



BOOK OF ABSTRACTS

XXI EUROFOODCHEM

22-24 November 2021

On-line conference



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EDITORS

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Conference organized under the auspices of the Food Chemistry Division of the European Chemical Society (FCD-EuChemS), the Portuguese Chemical Society (SPQ) and the Serbian Chemical Society.



22-24 November 2021

Scientific Program
(Timetable is set for CET)

| 22 th November | |
|---------------------------|--|
| 14:30-14:45 | Opening Ceremony |
| 14:45-15:20 | PL1. Richard Stadler Virtual Room 1 – "Real and not-so-real problems of chemical food safety" |
| 15:20-15:50 | Oral and flash presentations Virtual Room 1 – OC1, Flash 1-3 Virtual Room 2 – OC2, Flash 4-6 |
| 15:50-16:40 | Poster session 1 – Wonder platform |
| 16:40-17:15 | PL2. Michele Suman Virtual Room 1 – "Untargeted analysis with GC-Orbitrap as powerful tool for the authentication of spices and herbs: focus on oregano" |
| 17:15-18:00 | Oral presentations Virtual Room 1 – OC3-5 Virtual Room 2 – OC6-8 |

| 23 th November | |
|---------------------------|--|
| 14:30-15:05 | PL3. Lenka Kouřimská Virtual Room 1 – "Insects as sustainable alternative food and feed protein source" |
| 15:05-15:50 | Oral presentations Virtual Room 1 – OC9-10, Flash 7-9 Virtual Room 2 – OC11-12, Flash 10-12 |
| 15:50-16:40 | Poster session 2 – Wonder platform |
| 16:40-17:15 | PL4. Victor Freitas Virtual Room 1 – "Molecular approaches for understanding and modulating food taste to make food healthier and more tasty " |
| 17:15-18:00 | Oral presentations Virtual Room 1 – OC13-15 Virtual Room 2 – OC16-18 |

| 24th November | |
|---------------------------------|--|
| 14:30-15:05 | PL5. Yiğit Altay Virtual Room 1 – "The analysis of the future of food: What, why and how? " |
| 15:05-15:50 | Oral presentations Virtual Room 1 – OC19-20, Flash 13-15 Virtual Room 2 – OC11-12, Flash 16-18 |
| 15:50-16:30 | Poster session 3 – Wonder platform |
| 16:30-17:05 | PL6. Robert Wolff Virtual Room 1 – "Total utilisation of marine biomass – How can Norwegian seafood industry create more value and bring healthy products to the market? " |
| 17:05-17:50 | Oral presentations Virtual Room 1 – OC23-25 |

Detailed Program

22th November (CET)

14:30-14:45 Opening Ceremony

Plenary session 1

Virtual Room 1 – Chairs: **Tanja Cirković Veličković** and **Michael Murkovic**

14:45-15:20 **Richard Stadler** - Real and not-so-real problems of chemical food safety

Virtual Room 1 – Chairs: **Tanja Cirković Veličković** and **Michael Murkovic**

15:20-15:35 OC01 – David Moreno González – A worldwide study of pesticide residues in fruit-based soft drinks using liquid chromatography/tandem mass spectrometry

15:35-15:40 F01 – Maria da Luz Galante Maia – Synthetic musks in shrimp and seawater samples from the NW Portuguese coast

15:40-15:45 F02 – Cátia Sofia Faria Martins – Extension of shelf-life of lager beer can be a solution to prevent beer wastage resulting from its reduced consumption during the SARS-Cov-2 pandemic?

15:45-15:50 F03 – Lukas Bodenbender – Development of a prototype GC-(ion trap)MS/MS-IMS-system

Virtual Room 2 – Chairs: **Slavica Ražić** and **Maja Natić**

15:20-15:35 OC02 – Margita Utczás – Analysis of WADA prohibited substances in ecdysterone-containing dietary supplements

15:35-15:40 F04 – Bram Miserez – Food fingerprinting techniques for the authentication of oregano

15:40-15:45 F05 – Philipp Weller – Non-targeted VOC profiling by GC-IMS and machine learning - principles and applications

15:45-15:50 F06 – Mónica Honrado – DNA-based methods as a powerful tool for the entomological authentication of honey

