



Universitatea  
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Univerza v Ljubljani  
*Biotehniška* fakulteta



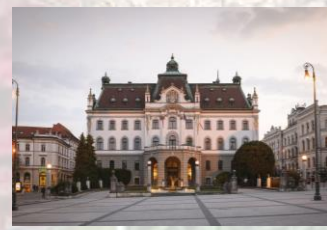
International Summer School  
FOOD SAFETY AND HEALTHY LIVING  
(Session 2)

FSHL2 - 2023

**PROGRAM  
&  
BOOK OF ABSTRACTS**



Ljubljana, Slovenia  
September 15-23, 2023





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## Program

### Monday, 11 September

<b>Virtual conference – presentations of students and their Universities/Faculties</b> <a href="https://bf-uni-lj-si.webex.com/bf-uni-lj-si/j.php?MTID=me3c385c94693a51cf1b6ac4b13576574">https://bf-uni-lj-si.webex.com/bf-uni-lj-si/j.php?MTID=me3c385c94693a51cf1b6ac4b13576574</a>	
10:00 – 10:10	<b>Introduction</b>
10:10 – 10:20	University of Ljubljana, Biotechnical Faculty, Slovenia
10:20 – 10:30	Marche Polytechnic University, Ancona, Italy
10:30 – 10:40	University of Milan, Italy
10:40 – 10:50	Valencia Polytechnic University, Spain
10:50 – 11:00	University of Łódź, Chemistry Faculty, Poland
11:00 – 11:10	University of Rijeka, Croatia
11:10 – 11:20	University St. Kliment Ohridski - Bitola, North Macedonia
11:20 – 11:30	University of Novi Sad, Faculty of Agriculture, Serbia
11:30 – 12:00	University of Novi Sad, Faculty of Technical Sciences, Serbia
12:00 – 12:10	<b>Coffee break</b>
12:10 – 12:20	Transilvania University of Brasov, Faculty of Medicine, Romania
12:20 – 12:30	“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania
12:30 – 12:40	”Iuliu Hatieganu” University of Medicine and Pharmacy, Cluj-Napoca, Romania
12:40 – 12:50	“Lucian Blaga” University of Sibiu, Faculty of medicine, Romania
12:50 – 13:00	Tirana Agricultural University, Albania
13:00 – 13:10	Polytechnic Institute of Beja, Portugal
13:10 – 13:20	University of Lisbon, School of Agriculture, Portugal
13:20 – 13:30	<b>Final remarks</b>

### Friday, 15 September

14:30 – 15:30	<b>Registration</b> <b>Welcome drink</b>
15:30 – 15:45	<b>Opening ceremony</b>
<b>Chairperson: Maria João Barata de Carvalho</b>	
15:45 – 16:15	<b>Introduction to Experimental Work:</b> <b>Lactic Acid Fermentation of Spirulina Microalgae and Its Use in Bakery Products –</b> <i>Polona Jamnik, Barbka Jeršek, Mojca Korošec, Jasna Bertonec, Mateja Lušnic Polak</i> University of Ljubljana, Biotechnical Faculty, Slovenia
16:15 – 16:45	<b>Sensory Analysis in Traditional Food</b> <i>Maria João Barata de Carvalho</i> Polytechnic Institute of Beja, School of Agriculture, Portugal
17:00 – 19:00	<b>Introduction to Slovene Language</b> <i>Tanja Jerman</i> University of Ljubljana, Faculty of Arts, Centre for Slovene as a Second and Foreign language, Slovenia



## Monday, 18 September

<b>Chairperson: Rui FM Silva</b>	
9:00 – 9:30	<b>Antioxidants - Challenges for Food Science and Health</b> <i>Mihaela Badea</i> “Transilvania” University of Brasov, Faculty of Medicine, Romania
9:30 – 10:00	<b>Impact of Isolation and Purification on Antioxidant Activity</b> <i>Mihaela Skrt</i> University of Ljubljana, Biotechnical Faculty, Slovenia
10:00 – 10:30	<b>Mycotoxins Analysis: An Overview of Novel Detection Constructs</b> <i>Jean-Louis Marty</i> University of Perpignan Via Domitia, France
10:30 – 11:00	<b>Coffee break</b>
<b>Chairperson: Jean-Louis Marty</b>	
11:00 – 11:30	<b>Synergistic Antioxidant Effect of <math>\alpha</math>-tocopherol and Myricitin Combination in an Oil-in-water Emulsion</b> <i>Artiona Laze</i> Agriculture University of Tirana, Albania
11:30 – 12:00	<b>Effect of High-Pressure as a Non-Thermal Pasteurisation Technology for Raw Ewes’ Milk and Cheese Safety and Quality: Case Study on Serra da Estrela Cheese</b> <i>Ana Rita Inácio</i> Polytechnic Institute of Beja, School of Agriculture, Portugal
12:00 – 12:30	<b>Spermatogenesis, Male Reproduction, and Nutrition: Single-cell Analysis to Decipher Germline Protection Against Metabolic Stress</b> <i>Klementina Fon Tacer</i> School of Veterinary Medicine Texas Tech University, Amarillo, Texas, USA
12:30 – 14:00	<b>Lunch break</b>
14:00 – 16:00	Experimental work (BTH group, MB group)

## Tuesday, 19 September

9:00 – 10:30	Experimental work (BTH group, MB group)
10:30 – 11:00	<b>Coffee break</b>
<b>Chairperson: Lea Pogačnik da Silva</b>	
11:00 – 11:30	<b>Nutrition for Healthy Brain - Focus on Dietary Polyphenols</b> <i>Rui FM Silva</i> University of Lisbon, Faculty of Pharmacy, Portugal
11:30 – 12:00	<b>Polyphenols and Cellular Stress Response</b> <i>Vera Župunski</i> University of Ljubljana, Faculty of Chemistry and Chemical Technology, Slovenia
12:00 – 12:30	<b>Food Allergy: An Open Challenge in Food Safety</b> <i>Patrizia Restani</i> University of Milan, Department of Pharmacological and Biomolecular Sciences, Italy
12:30 – 13:30	<b>Coffee break/International Village</b>

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<b>Chairperson: Patrizia Restani</b>	
13:30 – 14:00	<b>Climate Change, Adapted Winemaking Technology and Consumer Expectations</b> <i>Tatjana Košmerl</i> University of Ljubljana, Biotechnical Faculty, Slovenia
14:00 – 14:30	<b>Grape Seed Oil Chemical Properties</b> <i>Branka Mozetič Vodopivec</i> University of Nova Gorica, School for Viticulture and Enology, Slovenia
14:30 – 15:00	<b>Should I be Stressed?</b> <i>Laura Elena Gaman</i> Carol Davila University of Medicine and Pharmacy, Bucharest, Romania
17:00 – 18:00	Boat trip Ljubljana

## Wednesday, 20 September

9:00 – 11:00	Experimental work (BTH group, MB group)
9:00 – 13:00	Experimental work (Tech group)
10:30 – 13:00	Experimental work (Sens group)
13:00 – 14:00	<b>Lunch break</b>
14:00 – 15:00	Experimental work (BTH group, MB group, Tech group, Sens group)
15:00 – 17:00	Experimental work (Sens group)

