sensometrics, statistical methods, sensory techniques

Acknowledgment: The presentation is a part of the research project APVV-17-0564 "The Use of Consumer Neuroscience and Innovative Research Solutions in Aromachology and Its Application in Production, Business, and Services" dissemination.

Biography: Vladimír Vietoris is the head of the SPU sensory laboratory in Nitra. During his 20 years in which he has been working in sensory analysis, he has authored a number of publications in the field of sensory analysis and sensometrics. He participates in many projects that are related to the preference of products from the point of view of laboratory analysis and consumers. In the year 2020 he received OIV award 2020 for book about Winemaking and enogastronomy. He is active in application of new digital technologies in sensory approach.

Presenting author details
Full name: Vladimír Vietoris
Contact email: vladimir.vietoris@uniag.sk
ORCID: 0000-0001-8873-0187

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Small microcapsules for big/healthy plants and biofunctional food

Marko Vinceković
University of Zagreb Faculty of Agriculture, Svetošimunska cesta 25, Zagreb, Croatia

The use of agrochemicals in agriculture had substantial repercussions for the environment, food security as well as human health because some of them are persistent organic pollutants. To diminish the overall exposure to agrochemicals that may end up in the environment, the worldwide intention is the restriction of their use and application of environmentally friendly systems like biofertilizers and/or biopesticides (pesticides derived from natural materials). Biofertilizer formulations usually contain a living microorganism (bacteria, fungi) and a suitable carrier together with additives. Efficient formulation demands a carrier material which must preserve or maintain living organisms in a viable condition during storage and transport as well as must keep its functional properties after application. Encapsulation in microparticles (microspheres/microcapsules) is an advanced technology which is superior to other formulations in terms of living organism protection from the environment, improvement of their viability and possibility of controlled release into the field. Trends of encapsulation in agriculture are focused on the preparation and application of microparticle formulations involving biological and chemical agents on different plant cultures during the process of functional and healthier food production. The investigation pointed out that proper selection of formulation variables helps in designing microparticles with the controlled release of biofertilizer and micro- and macronutrients for plant protection and nutrition. Functional foods are ingredients that offer health benefits that extend beyond their nutritional value. Some types contain supplements or other additional ingredients designed to improve human health and life.

Key words: encapsulation, microparticles, plant protection, plant nutrition, functional food

Acknowledgment: We acknowledge the financial support of the Croatian Science Foundation (Project: UIP-2014-501 09-6462, Operational Program Competitiveness and Cohesion 2014-2020, K.K.01.1.1.0058 “Potential of microencapsulation in cheese production”

Biography: Dr. Marko Vinceković is an associate professor working in higher education for 17 years. Most of his competencies are related to colloid chemistry and applied chemistry in agriculture. Since 2003 he has been researching biopolymer molecular structure/function relationship and Physico-chemical processes in complex systems with biopolymers (oppositely charged polysaccharides, proteins and surfactants). Current research interest is in the investigation of intermolecular interactions in new biopolymer-based microcapsule formulations for plant nutrition/protection and functional food preparation. He is a coordinator and partner of several national and international projects.

Presenting author details
Full name: Marko Vinceović
Contact email: mvincekovicågr.hr
ORCID: 0000-0001-6158-3914

DOI: https://doi.org/10.15414/2021.9788055223322

Title: COVID 19 and its impact on agri-food sector

Miroslav Záhradník
University address: National Agricultural and Food Center – Research Institute for Animal Production Nitra,Address: Hlohovecká 2, 95141 Lužianky, Slovakia

The COVID-19 pandemic has adversely affected society worldwide. The consequent economic impacts are becoming increasingly important. This lecture aimed to characterize the areas of the agri-food value chain adversely affected by COVID-19, its impact channels, and public support mechanisms available in the Slovak republic. First, key trends and characteristics of the Slovak agri-food industry before the pandemic outbreak were covered. Special attention was devoted to the implications for the primary level, the current situation of cattle farms in Slovakia, their challenges and opportunities. The link to the scientific approaches and applied research results in the field was provided. The multidisciplinary approach to practical and acceptable precision livestock production systems and the uptake of the digital advisory tools was discussed.

Key words: COVID-19, pandemic, agri-food, digitisation, multidisplinarity

Acknowledgment: This publication was supported by the Operational program Integrated Infrastructure within the project: Sustainable smart farming systems taking into account the future challenges 313011W112, cofinanced by the European Regional Development Fund.