15:50-16:40 **Poster session** – Wonder platform

Plenary session 2

Virtual Room 1 – Chairs: **Joana Amaral** and **Manuel Coimbra**

16:40-17:15 **Michele Suman** – Untargeted analysis with GC-Orbitrap as powerful tool for the authentication of spices and herbs: focus on oregano

Virtual Room 1 – Chairs: **Joana Amaral** and **Manuel Coimbra**

17:15-17:30 OC03 – Leslie Valeria Simon – Deep-learning assisted data augmentation of spectral data for the authentication and quality analysis of food products

17:30-17:45 OC04 – Charlotte Capitain – Optimized headspace gas chromatography-ion mobility spectrometry (HS-GC-IMS) and non-negative matrix factorization (NNMF) for non-targeted VOC profiling of fermented dairy

17:45-18:00 OC05 – Helmut K. Mayer – Extended shelf life (ESL) milk displaces pasteurized fresh milk from Austrian market – boon or bane?

Virtual Room 2 – Chairs: **Zuzana Ciesarová** and **Michael Granvogl**

17:15-17:30 OC06 – João Siopa – Development of a fast method for prediction acrylamide formation in industrially produced biscuits with and without the use of asparaginase

17:30-17:45 OC07 – Lucía González Mulero – Acrylamide content in common Spanish culinary preparations and exposure from household, catering and industrial settings

17:45-18:00 OC08 – Rosa Pilolli – In-house validation of a prototype reference method for six allergens detection in chocolate by HPLC-MS/MS analysis

23th November (CET)

Plenary session 3

Virtual Room 1 – Chairs: **Cristina Todasca** and **Livia Simon Sarkadi**

14:30-15:05 **Lenka Kouřimská** – Insects as suitable alternative for food and feed source

Virtual Room 1 – Chairs: **Cristina Todasca** and **Livia Simon Sarkadi**

15:05-15:20 OC09 – Cláudia Pereira Passos – Raspberry fruit drying stabilization and application in the development of muffins

15:20-15:35 OC10 – Filipa Fernandes – Nutritional enrichment of "Económicos" through the incorporation of chestnut flour

15:35-15:40 F07 – Joscha Christmann – Monitoring of fermentation processes by gas chromatography-ion mobility spectrometry (GC-IMS) and machine learning

15:40-15:45 F08 – Ricardo Moura Ferreira – Production of *Opuntia ficus-indica* fermented beverage: The effects of fermentation time and pasteurization methods on the physicochemical properties

15:45-15:50 F09 – Mareike Krell – Determination of benzyl isothiocyanate-protein conjugates in a vegetable- enriched bread with different cress genera

Virtual Room 2 – Chairs: **Matthias Wüst** and **Beatriz Oliveira**

15:05-15:20 OC11 – Bianca Rodrigues de Albuquerque – Chemical composition and bioactivities of the *Nephelium lappaceum* L. epicarp

15:20-15:35 OC12 – Eleomar Pires Júnior – *Tradescantia zebrina* Bosse: study of the phenolic composition and bioactive properties of a potential natural coloring ingredient

15:35-15:40 F10 – Ana Luísa Pires Fernandes – Recovery of polyphenols and polysaccharide-polyphenols conjugates from grape pomace. Application for type II diabetes mellitus prevention

15:40-15:45 F11 – Rafael Mascoloti Sprea – Volatile composition and bioactive properties of lemon verbena (*Aloysia citrodora* Palau) essential oil: comparison of two extraction methods

15:45-15:50 F12 – Ana Barros – Preliminary study of winery by-products from Dão Region: Phytochemical potential to fight multidrug bacteria resistance

15:50-16:40 *Poster session* – Wonder platform

Plenary session 4

Virtual Room 1 – Chairs: **Małgorzata Starowicz** and **Celestino Santos-Buelga**

16:40-17:15 **Victor de Freitas** – Molecular approaches for understanding and modulating food taste to make food healthier and more tasty

Virtual Room 1 – Chairs: **Małgorzata Starowicz** and **Celestino Santos-Buelga**

17:15-17:30 OC13 – Bartosz Fotschki – Stimulation of intestinal microbiota with fructooligosaccharides favourably enhances the effects of raspberry polyphenols in rats