## Thursday, 21 September

8:00 – 9:00	Experimental work (BTH group, MB group)
9:30 – 18:00	Fieldtrip to “VINAKOPER” - wine boutique & cellar Visit of Piran city

## Friday, 22 September

8:00 – 9:00	Experimental work (BTH group, MB group)
<b>Chairperson: Mihaela Badea</b>	
9:30 – 10:00	<b>Application of Novel Green Methods for Extraction of Bioactive Compounds from Plant Material</b> <i>Polonca Trebše</i> University of Ljubljana, Faculty of Health Sciences, Slovenia
10:00 – 10:30	<b>Interaction apple, blue LED light irradiation and Penicillium expansum</b> <i>Rajko Vidrih</i> University of Ljubljana, Biotechnical Faculty, Slovenia
10:00 – 10:30	<b>Voltammetric Analysis of Oil Samples</b> <i>Kamila Koszelska</i> University of Łódź, Faculty of Chemistry, Poland
10:30 – 11:00	<b>Coffee break</b>

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<b>Chairperson: Tatjana Košmerl</b>	
11:00 – 11:30	<b>Will Cultured Meat Save the Planet? A Short Exploration of Policy, Industry, and Consumers</b> <i>Andreja Vezovnik</i> University of Ljubljana, Faculty of Social Sciences, Slovenia
11:30 – 13:00	<b>Group presentations (BTH group, MB group, Tech group, Sens group)</b>
13:00 – 13:30	<b>Discussion</b>

## Saturday, 23 September

9:00 – 11:00	<b>Final conclusions</b>
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### Laboratory work:

#### **Lactic Acid Fermentation of Spirulina Microalgae and its Use in Baking Products**

**BTH group** - biotechnology group (12 students)

**MB group** - microbiology group (12 students)

**Tech group** - technology group (18 students)

**Sens group** - sensory analysis group (18 students)



## **INTRODUCTION TO EXPERIMENTAL WORK:**

### **LACTIC ACID FERMENTATION OF SPIRULINA MICROALGAE AND ITS USE IN BAKERY PRODUCTS**

**Polona Jamnik, Barbka Jeršek, Mojca Korošec, Jasna Bertonec, Blaž Ferjančič, Mateja Lušnic Polak, Mojca Kuhar, Iva Zahija Jazbec**  
*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana, Slovenia*

#### **Abstract**

Lactic acid fermentation is known to improve nutritional properties and functionality and to extend the shelf life of foods. We will perform the lactic acid fermentation of *Arthrospira platensis* (*Spirulina*) microalgal biomass as a rich source of nutrients and bioactive compounds using *Lactobacillus plantarum* as the starter culture. Fermented and non-fermented biomass will be analysed by determining pH, lactic acid bacteria count and microbiological safety. The microbiological safety will be determined by qualitative (*Salmonella* spp. and *Listeria monocytogenes*) and quantitative (yeast and moulds, aerobic mesophilic bacteria, *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, *Clostridium perfringens*) microbiological analysis. Qualitative analysis will be performed after enrichment of sample in Universal pre-enrichment broth (UPB) and the number of different microorganisms will be determined with plate count method by using appropriate medium and incubation conditions. *Spirulina* biomass is already used as a food ingredient and incorporated into bakery products, yoghurt, pasta, etc. Sponge cake is a very popular product due to its fine texture, rich aroma and intense flavour. In order to develop healthy sponge cake, fermented *Spirulina* biomass will be used to improve its nutritional value. Three different sponge cakes will be prepared; sponge cake with fermented *Spirulina* biomass, sponge cake with non-fermented *Spirulina* and control sponge cake (without *Spirulina* addition). We expect that the addition of *Spirulina* biomass, even in small amounts, will have a strong influence on the sensory properties. Sensory quality and acceptability of sponge cakes will be tested with the means of sensory analysis, where all participating students will serve as a consumer panel. For this purpose, we will use the qualitative descriptive method and the 9-point hedonic scale, to compare sensory properties and acceptability of sponge cakes with *Spirulina* and the control sponge cake, as perceived by consumers.

**Keywords:** *Lactobacillus plantarum*, microbiological safety, nutritional value, sensory analysis

#### **Biographies**

Polona Jamnik, full professor of biotechnology at the Biotechnical Faculty of the University of Ljubljana, earned her bachelor's degree from the University of Ljubljana in 1997 and her Ph.D. in 2002. She was a mentor/co-mentor to 90 graduate and 4 Ph.D. students. Since 2022 she has been the chair of the College of biotechnology studies at Biotechnical Faculty and since 2021 president of the Senate commission of undergraduate studies of University of Ljubljana. Her research field is focused to food biotechnology and cell health. She has published 50 original scientific papers and 6 review papers in international journals.





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Barbara Jeršek is a professor of microbiology at the Biotechnical Faculty, University of Ljubljana. She holds Diploma (1989), Magister (1994), and Ph.D. (1999) degrees, all obtained from the Biotechnical Faculty. She has published over 50 research papers, presented more than 90 papers at congresses and meetings, and actively participated in 21 scientific projects. Her research focuses on molecular methods for the microbial detection, identification, quantification, and typing. Specifically, she has worked on the development and application of polymerase chain reaction (PCR)-based methods in various food and industrial environments. Her work extends beyond pathogens and spoilage bacteria, encompassing areas like allergens, mycotoxins, bacterial toxins, food adulterations, the study of bacterial response mechanisms and microbiomes of various environments.

Mojca Korošec, associate professor of nutrition at the Biotechnical Faculty of the University of Ljubljana, received her PhD in 2012. Her research area is food composition, sensory properties and perception. She has supervised one PhD student and more than 50 graduate students and published more than 40 research papers. She has presented over 120 papers at international and national scientific meetings. She is chair of the National hub for food sensory research, and a member of the Sensory analysis Working group of the International Honey Commission.



Jasna Bertoneclj is an associate professor at the Department of Food Science and Technology, Biotechnical Faculty, University of Ljubljana. She teaches and researches in the area of food quality assessment (macro and micronutrients; food analytical methods; food legislation), bee products characterization, sensory analysis (sensory methods; trained panels and consumers; food acceptability), and nutrition (healthy and balanced diets for various population groups; nutrition policy). She has supervised more than 50 students and published more than 30 scientific papers. She is a member of the national and international panels for sensory assessment of honey.

Mateja Lušnic Polak is an assistant professor at Biotechnical faculty, Department of Food Science and Nutrition. She graduated in 2008 and defended her PhD in 2014. She is a researcher in a research programme Integrated Food and Nutrition and author or co-author of 28 original scientific papers. In recent years, she has participated in several European projects. She has a partial teaching load as assistant in BSc and MSc programmes and supervised or co-supervised more than 20 graduate students. She is also a member of the sensory panel in the field of meat and meat products.