Biography: Ing. Miroslav Záhradník, PhD. is a researcher at National Agricultural and Food Centre - Research Institute for Animal Production Nitra. Specialist in economic and environmental optimization and modelling of livestock production systems, also giving consultations, expert lectures and individual advisory. In 2015 he was awarded by the Golden Sickle award 2015 in the category Science and research for the application EkonMOD milk tool. In 2017 awarded the Personality of Science and Technology under 35 for research and development of supportive management tools for efficient dairy farms. Member of the permanent subgroup on innovation in agricultural productivity and sustainability (EIP-AGRI).

Presenting author details
Full name: Miroslav Záhradník
Contact email: miroslav.zahradnik@nppc.sk
ORCID: 0000-0002-1377-8415

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Agrobiotechnology of plant production

Želmíra Balážová
Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences,
Department of Biochemistry and Biotechnology, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia,
tel.: +421376414327

In the past decade, genomics research has enabled enormous progress in our understanding of plant genomes. Genomics studies, focused on whole-genome analysis, have opened up a new era for biology in general, and for agriculture in particular. Diversity in plant genetic resources provides opportunity for plant breeders to develop new and improved cultivars with desirable characteristics. For genetic diversity analysis and accurate identification of genotypes is the most important to choose molecular technique, determine the number of markers that is necessary to use for analysed set of genotypes. For determination the genetic diversity and identification of different genotypes of selected cereals and pseudocereals, three molecular techniques, RAPD, SCoT and STMS, were chosen. Ability of identification and differentiation of genotypes, reproducibility of analysis and suitability of using of each technique for analysis were also tested. Proteomics is the study of all of a genome's putative proteins and involves the systematic analysis of proteins to determine their identity, quantity, and function. Proteomics technology using different high-performance separation techniques such as two-dimensional gel electrophoresis, one-dimensional and multidimensional chromatography, combined with high-resolution mass spectrometry has the power to monitor the protein composition of food resources. The use of proteomics in food technology is presented, especially for characterization and standardization of raw materials, process development, detection of batch-to-batch variations and quality control of the final product. Further attention is paid to the aspects of food safety, especially regarding biological and microbial safety, detection of allergens in the food resources like cereals and pseudocereals.

Key words: genomics, proteomics, cereals, pseudocereals, molecular markers, protein map

Acknowledgment: This work was co-funded by grant VEGA No.1/0246/18 and KEGA project No. 025SPU-4/2018.

Biography: Želmíra Balážová is the Associate Professor at the Department of Biochemistry and Biotechnology Faculty of Biotechnology and Food Sciences, Slovak University of Agriculture in Nitra. She has published more than 200 papers in reputed journals and more than 180 citations on these papers.

Presenting author details
Full name: Želmíra Balážová, Assoc. Prof. PhD.
Contact email: zelmira.balazova@uniag.sk
ORCID: 0000-0002-6093-3908

DOI: https://doi.org/10.15414/2021.9788055223322

Title: Allergens in foods and environment

Jana Žiarovská
Slovak University of Agriculture in Nitra; Tr. A. Hlinku 2; 94976; Nitra

Allergy is actually the most common chronic disease in Europe that affects the life not only of those who suffer in allergy but the lives of their families, too. Allergens are most often defined as antigens that are capable of simulating hypersensitive immunological reactions. The lecture was aimed to introduce the allergen per se from different points of view – allergological, imunological as well as molecular one and the principles of allergens as antigens for humans at the one side and allergens of common parts of food resources at the other side were pointed together with the fact, that clinical manifestation of allergies seems to be tightly connected with geographical and exposure factors. The basic differences were defined among major and minor allergens, primary and secondary allergens as well as among complete and incomplete allergens. Panallergens were characterized as the families of related proteins, which are involved in general vital processes and thus, widely distributed throughout nature. Their alternative classification such as real panallergens, eurallergens, stenallergens and monallergens was discussed in the background of food allergies. Besides the food allergies, all the other sources of allergens were described and characterized. The types of IgE-mediated food allergy, non-IgE-mediated food allergy and mixed IgE and non-IgE-mediated food allergies was described. The relevance of cross-reactivity for food allergies and the co-sensitisation with proteins with similar epitopes was pointed together with principles of oral allergy syndrome as well as pollen-food allergy syndrome.