17:30-17:45 OC14 – Marcelo Dias Catarino – Impact of *Fucus vesiculosus* phlorotannins on the human gastrointestinal tract

17:45-18:00 OC15 – Gregorio Peron – A multi-target strategy to prevent urinary tract infections: the dual mechanism of action on intestinal barrier and urinary epithelium of a novel nutraceutical combining cranberry extracts, D-mannose and ascorbic acid

Virtual Room 2 – Chairs: **Marija Stojadinovic** and **Vieno Piironen**

17:15-17:30 OC16 – Helena Kieserling - Structure analysis of proteins at interfaces

17:30-17:45 OC17 – Inês Filipa Mourão Ferreira - Oxidative stability of beer assessed by electron paramagnetic resonance (EPR) spectroscopy

17:45-18:00 OC18 – Marta Malheiro Leite - Validation of an analytical methodology for mycotoxin determination by UHPLC-MS/MS in the maize value chain

24th November (CET)

Plenary session 5

Virtual Room 1 – Chairs: **Marco Arlorio** and **Karel Cejpek**

14:30-15:05 **Yiğit Altay** – The analysis of the future of food: What, why and how?

Virtual Room 1 – Chairs: **Marco Arlorio** and **Karel Cejpek**

15:05-15:20 OC19 – Zuzana Ciesarová – Innovation in puffed breads production: asparaginase application to acrylamide diminishing

15:20-15:35 OC20 – Laura Alessandroni – Organic chicken meat in a compostable biopackaging solution: a comparative shelf-life study

15:35-15:40 F13 – Lukáš Kolarič – The production of low-cholesterol milk products

15:40-15:45 F14 – Kamgang Nzekoue Astride Franks – Vitamin D from edible mushroom wastes: a new sustainable approach

15:45-15:50 F15 – Sara Alexandra Cunha – Microalgae hydrolysates as functional ingredients: antihypertensive potential

Virtual Room 2 – Chairs: **Wiesław Wiczowski** and **Maria J. Cantalejo**

- 15:05-15:20 OC21 – Haizhou Wu – Lipid oxidation in sorted herring (*Clupea harengus*) filleting co-products and its relationship to composition
- 15:20-15:35 OC22 – Paula Albendea – Effect of feeding olive pomace and soybean acid oils on European seabass fillet quality
- 15:35-15:40 F16 – Filipa Rego Pinto – Seasonal variation of mineral content in the muscle of fish species with no or low commercial value in Portugal
- 15:40-15:45 F17 – Tania Körber – Influence of a magnesium sulfate application on the content of sulfolipids in green multi-leaf lettuce
- 15:45-15:50 F18 – Leon Valentin Bork – Melanoidin formation based on aldol reactions of norfuranol and short- chain Maillard intermediates

15:50-16:40 **Poster session** – Wonder platform

Plenary session 6

Virtual Room 1 – Chairs: **Irena Vovk** and **Lillian Barros**

- 16:30-17:05 **Robert Wolff** – Total utilisation of marine biomass – How can Norwegian seafood industry create more value and bring healthy products to the market?

Virtual Room 1 – Chairs: **Irena Vovk** and **Lillian Barros**

- 17:05-17:20 OC23 – Petras Rimantas Venskutonis – Biorefining platform for the recovery of health beneficial fractions from fruit processing by-products enhances the effects of raspberry polyphenols in rats
- 17:20-17:35 OC24 – Custódio Roriz – Betacyanins from *Gomphrena globosa* L. as natural food colorants: application in different foodstuff
- 17:35-17:50 OC25 – Neda Ahmadiani – Characterization and quantification of apple pomace's phenolic compounds extracted using conventional and pressurized liquid solvent extraction techniques
- 17:50-18:00 **Closing ceremony and awards**