## SENSORY ANALYSIS IN TRADITIONAL FOOD

**Maria João Carvalho**<sup>\*1,2</sup>, **Rita Inácio**<sup>1</sup>, **Teresa Santos**<sup>1</sup>, **João Dias**<sup>1,3</sup>, **Antónia Macedo**<sup>1,4</sup>,  
**Manuela Costa**<sup>1</sup>, **Miguel Floro**<sup>1</sup>, **Célia Lampreia**<sup>1</sup>, **Silvina Ferro Palma**<sup>1</sup>

<sup>1</sup>IPBeja; <sup>2</sup>MARE; <sup>3</sup>Geobiotech; <sup>4</sup>LEAF, Portugal

### Abstract

Sensory evaluation has been used since ancient times as “a scientific method to evoke, measure, analyze, and interpret those responses to products as perceived through the senses of sight, smell, touch, taste and hearing”. Historically, it was considered a methodology that complements technological and microbiological safety when assessing the quality of food, and its evolution recently has placed it as one of the most important methodologies with application to ensure final product acceptance and define traditional foods characteristics as part of a country heritage.

Traditional foods are often related to local and artisan foods referring to specific ingredients, location of the production, and represent a group of people, knowledge/know-how. This uniqueness often is referred to as “authenticity”, which may be more often used for cultural products.

Serpa is a Protected Designation of Origin (PDO) cheese considered one of the most famous traditional Portuguese cheeses, due to its unique sensory profile and long-lasting cultural heritage. This artisanal cheese is manufactured in a delimited area in the South Alentejo region from ovine raw milk and extracts of *Cynara cardunculus* L. as a coagulant, encompassing a ripening time of at least 30 days, and the Portuguese ‘familiarity with this product attributes affects its potential acceptability.

**Keywords:** Cheese, Taste, Aroma, Texture

### \*Biography

PhD Food Technology in Facultad de Veterinária- Universidad d Extremadura (UNEX), Cáceres. MSc in Food Technology/Quality in Faculdade de Ciência e Tecnologia, in UNOVA, Caparica. Agro-Industrial Engineering in Instituto Superior de Agronomia (ISA) in Lisbon University, Lisbon. Professor/Researcher in ESA/IPBEJA; Director of ESA/IPBEJA (since 14th February). Sensory Laboratory Responsible; Sensory Laboratory Management; Quality Manager (assays accredited by EN IEC/ISO 17 025:2018); Certified PDO Cheeses – SERPA, NISA, ÉVORA panel responsible; Olive-oil panel responsible, bread panel responsible and fruits, meat, fish and seafood panels responsible); Certified PDO Cheeses – SERPA, NISA, ÉVORA panelist; Olive-oil panel panelist, bread panelist and fruits, meat, fish and seafood panelist); Coordinator of a short-cycle degree in “Innovation and Food Technology” (Desp.102/PIPB/2015); Coordinator “Food Science and Technology” Bachelor graduation. Coordinator in International Mobility in Food Science and Technology degrees (Bachelor and Master). Member of IPBEJA Technical and Scientific Council. Fields of study subjects: innovation and products development, fish and meat technology and by-products valorization, breadmaking, sensory techniques and rheological approaches



**Researcher ID:** 781B-E8EB-F5C3; **ORCID:** [orcid.org/0000-0001-9909-6345](https://orcid.org/0000-0001-9909-6345)

## FOOD SAFETY AND HEALTHY LIVING

International Summer School – Session 2

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## INTRODUCTION TO SLOVENE LANGUAGE

### Tanja Jerman

*Centre for Slovene as a Second and Foreign Language at the Faculty of Arts of the University of Ljubljana*

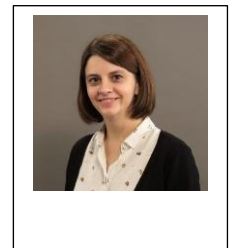
### Abstract

A survival course of Slovene. In a fun and exciting way, you will learn basic information about Slovene language, how to pronounce Slovene words and how to say some common and useful expressions which will make your stay in Slovenia more pleasant. All you need is a pen, curiosity, and lots of good humour. No knowledge of Slovene is required.

**Keywords:** survival Slovene

### \*Biography

Tanja Jerman is employed as the head teacher of Slovene as a second and foreign language at the Centre for Slovene as a Second and Foreign Language at the Faculty of Arts of the University of Ljubljana. She teaches adult foreigners at all levels and is a co-author of textbooks, didactic and online materials for Slovene as a second and foreign language. She trains teachers and participates in national and international projects. She is also a rater for exams testing knowledge of Slovene as a second and foreign language.





## ANTIOXIDANTS - CHALLENGES FOR FOOD SCIENCE AND HEALTH

**Mihaela Badea**

*Transilvania University of Brasov, Romania*

### Abstract

Found mainly fruits, vegetables, cereals, mushrooms, beverages, flowers, spices and traditional medicinal herbs, as well as in dietary-supplements, antioxidants play very important roles in maintaining a healthy life and in preserving the food quality.

Natural antioxidants which are present in plant materials are mainly polyphenols, carotenoids and vitamins. The health effect of an antioxidant depends on the structure and concentration of the bioactive compound that can be delivered to specific organ sites, the homeostasis in the redox states of tissues, and whether this antioxidant can perform the expected function.

Several studies used antioxidants as nutrients trying to demonstrate the expected disease-prevention effects. Most of research performed in cell cultures, animal models and in some human studies correlated preventive effects of several antioxidants regarding different possible ROS (reactive oxygen species) associated diseases as cancer, cardiovascular and neurodegenerative diseases, and aging. There are also studies that shown that high doses antioxidants can lead to toxicity because of pro-oxidative activities, or where are limitations in predicting health effects associated with antioxidants.

**Keywords:** dietary-supplements, reactive oxygen species, diseases, natural antioxidants

### \*Biography

Mihaela Badea, Professor of Biochemistry, Laboratory techniques, Organic chemistry, Analytical chemistry, Methodology of scientific research at Faculty of Medicine, Transilvania University of Brasov, Romania

Habilitation in Medicine (2017) - University of Medicine and Pharmacy Carol Davila from Bucharest; PhD in Chemistry (2005) - Babes-Bolyai University of Cluj-Napoca; PhD in Medicine (2021) – Transilvania University of Brasov; Member of the Academic Nutritional Science PhD's staff of the University of Milan (Italy) (since 2019).

Research results applied in life sciences – environmental monitoring, food control and medicine – author of more than 60 papers in ISI WOS journals, coauthor for one patent. She acted as editor and contributor in books in the field of life sciences (medicine, environment, nutrition) with the international scientific teams. She successfully coordinated conferences (New Trends on Sensing-Monitoring- Telediagnosis for Life Sciences- NT SMT-LS -2014-2022, Healthy Nutrition and Public Health - IC-HNPH 2011, was chairing the organisation of International Summer Schools -Food Safety and Healthy Living -FSHL 2018-2023; Telemonitoring and Telediagnostic for Life Sciences – TTLS 2013; Bioanalytical Methods for Life Sciences -BMLS 2011).

**Researcher ID:** Z-1490-2018; **ORCID:** <http://orcid.org/0000-0003-4824-2175>; **Personal webpage:** <https://www.unitbv.ro/contact/comunitatea-unitbv/2995-badea-mihaela.html>





## IMPACT OF ISOLATION AND PURIFICATION ON ANTIOXIDANT ACTIVITY

**Mihaela Skrt**

*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana; Slovenia*

### Abstract

Antioxidants are compounds that play a crucial role in maintaining the balance of free radicals and reduce the potential damage they can cause to cells and biomolecules like DNA, proteins, and lipids.