Key words: allergens, food allergy, cross-reactivity

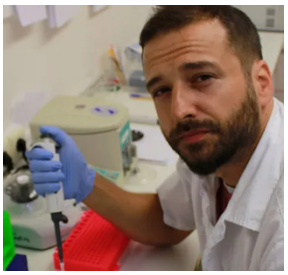
Acknowledgment: This lecture was supported by the Operational program Integrated Infrastructure within the project: Demand-driven research for the sustainable and innovative food, Drive4SIFood 313011V336, cofinanced by the European Regional Development Fund.

Biography: Jana Žiarovská – head of Department of Agrobiology at Research centre AgroBioTech; head of Laboratory of Agrobiodiversity and Genetic technologies and a teacher and researcher at the Department of Genetics and Plant Breeding at SUA in Nitra. Her original professional background is genetic technologies and molecular identification of genomic and transcriptomic differences of selected plant genes with focus on allergens. She has been coordinating several research and educational projects both on national (e.g. within the Operational programme Research and Development; Slovak national research agencies; research in collaboration with private sector) and international level (e.g. international and COST projects). She is an author and co-author of more than 100 scientific papers within the scope of plant genetic technologies.

DOI: https://doi.org/10.15414/2021.9788055223322

Presenting author details
Full name: Doc. Ing. PaedDr. Jana Žiarovská, PhD.
Contact email: jana.ziarovska@uniag.sk
ORCID: 0000-0002-0005-9729

DOI: https://doi.org/10.15414/2021.9788055223322



Title: Nutrigenomics

Radoslav Židek
University address SUA in Nitra, Tr. A. Hlinku 2, 949 76 Nitra

Sport and exercise performance are significantly influenced by nutrition, yet individuals respond differently to the same foods, nutrients and supplements consumed. This holds true for a variety of ages, ethnicities, and level of skill, and whether the goal is optimizing physical activity for health and fitness or for high performance sport. The paradigm shift, away from the one-size-fits-all group approach and toward personalization for the individual, is moving nutrigenomics research from basic science into practice. While it has long been recognized that genetics plays an influential role in determining how an athlete responds to foods and nutrients, the surge in research into gene-diet interactions over the past decade has provided a scientific basis for this hypothesis through various research initiatives and the corresponding increase in published studies. Genetic variants affect the way we absorb, metabolize, utilize and excrete nutrients, and gene-diet interactions that affect metabolic pathways relevant to health and performance are now widely recognized. Personal genetic testing can provide information that will guide recommendations for dietary choices that are more effective at the individual level than current dietary advice, which has been set by government agencies and other health and sport organizations. Disclosure of genetic information has also been shown to enhance motivation and behavior change and strengthen adherence to the dietary recommendations provided. Although athletes tend to exhibit higher levels of motivation in general, nutrition professionals still encounter significant barriers to behavior change when counseling athletes on the adoption of beneficial sports nutrition practices.

Key words: nutrigenomic, personalised nutrition and lifestyle

Biography: Radoslav Židek, PhD., is an associate professor in Slovak University of Agriculture in Nitra. He is affiliated to Department of food hygiene and safety. He is forensic specialist for genetics and food industry specialised in food traceability, food identification and personalised nutrition. He is specialised in mathematical modelling and big data approaches in data analysis. He is author or co-author of more than 100 publication and 2 books. He is head of NGO organisation “Euroconsumers” and has participated in more than 20 National and European funded projects.

Presenting author details
Full name: Radoslav Židek, PhD.
Contact email: radoslav.zidek@uniag.sk
ORCID: 0000-0003-4751-1257

DOI: https://doi.org/10.15414/2021.9788055223322

Name of publication
CASEE ONLINE WINTER SCHOOL
Food Environment and Health Risk Assessment in Danube Region (DanubeFEHRA)
Book of Abstracts

Editors
Ing. Eva Ivanišová, PhD.
Ing. Ľubomír Belej, PhD.
prof. Ing. Adriana Kolesárová, PhD.

Reviewers
prof. RNDr. Alena Vollmannová, PhD.
prof. Ing. Norbert Lukáč, PhD.

Graphic design
Mgr. Dominik Hollý

Publisher
Slovak University of Agriculture in Nitra, Slovakia
Tr. A. Hlinku 2, 949 76 Nitra
Slovak Republic
Edition: first

Year of publication
2021

Form of publication
online

Pages: 58

Contributions are published in original version,
not edited at the Publishing Center of SUA in Nitra.

ISBN 978-80-552-2332-2

DOI: https://doi.org/10.15414/2021.9788055223322