LIST OF POSTERS

| No. | Title | Presenting author |
|-----|--|-------------------------|
| 1 | Nutritional and antioxidant characterisation of the peel of 10 species of coloured potatoes | Izamara de Oliveira |
| 2 | Olive leaves as a source of biophenols: extraction, quantification, and antioxidant activity evaluation in Portuguese olive trees | Carolina L. Ronca |
| 3 | Analytical tools to support the development of new protein ingredients – chemical analyses and nutritional quality | Minna Rotola-Pukkila |
| 4 | Analytical tools to support the development of new protein ingredients – sensory analyses | Nora Logrén |
| 5 | Analytical tools to support the development of new protein ingredients – technological properties | Joni Viitala |
| 6 | Chemical characterization and bioactive properties of different winemaking residues towards their valorization | Cristina N. Duarte |
| 7 | Multi-response optimization of enzyme-assisted extraction of bilberry (<i>Vaccinium myrtillus</i> L.) pomace | Michail Syrpas |
| 8 | Effect of supplemental red grape pomace on proportion of valuable meat parts of Ross 308 broiler chickens | Matej Čech |
| 9 | Microwave-assisted extraction of phenolic compounds from pine nut skin | Soraia P. Silva |
| 10 | Ultrasound-assisted extraction of bioactive compounds of olive seeds from three cultivars with valuable antineurodegenerative properties | Irene Gouvinhas |
| 11 | Determination of enzymes activity in mango (<i>Mangifera indica</i> L.) peel extracts | Nika Kučuk |
| 12 | Extraction of essential oils from the residues of two shrub species aiming for their revalorization: chemical characterization and antioxidant, antimicrobial and cytotoxic activities | Virginie Xavier |
| 13 | Extraction of phenolic compounds with antioxidant activity from cherry seeds: preliminary study | Raquel Guiné |
| 14 | High hydrostatic pressure, a green processing for apple by-product valorisation | Rocío De la Peña-Armada |
| 15 | How the extraction method affects the bioactive and antimicrobial properties of pomegranate peel and seed extracts | Lara Campos |
| 16 | Physicochemical characterization and bioactive potential of Cocfee silverskin | Pedro Esperanço |
| 17 | NMR a tool for unicity evaluation of Feteasca Neagra traditional Romanian wine | Cristina Todasca |
| 18 | Optimization and validation of HS-SPME GC-MS method for the analysis of volatile organic compounds (VOCs) in dry-cured ham | Katja Babič |
| 19 | Authenticity of coffee: Arabica or robusta? | Jana Kvirencova |
| 20 | Fiber and low molecular weight carbohydrate composition in new industrial milling fractions of rye varieties | Marietta Szentmiklóssy |
| 21 | An innovative control strategy based on machine learning and miniature near infrared spectroscopy to assure the geo-traceability of cephalopods | Maria Olga Varrà |
| 22 | Mineral profile of sea cucumber caught off Northeast Atlantic (Portugal) | Helena Maria Lourenço |
| 23 | Physicochemical properties of inulin isolated from dandelion (<i>Taraxacum officinale</i>) roots by “green” extraction | Ivanka Hambarliyska |
| 24 | Analytical tools to identify authenticity markers of PDO “Pera Rocha do Oeste” and PGI Alcobaça apple var. golden delicious | Ana M.S. Costa |
| 25 | Interactions of apocarotenoids with β -lactoglobulin | Maximilian Martin |
| 26 | Amino acid composition of Rugova cheese | Kaltrina Berisha |
| 27 | Microwave-assisted extraction: an eco-friendly alternative for extraction of antioxidant compounds from blueberry | Débora G. Bortolini |
| 28 | UHPLC-PDA-MS analysis of vitamin B12 and its pseudo-form in nutritional supplements based on microalgae | Sabrina Van den Oever |
| 29 | Structure and antioxidant activity relationships of dipeptides derived from foods | Damir Mogut |
| 30 | The profile of polyphenolic compounds, total phenolics and flavonoids contents, anti-oxidant and anti-microbiological properties of bee products | Małgorzata Starowicz |
| 31 | Comparison of total antioxidant capacity and total content of polyphenols in green coffea arabica from South and Central America | Katarína Poláková |
| 32 | Micro- and macroalgae amino acid profile and protein content | Elisa Costa |
| 33 | Barley (<i>Hordeum vulgare</i> L.) grain as a source of antioxidant peptides | Justyna Bucholska |
| 34 | Geographical origin authentication of roasted coffea arabica using volatiles profile and linear discriminant analysis | Alžbeta Demianová |
| 35 | Phenolic compounds of blackthorn (<i>Prunus spinosa</i> L.) fruits originated from Serbia | Nenad Mićanović |