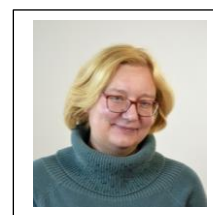
The antioxidative activity of a compound depends on several factors, including its chemical structure, concentration, and its ability to scavenge free radicals. Obtaining antioxidants from biomass involves a series of extraction and purification processes. The extraction of antioxidants from plant biomass involves several steps, and the choice of extraction method depends on the nature of the antioxidants and the properties of the plant material. The choice of extraction method can impact the yield, purity, and stability of the extracted antioxidants. Additionally, the antioxidant content of plant biomass can vary depending on factors such as plant species, growing conditions, and harvest time.

In this paper, we will focus on the comparison of antioxidative activities of plant extracts gained with the classical maceration extraction process and with ultrasound-assisted extraction from pomegranate, onion and olive leaves. The purification processes with liquid chromatography of certain antioxidants from plant biomass will be discussed as well as the most recent developments regarding the green and environmentally friendly techniques for extraction of natural bioactive compounds.

**Keywords:** plant biomass, extraction, antioxidants, liquid chromatography, green chemistry

### Mihaela Skrt

- Teaching assistant in laboratory courses in Biochemistry, Analytical Biotechnology and Chemistry at the Biotechnical faculty of the University of Ljubljana, Slovenia;
- Habilitation in Biochemistry (2020) – University of Ljubljana;
- PhD in Biotechnology (2002) – Biotechnical faculty, University of Ljubljana;
- Biochemistry university education at Faculty of Chemistry and Chemical Technology, University of Ljubljana (1996);
- Member of the Slovenian Biochemistry Society and Slovenian Microbiology Society;
- Research results applied in the field of food chemistry and nutrition, separation– author of more than 40 papers in ISI WOS journals, coauthor for one patent. She acted as guest editor in the field of life sciences with the international scientific teams. She is an award-winning mentor for several research projects for high-school students (2015-2023).
- Her research work is in the field of biochemical and biophysical-chemical characterization of natural compounds as a part of the research program group P4-0121.



**Researcher ID:** ARRS-15466; **ORCID:** <http://orcid.org/0000-0002-9755-9673>





## **MYCOTOXINS ANALYSIS: AN OVERVIEW OF NOVEL DETECTION CONSTRUCTS**

**Gaëlle Catanante<sup>1</sup> and Jean Louis Marty<sup>2\*</sup>**

*<sup>1</sup>BAE équipe projet biocapteur analyse environnement, Université de Perpignan and LBBM Observatoire Océanologique de Banyuls-sur-Mer Pierre Fabre 66650 Banyuls/Mer France*

*<sup>2</sup>Sensbiotech, Ceret, France and Université de Perpignan Via Domitia, Perpignan France*

### **Abstract**

The analysis of foods to assess the presence of chemical contaminants is a practice of crucial importance for ensuring food safety and quality.

Mycotoxins are toxic metabolites produced by fungi, on different foodstuffs. They have harmful effect on human and animal health. Mycotoxins are considered as harmful naturally occurring secondary metabolites. Mycotoxin contamination has attracted the worldwide attention and has been considered as major financial problem due to the huge economic losses mainly based on human health, animal productivity, and national and international level trade there must be a proper legislation to set the acceptable limit of toxins for the purpose to minimize the exposure to mycotoxins.

The classical techniques have some drawbacks such as high cost and less sensitivity. In order to address these issues, various methods have been developed. Among these, biosensors are considered as promising tool in the assessment of mycotoxin food contamination. Electrochemical and optical aptasensors are promising methods. They offer the advantages of low cost, low power consumption, and high stability. This presentation mainly focuses on the methods development in the sense that how mycotoxins can be detected from new emerging bio-analytical approaches. Several applications of determination of mycotoxins in food and feed will be discussed.

**Keywords:** mycotoxins, biosensors, antibodies, aptamers

### **\*Biography**

Jean Louis MARTY is Honorary Professor at the Université de Perpignan Via Domitia and biotechnology consulting. His background is in the field of biotechnology. He has extensive experience in the domain of optical and electrochemical biosensors and bio receptors immobilization techniques. His specialization also includes but not limited to implementation of biosensors for the detection of pesticides, marine toxins, mycotoxins, drugs. He is the founder of three companies in the field of biotechnology and biosensor. He was awarded with number of national and international projects in the field of biosensors mainly funded by European Agency projects. He has supervised 30 PhD with 25 foreign students from 11 nationalities. He is author of more 300 publications and 50 book chapters.



**Researcher ID:** 55909455300

**ORCID:** 0000-0002-1425-9887



## **SYNERGISTIC ANTIOXIDANT EFFECT OF $\alpha$ -TOCOPHEROL AND MYRICETIN COMBINATION IN AN OIL-IN-WATER EMULSION**

**Artiona Laze\***, Ipek Bayram

*\*Department of Chemistry, Agriculture University of Tirana, Tirana, Albania*

*Department of Food Science, University of Massachusetts, Amherst, Massachusetts 01003, United States*

### **Abstract**

Lipid oxidation is one of the most important chemical reactions affecting food quality, and it can have negative effects on human health through the production of toxic by-products and the destruction of essential nutrients. Natural antioxidants, such as vitamin E (tocopherols), vitamin C (ascorbic acid), carotenoids, myricetin and phenolic compounds are now frequently added to food products to protect the sensory and nutritive quality of the food. Because of the complexities of the lipid oxidation process and heterogeneous food systems, such as oil-in-water emulsions, a single antioxidant is not generally effective at all stages of the food preservation. Therefore, it may be successful to use a combination in which the antioxidants produce a synergistic effect to improve antioxidative performance. In a published research study led by the University of Massachusetts Amherst, the following aspects of antioxidant activity have been analysed: the synergistic antioxidant activity of myricetin and  $\alpha$ -tocopherol in oil-in-water emulsions, the reasons behind this synergistic activity, alternative antioxidant preservation strategies for the food industry were also assessed. The goal of this presentation will be to discuss the complexities of the lipid oxidation process, including that of oil-in-water emulsions and the synergistic activities of antioxidants.

**Keywords:** Natural antioxidant, lipid oxidation, myricetin, synergism.

### **\*Biography**

Assoc. Prof. Dr. Artiona Laze has over 10 years of working experience as a lecturer and researcher at the Agriculture University of Tirana, Faculty of Biotechnology and Food.

Assoc. Prof. Dr Laze has finished her Bachelor and Master of Science studies in Chemistry at the University of Tirana, Faculty of Natural Science. In 2016, she received her doctoral degree in “Food Science and Biotechnology” at the Agriculture University of Tirana, Faculty of Biotechnology and Food. To broaden her research experience and attributes, she applied for a doctoral exchange, as an Erasmus Mundus Scholar, in Slovenia at the University of Maribor, Faculty of Agriculture and Life Sciences, where she performed hands-on experiments in the field of food chemistry and prepared manuscripts for publication. After obtaining her doctoral degree, she conducted a 6 month post-doctorate at the University of Bologna, Faculty of Food Science and Technology in Italy. During her career, she has been hosted at the University of Massachusetts, Amherst, Department of Food Science, as part of AADF MIP Professional Fellowship Program. Assoc. Prof. Dr Artiona Laze has successfully presented lessons at various universities as well her research results at international scientific conferences.





## **EFFECT OF HIGH-PRESSURE AS A NON-THERMAL PASTEURISATION TECHNOLOGY FOR RAW EWES' MILK AND CHEESE SAFETY AND QUALITY: CASE STUDY ON SERRA DA ESTRELA CHEESE**

**Rita S Inácio**\*<sup>1</sup>, **Jorge A. Saraiva**<sup>2</sup>, **Ana M. P. Gomes**<sup>3</sup>

<sup>1</sup>*Department of Applied Technologies and Sciences, School of Agriculture, Polytechnic Institute of Beja, Portugal; rita.inacio@ipbeja.pt*

<sup>2</sup>*LAQV-REQUIMTE, Department of Chemistry, University of Aveiro; Portugal*

<sup>3</sup>*CBQF—Centro de Biotecnologia e Química Fina, Universidade Católica Portuguesa, Porto, Portugal*

### **Abstract**

The most appreciated traditional raw Portuguese cheese is Serra da Estrela Cheese with Protected Denomination of Origin (PDO). High-pressure processing (HPP) has been increasingly applied for cold pasteurisation, mainly due to its capacity for producing microbiologically safe products.

The effect of HPP on Serra da Estrela Cheese after pressure processing and subsequently stored for 500 days at 5 °C on: endogenous microflora, proteolysis indexes, sensorial characteristics and physicochemical parameters was studied. Cheeses with 45 days of ripening were HPP at 600 MPa/6 min (P1), 450 MPa/6 minutes (P2) and 450 MPa/9 minutes (P3).

Microbial counts revealed that lactococci, lactobacilli, enterococci and total mesophilic microorganisms were reduced about 4 Log CFU/g in P1 cheeses and about 2 Log CFU/g for P2 and P3, relatively to unpasteurised cheeses, upon pressurization and during storage. The proteolysis indexes were, in general, lower in HPP cheeses relatively to the control chesses. It should be highlighted that P1 cheeses kept the ripening extension index along 500 days of storage closer to unpasteurized cheese at 45 days of ripening.

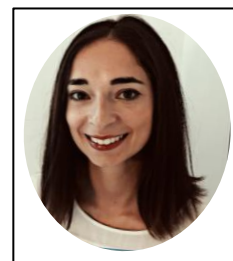
The results obtained allow concluding for good potential to render Serra da Estrela cheese microbiologically safe, with shelf-life extension with a proteolysis level similar to that of unpasteurized cheese.

### **\*Biography**

Rita Inácio holds a BSc in Biotechnology (2011) and a MSc in Food Biotechnology (2013), both by Univ. of Aveiro (Portugal). She developed her PhD in Food Science and Technology and Nutrition (2020) in Universidade Católica do Porto and UA, focusing on the “Effect of high-pressure as a non-thermal pasteurisation technology for raw ewes’ milk and cheese safety and quality: Case study on Serra da Estrela cheese”.

During 10 years, she developed good work skills in high pressure processing applied in food preservation and processing. She authored 14 papers in peer-reviewed journals, 5 book chapters, 1 patent and more than 30 communications in national and international meetings. From 02/2020 until now, she was invited as assistant professor by the Polytechnic Institute of Beja - Higher School of Agriculture. Since 02/2023 is quality manager of the Sensory Analysis Laboratory with accredited tests.

**Researcher ID:** AAD-2073-2020; **ORCID:** <https://orcid.org/0000-0003-4347-9878>





## **SPERMATOGENESIS, MALE REPRODUCTION, AND NUTRITION: *Single-cell analysis to decipher germline protection against metabolic stress***

**Maria Camila Hoyos Sanchez<sup>1,2</sup>, Tadej Jerončič<sup>1,2</sup>, Robert E. Hammer<sup>3</sup>, and  
Klementina Fon Tacer<sup>1,2,\*</sup>**

<sup>1</sup>*School of Veterinary Medicine Texas Tech University, Amarillo, Texas, USA*

<sup>2</sup>*Texas Center for Comparative Cancer Research, Amarillo, Texas, USA*

<sup>3</sup>*Transgenic Technology Center, UT Southwestern Medical Center, Dallas, Texas, USA*

### **Abstract**

In this study, we aimed to investigate the molecular effects of nutritional stress on the germline and the protective mechanisms activated, focusing on the role of *Magea* genes in spermatogenesis under these conditions. To achieve this, wild-type and *Magea* knockout mice were subjected to a 3-month nutrient restriction, maintaining them at 80% of their initial body weight. The impact at both organismal and single-cell levels was evaluated. Cortisone levels, indicative of stress, significantly increased in all food-restricted animals. Transcriptome analysis of various testicular cells revealed significant changes only in the knockout animals, suggesting that *Magea* genes play a crucial role in conveying protective mechanisms for the production of robust male gametes. These findings provide insights into mitigating the adverse effects of stress on male fertility and progeny health. Understanding the underlying molecular mechanisms may facilitate the development of effective strategies to safeguard male reproductive function and improve reproductive outcomes.

**Keywords:** germ cells, safeguard, reproductive health, *Magea* genes

### **\*Biography**

Klementina Fon Tacer is an assistant professor at Texas Tech University School of Veterinary Medicine (TTU SVM) and director of the Texas Center for Comparative Cancer Research (TC3R) in Amarillo, Texas. Dr. Fon Tacer obtained her DVM and Ph.D. degrees at the University of Ljubljana. After postdocs at the UTSW Medical Center in Dallas, Texas, and St. Jude's Children Research Hospital in Memphis, Tennessee, she joined the newly established TTU SVM as a Cancer Prevention and Research Institute of Texas (CPRIT) Scholar to pursue research at the intersection of reproduction and cancer. She also serves as a Board of Directors member of the American Society for Andrology, demonstrating her commitment to advancing the knowledge and understanding of reproductive science.



**Researcher ID:** 20347

**ORCID:** 0000-0003-1928-7745

**Personal webpage:** fontacerlab.org





## **NUTRITION FOR HEALTHY BRAIN - FOCUS ON DIETARY POLYPHENOLS**

**Rui F.M. Silva**\*<sup>1</sup> and **Lea Pogačnik**<sup>2</sup>

<sup>1</sup>*imed.Ulisboa, DCFM, Faculdade de Farmácia, Universidade de Lisboa, Portugal*

<sup>2</sup>*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana, Slovenia*

### **Abstract**

Dementia is the 7<sup>th</sup> cause of death among all diseases, with a high economic burden and social impact. The estimated total global societal cost of dementia for 2019 was US\$ 1.3 trillion, and these costs are expected to surpass US\$ 2.8 trillion by 2030.

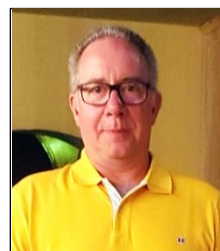
Despite the extensive research, neurodegenerative diseases, like Alzheimer's and Parkinson's, are still without a cure, mostly because symptoms are only revealed when an extensive neuronal population is already injured. Curable strategies, like the replacement of the lost neurons by neuronal stem cells to recover function, although promising, are still not effective. As so, neuroprotective approaches designed to increase brain natural defences and maintain brain health seem to be very useful.