Extraction of essential oils from the residues of two shrub species aiming for their revalorization: chemical characterization and antioxidant, antimicrobial and cytotoxic activities

Virginie Xavier^{1,2}, Sandrina Heleno¹, Miguel A. Prieto², Joana Amaral¹, Irene Mediavilla Ruiz³, Luis Saul Esteban Pascual³, Isabel C.F.R. Ferreira¹, Lillian Barros^{1,*}

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In recent years, essential oils have been subject of research for their bioactive properties, such as antimicrobial, fungitoxic, anti-viral, anti-inflammatory and antioxidant activities. Owing to these properties they are potentially interesting for diverse industries including the food industry since one of its main problems concerns microbes and associated toxins that are responsible for food spoilage. Although the application of essential oils in the food industry may have some limitations, such as impact on the organoleptic properties and low solubility, different delivery strategies such as nanoencapsulation, active packaging and coatings are promising technologies that may overcome these issues without compromising nutritional properties in food systems [1]. In this view, increased knowledge on the composition and activity of different essential oils is needed, particularly regarding novel potential sources of essential oils such as agricultural wastes or species grown in marginal lands, on a perspective of circular economy. Therefore, in the scope of the BeonNAT project, biomass from different tree and shrub species are being screened as possible sources of essential oils and respective bioactivity evaluated.

In this work, the essential oil extracted by steam distillation from the branches (>20mm) of two shrub species grown in Spain, *Juniperus communis* L. and *Cistus ladanifer* L., was characterized for their chemical composition by gas chromatography coupled with mass spectrometry (GC-MS) as well as for their antioxidant, antimicrobial, anti-inflammatory and cytotoxic activities. GC-MS analysis allowed the identification of 98.1% of compounds in *J. communis* EO, corresponding to a total of 63 identified compounds, with α -pinene being the major compound (35.1%), followed by limonene (15.0%), sabinene (6.7%), cis-tujopsene (8.0%), β -myrcene (3.2%) and β -caryophyllene (3.5%). In general, the chemical composition is in agreement with that of juniper berry EO, defined in the European Pharmacopoeia and ISO 8897 standard, except for limonene (15.0%) which was slightly higher than the defined range (Eur. Ph of 2-12% and ISO standard of 2-8%). For *C. ladanifer* EO, 61 compounds were identified corresponding to 92.8% of the total compounds, with viridiflorol being the main compound (24.0%), followed by α -pinene (19.3%), ledol (6.9%), camphene (6.7%) and bornyl acetate (5.0%), which is in good agreement with previous data [2]. Both oils showed potential against the panel of bacteria selected according to their importance in public health and foodborne diseases, highlighting the rock-rose EO that showed interesting activity against *Escherichia coli*, *Morganella morganii*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Listeria monocytogenes* and methicillin resistant *Staphylococcus aureus* in a concentration range of 0.039-2.5%(v/v). Regarding the antioxidant activity, both oils showed promising results, with EC₅₀ values of 1.35 \pm 0.19 mg/mL and 1.30 \pm 0.07 mg/mL in the reducing power assay and 68% and 83% inhibition of oxidation according to the cellular antioxidant activity assay, for *J. communis* and *C. ladanifer*, respectively. The essential oils showed anti-inflammatory (IC₅₀ of 24 \pm 1 μ g/mL and 21 \pm 2 μ g/mL for juniper and rock-rose, respectively) and cytotoxic activity, with the best results obtained with the rock-rose EO in the inhibition of stomach-AGS, colon-CaCo, breast-MCF-7 and lung-NCI-H460 cancer cell lines (GI₅₀ between 47 \pm 5 μ g/mL and 58 \pm 1 μ g/mL). Juniper EO did not evidenced cytotoxicity in non-tumoral Vero cells at the highest tested concentration (400 μ g/mL) which can be an indicator of its safety. Overall, the results demonstrated that shrubs biomass can be a source of EO with similar composition to that reported for respective berries and leaves. The EOs showed interesting antibacterial and antioxidant activity thus being potential candidates for further studies on their safety and potential application in food systems.

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