The inclusion of natural products in diet with the ability to reach the brain and rescue neurons from damage, like the ones rich in antioxidant polyphenols, seems to be an affordable and promising neuroprotective strategy. There are now multiple results that point to a positive action of such products, targeting intracellular key disease-related targets. While the cure is still not in our grasp, these molecules may increase long term health of the brain or reduce the risk of neurodegeneration, having a great social and economic impact.

**Keywords:** Dementia, neurodegenerative diseases, neuroprotection, safety

### **\*Biography**

Rui Silva is Professor of Histology & Embryology and of Neurobiology at Universidade de Lisboa, Faculdade de Farmácia, Portugal. He is an expert on cell biology, namely nerve cell cultures, cell signalling, cell death mechanisms and neurotoxicology. His main research interests are on the neurosciences area, in the topics of neurobiology, neurotoxicology, neurodevelopment and glial function associated to neurologic conditions and neurodegeneration. Neuroprotection mechanisms is the most relevant area of intervention, embracing the neuroprotective properties of food natural products and food-borne molecules, either introduced in the regular diet or as additives or medicines, by several cell and molecular mechanisms, beyond the traditional antioxidant properties described for food polyphenols. He has published more than 90 research articles, mentored over 30 post-graduate students, and given more than 150 communications in scientific meetings in several countries. He is an Editorial Board Member of scientific journal *Antioxidants*, guest editor of special issue *Dietary Polyphenols and Neuroprotection (Antioxidants)* and Associate Editor of *Frontiers in Cellular Neuroscience - Non-Neuronal Cells*



**Researcher ID:** <https://www.webofscience.com/wos/author/record/816516>

**ORCID:** 0000-0002-0118-9357

**Personal webpage:** <https://imed.ulisboa.pt/members/rui-silva/>



## POLYPHENOLS AND CELLULAR STRESS RESPONSE

Jerneja Nimac<sup>1,2</sup>, Lea Pogačnik da Silva<sup>3</sup>, Boris Rogelj<sup>1,4</sup>, Vera Župunski<sup>4\*</sup>

<sup>1</sup>*Department of Biotechnology, Jožef Stefan Institute, Slovenia*

<sup>2</sup>*Graduate School of Biomedicine, Faculty of Medicine, University of Ljubljana, Slovenia*

<sup>3</sup>*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana, Slovenia*

<sup>4</sup>*Faculty of Chemistry and Chemical Technology, University of Ljubljana, Slovenia*

### Abstract

Cellular stress leads to many diseases including neurodegenerative disorders that nowadays, represent a significant global health burden. They are characterized by the progressive degeneration and loss of neurons leading to motor dysfunction, cognitive decline, and ultimately death.

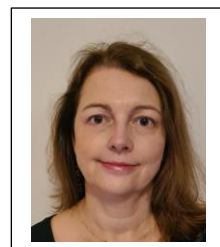
Our research is focused mainly in neurodegenerative diseases amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD). We study the role of stress granules (SGs) in cellular stress response and their contribution to disease pathology. SGs are dynamic, cytoplasmic aggregates of RNA and proteins that form in response to various stressors, functioning as a protective mechanism to facilitate cellular recovery. However, aberrant SG dynamics and persistence have been implicated in the development and progression of neurodegenerative diseases, including ALS/FTD.

We explored the effects of plant extracts containing diverse polyphenols on SG formation and neurodegeneration. None of the extracts were cytotoxic, moreover, they proved to be potentially neuroprotective. Neuroblastoma cells contained less SG after exposure to extracts and stressor compared to the control indicating that antioxidant activity of the extracts regulate SG dynamics. Further studies on molecular mechanism underlying plant extracts-mediated neuroprotection could give new opportunities for the development of extract-based therapeutic interventions for neurodegenerative diseases.

**Keywords:** antioxidants, plant extracts, stress granules, neurodegeneration

### \*Biography

Vera Župunski is an assistant professor at the University of Ljubljana, Slovenia and is based at the Chair of Biochemistry, Faculty of Chemistry and Chemical Technology. She received her undergraduate degree in Chemistry from the University of Ljubljana, Slovenia, where she also finished her PhD in the field of molecular evolution of multigene families and retrotransposons. During her postdoctoral training at Cancer Research



UK she studied nuclear transport of LINE1, the only active retrotransposon in humans. She also did research at King's College London, UK to explore the nuclear trafficking of TDP-43, one of the most important proteins in amyotrophic lateral sclerosis (ALS). Now, her main research interests lie in molecular mechanisms of LINE1 retrotransposition and in uncovering molecular causes for neurodegenerative diseases like ALS and FTD.



## FOOD ALLERGY: AN OPEN CHALLENGE IN FOOD SAFETY

**Patrizia Restani\***, Corinne Bani, Francesca Mercogliano, Chiara Di Lorenzo  
*Università degli Studi di Milano, Dept. Pharmacological and Biomolecular Sciences, Italy,*

### Abstract

In the last decades, there has been an increasing sensitivity towards food-associated pathologies and in particular food allergies and intolerances. Concern has arisen about the increase in the number of people with food allergies, a disease that can be fatal in some conditions.

Food allergy has a higher incidence in childhood (especially for milk and eggs) but they usually reach tolerance after 3 years of age. Food allergy is also widespread in adults who show symptoms ranging from mild reactions to fatal events. Over the years, legislation has included a series of regulations to protect allergic consumers, but these rules are still lacking because the absence of a legal limit to define the absence of a certain allergen leads companies to use cautionary statements (for example "may contain traces of ...").

In this presentation two cases of fatal anaphylaxis will be described; they showed how the problem is still largely unresolved with risk situations deriving from superficiality, imprudence, and ignorance of the problem. The protection of allergy sufferers requires sensitivity on the part of collective catering and food companies. Even more critical is the need for correct information to patients who too often underestimate the risk associated with their condition.

**Keywords:** food intolerance, anaphylaxis, labelling, milk

### \*Biography

Patrizia Restani is graduated in Pharmaceutical Chemistry and Technology and obtained a PhD in Toxicology at the Università degli Studi di Milano. Retired from 11.2022, she was Full Professor in Food Chemistry, at the School of Pharmacy, Università degli Studi di Milano, where was responsible for the teachings: 1) Food Chemistry; 2) Dietetic Products; 3) Analytical methods for detection of xenobiotics in foods. She is still adjunct professor at the Università degli Studi di Milano for the teaching "Dietetic Products". She was the Coordinator of the school in Scienze e Sicurezza Chimico-Tossicologica dell'Ambiente (Chemical Safety and Toxicological Environmental Sciences), Università degli Studi di Milano from 2011 to 2017 and from 2019 to 2022. She has been involved in numerous national and international research programs in the field of Food Safety, Dietetic products, Risk and Benefit Assessment, and has managed several scientific projects both as the project coordinator and as the responsible of research units. She coordinated the European Project PlantLIBRA (Plant Food Supplements: Level of Intake, Benefit and Risk Assessment) in the context of the 7th EU Framework Program, involving 25 partners distributed in 4 continents. She received the title of Honorary Professor at the Transylvanian University of Brasov (Romania). She is scientific secretary of the Commission IV "Safety and Health" at the OIV- International Organization of Vine and Wine- and is a member of the Italian Delegation (Ministry of Agriculture) at the same organization. She is a member of the technical committee for Nutrition and Animal health - Section for dietetics and nutrition of the Italian Ministry of Health. **ORCID:** 0000-0002-3008-5987





## **CLIMATE CHANGE, ADAPTED WINEMAKING TECHNOLOGY AND CONSUMER EXPECTATIONS**

**Tatjana Košmerl\***, Nik Mahnič

*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana, Slovenia*

### **Abstract**

The effects of climate change on viticulture and winemaking technology are well known. They are associated both with changes in the development of grapes and with "toxic" substances of microbial origin, such as mycotoxins.

The impact of climate change on viticulture and winemaking is widely recognized. It affects the development of grapes and can lead to the presence of harmful microbial substances like mycotoxins. Despite these changes, consumer preferences remain focused on fresh wines with moderate alcohol levels, higher acidity, and primary grape aromas. However, grape varieties from warm climates tend to produce less appealing wines characterized by higher alcohols, reduced fruity esters, and lower acidity, making them more susceptible to spoilage and oxidation.

The diminished aromatic freshness is due to an imbalance between higher alcohols and fruity esters, resulting in a simple, warm, and flat fragrance. To address this, various approaches are used, such as optimizing harvest dates, employing physical techniques like cryomaceration or cold soaking, and conducting low-temperature alcoholic fermentation.

In recent times, non-*Saccharomyces* yeasts have gained attention for their ability to enhance wines. They produce organic acids, boost the release of free aromatic compounds through  $\beta$ -glucosidase activity, and offer bioprotective benefits, all of which contribute to improved wine quality.

**Keywords:** wines, freshness, aroma, longevity

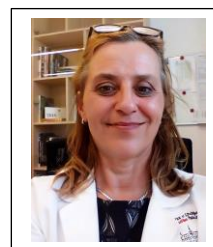
### **\*Biography**

PhD, Food science and technology (1999), Full Professor for Enology (2014), Chair of Plant Food Technologies and Wine

Research interests: Study of the impact of the grape and wine quality parameters (chemical, rheological, technological, sensorial), processing technology (oxidative and reductive winemaking technology), including the optimization of fermentation processes (alcoholic and malolactic) on the quality of the different categories of wine. Study of the effects of additive oenological means, conditions during maturation and aging of wine on the change in the composition, physico-chemical and microbiological stability and sensory quality; exploring the possibilities of new technologies and the replacement or reduction of the use of certain additives in the production of safer wine; characterization, identification and analysis of individual components of grape and wine.

**Researcher ID:** 10688;

**ORCID:** <https://orcid.org/0000-0003-4005-7485>







## GRAPE SEED OIL CHEMICAL PROPERTIES

**Branka Mozetič Vodopivec**

*University of Nova Gorica, School for viticulture and enology, Slovenia*

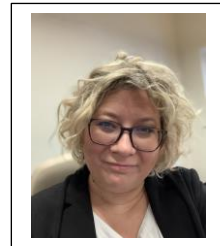
### Abstract

Grape seed oil is becoming increasingly popular in the pharmaceutical, cosmetic and food industries due to its special chemical composition. It is a way how to reuse oenological waste - skins and seeds – for new products with additional value. Skins and seeds are by product in winemaking, nowadays still mostly dumped in the fields or returned to the vineyards as biomass, as animal feed or in some countries also for production of distillates (Grappa). Grape seed oil can be used as edible oil due to its pleasant sensory properties. According to literature it has health-promoting properties, demonstrated primarily in *in vitro* studies, such as anti-inflammatory, cardioprotective, antimicrobial, and anti-cancer properties. These effects are claimed to be associated with grape seed oil constituents, particularly tocopherol, linolenic acid and also phenolic compounds. The aim of this summer school presentation is to give a brief overview of the composition and nutritional aspects – particular polyphenols - of the grape seed oil from different oil extraction techniques, grape sorts, seasons and grape type.

**Keywords:** grape, seed, oil, polyphenols

### \*Biography

Prof.dr. Branka Mozetič Vodopivec is a dean of School for viticulture and enology, at University of Nova Gorica, Slovenia since 2011. She obtained her BSc (1998) and PhD degree (2004) at University of Ljubljana, at Biotechnical Faculty – Food technology department. She is an expert on plant polyphenols determination and quantification from different plant source media –fruits, grapes, wine, juices, apple cider, olive oil and grape seed oil. In the last years she has been focusing also in grape and olive oil production wastes as source of important antioxidants, polyphenols. She has plenty of skills and knowledge in polyphenol quantification, identification and connection of polyphenols to fruit storage, growth conditions, food technology operations, wine/cider fermentation conditions, food quality and health properties. Her field of teaching at University of Nova Gorica are analytical methods in vine and wine, control of grape and wine quality and wine chemistry.



**Researcher ID:** COBISS (Slovenian database)

**ORCID:** <https://orcid.org/0000-0003-4420-2125>



## **SHOULD I BE STRESSED?**

**Laura Elena Gaman, Sandica Bucurica**

*Carol Davila University of Medicine and Pharmacy, Bucharest, Romania*

### **Abstract**

There are many definitions of stress: a state of worry, a mental tension, or “ a nonspecific response of the body to any demand”, as described first time by Hans Selye.

There are many “stressors”: different diseases, a “mieu interieur” of our body, social life, job, age and so on.

All these state of events could (or not) be explained by the “homeostasis of cortisol”.

Finally, we should be able to ask ourselves this: is it always undoubtedly wrong to be stressed or can something good come out of it?

### **\*Biography**

**Elena Laura GAMAN**

- Associate Professor, Department of Biochemistry, Faculty of Medicine, „Carol Davila” University of Medicine and Pharmacy
- PhD (2006) in Pharmacy, „Carol Davila” University of Medicine and Pharmacy



### **Research Interests**

Main research interest is the oxidative stress associated with different diseases:

mitochondrial disease in children, atherosclerosis and cardiovascular disease, neurological diseases like schizophrenia and Alzheimer’s, diabetes, chronic renal disease.



## APPLICATION OF NOVEL GREEN METHODS FOR EXTRACTION OF BIOACTIVE COMPOUNDS FROM PLANT MATERIAL

**Polonca Trebše**

*University of Ljubljana, Faculty of Health Sciences, Slovenia*

### Abstract

Extraction of bioactive compounds from plant material due to their oxidative properties requires strict control of temperature, pressure, presence of light and time. In addition, the bioactive compounds have different polarities, making their simultaneous extraction with a single solvent limited. Various extraction technologies are used to obtain different bioactive compounds, such as maceration, Soxhlet extraction, ultrasonic extraction, and microwave extraction. The choice of a suitable extraction method depends on the aspects such as biomass properties, physicochemical properties of the extractive molecules and their prospective end use. The use of conventional extraction solvents is related to high health and environmental toxicity concerns. Considering their limitations, the extraction of bioactive components using “green technologies”, such as extraction with supercritical fluids (SCF) is gaining increased attention. It enables the preservation of natural properties of bioactive compounds, as extractions are performed under inert and low-temperature conditions. Moreover, as extraction parameters in SCF are precisely controlled, increased selectivity and high yields are achieved, while total energy costs may be additionally reduced due to the moderate extraction times. Another major advantage of SCF includes reducing the negative impact on the environment due to the use of toxicologically unproblematic solvents such as carbon dioxide.

**Keywords:** supercritical fluids (SCF), extraction parameters, low-temperature conditions, preservation of natural properties

### \*Biography

**Polonca Trebše**

- PhD (1997) in Chemistry (organic chemistry), University of Ljubljana
- Professor of chemistry, Faculty of Health Sciences, University of Ljubljana, Slovenia
- E-mail: [polonca.trebse@zf.uni-lj.si](mailto:polonca.trebse@zf.uni-lj.si)
- Phone: (+386) 1 300 11 15



Her research and expert area include:

- studies on photochemical degradation and transport of different organic pollutants, mainly pesticides in the aquatic environment;
- Study of transformation and identification of different pollutants (UV filters, THMs) under disinfection conditions;
- Organic pollutants instrumental analysis;

**ORCID:** 0000-0003-4979-1336



## INTERACTION APPLE, BLUE LED LIGHT IRRADIATION AND PENICILLIUM EXPANSUM

Nik Mahnič, Klemen Bohinc, Barbara Jeršek, Polona Jamnik, Anja Rutar, Emil Zlatič, **Rajko Vidrih\***

*Biotechnical Faculty, Department of Food Science and Technology, University of Ljubljana, Slovenia*

### Abstract

More than 30% of agricultural produce is discarded postharvest due to non-adequate storage conditions, microbiological diseases being the main cause. *Penicillium expansum* is well known pathogen provoking fruit and vegetable deterioration pre- and postharvest. Only fungicide application is successful to some extent in preventing *P. expansum* growth. Here we report the application of blue LED light irradiation (245 nm) of 'Idared' apples inoculated with *P. expansum* at the proteome and metabolome levels. Light has inevitable role in plant development pre- and also postharvest. The results showed that postharvest apples exposed to blue LED light for 10 days had an intense red coloration, and when inoculated with *P. expansum*, a red ring developed around the lesion. At the metabolome level Cy-3-galactoside, Cy-3-arabinoside, Cy-7-arabinoside, quercetin 3-O-arabinopyranoside, quercetin 3-O-galactoside and quercetin 3-O-glucoside significantly increased during irradiation. By analysing proteome of apples irradiation affected the levels of proteins involved in response to stress, metabolism of amino acids and secondary metabolites, while in *P. expansum* the changed proteins were involved in carbohydrate metabolism, protein biosynthesis and the infection process. Results show, that blue LED light acts as a stressor in apples that enhances apples defence against *P. expansum* at least in early stages of infection.

**Keywords:** Apple, *Penicillium expansum*, blue light irradiation, defense response

### \*Biography

Prof. dr. Rajko Vidrih graduated in food science and technology (1984), defended his PhD thesis in postharvest physiology (1996). He has more than 30 years of experience in the field of fruit and vegetable storing and fat processing. From 2015 he is a full professor of plant food technologies, giving lectures in technologies of plant food at BSc, MSc and PhD level at Biotechnical Faculty, University of Ljubljana (programs of food technology) and at University of Donja Gorica, Montenegro. His professional interests include postharvest physiology of fruits and vegetables, nutritional value of fruit and vegetable as influenced by production system, application of natural antioxidants in fat processing and determination of trans fatty acids in food. His recent scientific activities include assigning of geographical origin of fruit and vegetable, application of hot water dipping of fruits and study of postharvest application of LED light on fruits.







## VOLTAMMETRIC ANALYSIS OF OIL SAMPLES

**Kamila Koszelska\***,

*University of Lodz, Department of Inorganic and Analytical Chemistry, Lodz, Poland*

### Abstract

Oil analysis provides valuable insights into the health and condition of oil samples. It involves various tests and examinations to assess the chemical, physical, and microbiological properties of the oil.

Several instrumental techniques have been developed so far for vegetable oil analysis, such as high-performance liquid chromatography (HPLC), which is the most widely used analytical tool, UV spectroscopy, FTIR spectroscopy, HPTLC, and other techniques. Electroanalytical techniques could be used as an alternative and they appear more and more popular in such analyses. A perfect example could be the square wave voltammetry (SWV) which is one of the most sensitive means for the direct evaluation of chemical compounds concentrations, and it is widely used in oil analysis. The main advantages of electrochemical techniques are short determination time, low cost and environmental friendliness.

During the lecture, I will briefly present voltammetric techniques, their operating principles, and the advantages of their application in the analysis of edible oil samples.

**Keywords:** voltammetry, analytical chemistry, sesame oil, black seed oil

### \*Biography

My research is focused on analysis of biologically active compounds, such as pesticides, drugs and biomolecules using electrochemical methods – mainly cyclic voltammetry (CV) and square wave voltammetry (SWV). I am also strongly interested in fabrication of new type of sensors useful in voltammetric analysis.

The field of my interests involves also study mechanisms of the electrode processes using electrochemical methods.



Since November 2021 I am employed as the assistant professor at the Faculty of Chemistry in Department of Inorganic and Analytical Chemistry (University of Lodz).

**ORCID:** 0000-0002-0375-3708



## **WILL CULTURED MEAT SAVE THE PLANET? A SHORT EXPLORATION OF POLICY, INDUSTRY, AND CONSUMERS**

**Andreja Vezovnik**

*University of Ljubljana, Faculty of Social Sciences, Slovenia*

### **Abstract**

Cultured meat is one of the solutions proposed by the fast-growing alternative protein industry to address the protein safety, animal welfare and environmental challenges of the conventional meat industry. The development of cultured meat products has boomed in the last 10 years, especially in the United States, Israel, and the Netherlands. In 2020, Singapore became the first country in the world to be approved to sell cultured meat, followed by the United States in June 2023, but it will likely be several years before regulators in the European Union approve the sale of cultured meat to consumers. Nonetheless, cultured meat is considered an important meat alternative and should be explored.

This lecture addresses three main aspects of cultured meat. First, it provides an overview of policy and regulatory developments related to cultured meat. Second, it will show how the cultured meat industry has evolved and how it is addressing the most puzzling issues of food safety, food security, animal welfare, and environmental concerns. Third, it will demonstrate the extent to which consumers are willing to accept cultured meat as an alternative to conventional meat. The presentation will conclude by highlighting the main challenges and concerns of the cultured meat industry.

**Keywords:** cultured meat, environment, food safety, food security.

### **\*Biography**

Andreja Vezovnik is a sociologist, associate professor of media studies, and senior researcher at the Centre for Social Psychology, University of Ljubljana, Slovenia. Her research is interdisciplinary and problem-oriented. She focuses on the future of food, food and technology, food marketing, food and media, food policy, and other food-related topics such as gender, nationality, politics, culture, and identity. For the past six years she has focused on the alternative proteins industry as it relates to media, policy, marketing, and consumers. In 2022, she was a Fulbright Scholar at the University of Colorado, Boulder where she researched the cultured meat sector. She is also a member of the Programme Committee of the international Food & Communication Conference, a founding member of the international FoodKom network, and a member of the Slovenian Strategic Food Council.



**Researcher ID:** 27578

**Personal webpage:** <https://www.fdv.uni-lj.si/en/news-andinformation/contacts/teachers/info/andreja-vezovnik>

# FOOD SAFETY AND HEALTHY LIVING

## International Summer School – Session 2

September 15-23, 2023, Ljubljana, Slovenia



### Location:

