



**Banat's University of Agricultural Sciences
and Veterinary Medicine "King Michael I of
Romania" from Timișoara**



romania2019.eu

Președinția României la Consiliul Uniunii Europene

Scientific Programme

**WEEK of the Banat's University of Agricultural Sciences and
Veterinary Medicine „King Michael I of Romania” from Timișoara**



Faculty of Food Engineering

Timișoara, 2019



**ROMANIAN ACADEMY
Timișoara Branch**



**Academy of Agricultural and
Forestry Sciences
"Gheorghe Ionescu-Sișești"
Timișoara Branch**



**Romanian Association of Food
Industry Specialists
Timișoara Branch**



**Romanian Chemistry Society
Timișoara Branch**

General Program

WEEK of the Banat's University of Agricultural Sciences and
Veterinary Medicine „King Michael I of Romania” from Timișoara

Faculty of Food Engineering

20.05.2019 (Monday)

09⁰⁰ - 10⁰⁰

Interpretation of the scientifically data - WORKSHOP

Organizers: Ducu Ștef, Dacian Lalescu, Despina-Maria Bordean, Liana Alda

*Seminar S2 - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
„King Michael I of Romania” from Timișoara*

10⁰⁰ - 11⁰⁰

How do employers think? Start finding the right job.

Organizers: Mirela Popa, Corina Mișcă, Camelia Moldovan,
Delia Dumbravă

Guests: Assoc. Prof. Dr. Denisa Adrudan, West University of Timișoara

11⁰⁰ – 12⁰⁰

Micro-structured ionized alkaline water obtained by electrolysis -
source of health and longevity - WORKSHOP

Organizers: Georgeta-Sofia Pintilie, Mariana-Atena Poiană,
Ioan David

Guests: Daniel Turcu, George Știrbu, Anda Ionelia Popescu - ENAGIC
International – Japan

*”Ionel Jianu” Amphitheater - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
„King Michael I of Romania” from Timișoara*

21.05.2019 (Tuesday)

09⁰⁰ – 11⁰⁰

Innovative education in university education in life sciences -
WORKSHOP

Organizer: Teodor - Ioan Trașcă

- **Theme 1** - Food quality, an innovative approach. The formative
educational character of the sensory approach in the formation of
healthy eating habits

Prof. Dr. Constantin Croitoru, Scientific Secretary of the ASAS Food
Industry Section, ASAS Member

- **Theme 2** - The role of demonstration centers in developing
innovative thinking on renewable energies

Prof. Dr. Dumitru Țucu, Vice President of Timișoara Branch of
ASAS, President of AGIR Renewable Energy Society

- **Theme 3** - Global Harmonization Initiative on Food Safety and
Security

Prof. Dr. Dumitru Mnerie, Ambassador for Romania from the Global
Harmonization Initiative

*”Ionel Jianu” Amphitheater - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
„King Michael I of Romania” from Timișoara*

15⁰⁰ – 17⁰⁰

Floral Art (II) - WORKSHOP

Organizers: Adrian Riviş, Teodor - Ioan Traşcă, Alexandru Popovici, Gabriel Megheduş-Mîndru, Mariana Poiană, Alexandru Rinovetz, Bogdan Rădoi

- **Theme 1 - Introduction. Floral art in food - brief European history**
Prof. Dr. Teodor – Ioan Traşcă, Faculty of Food Engineering, Banat's University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania” from Timișoara
- **Theme 2 - Floral art in catering**
Eng. Alexandru Popovici
- **Theme 3 - Natural geometries and fractal developments**
Assoc. Prof. Dr. Dan Moga, Director of Design and Applied Arts Department, West University of Timișoara
- **Theme 4 - Spiral: between natural structure and cultural geometry**
Prof. Dr. Camil Mihăescu, West University of Timișoara
- **Theme 5 - The secret language of flowers**
Assist. Prof. Dr. Gabriel Kelemen, West University of Timișoara

Interventions:

- *Floral and vegetal compositions in fashion design*
 - ✓ **Simona Noroc**, student, Fashion and design, West University of Timișoara
- *Flower art in pastry*
 - ✓ **Eng. Renata Chirițoiu**, „Aurora” Cake Shop
 - ✓ **Eng. Simona Pârvu**, „Codrina” Cake Shop
- *Floral olfactory art in oenology*
 - ✓ **Eng. Mariana Coraș**, „Enoteca de Savoya” manager:
- *Floral motifs in pastry*
 - ✓ **Eng. Stela Savin**, SC „Fropinn” SA
- *Floral sculpture in gastronomy*
 - ✓ **Chef Ionuț**, „Timișoara” Restaurant
 - ✓ „Renaissance” Restaurant representative
 - ✓ „Pepper” Restaurant representative

**„Ionel Jianu” Amphitheater - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
„King Michael I of Romania” from Timișoara**

22.05.2019 (Wednesday)

12⁰⁰ – 14⁰⁰

Culinary art 2019 – Extra-curricular activity - offers students the opportunity to learn / experience the "art" and "technique" of preparing food for human consumption

Organizers: Nicoleta Gabriela Hădărugă, Adrian Riviș, Ariana Bianca Velciov, Alexandru Erne Rinovetz

Guest: Cerasela Lungu – Master in culinary art

***"Ionel Jianu" Amphitheater - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
„King Michael I of Romania" from Timișoara***

Conferences Programme

1st Day - 23rd of May, 2019 (Thursday)

10³⁰ - 11⁰⁰

Registration at the Faculty of Food Engineering

*"Ionel Jianu" Amphitheatre - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

11⁰⁵ – 11²⁵

Opening of the Conference

11³⁰ – 12⁰⁰

Plenary Lecture PL₁

12⁰⁰ – 12³⁰

Plenary Lecture PL₂

*"Iulian Drăcea" Auditorium
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

13⁰⁰ – 15⁰⁰

Lunch

*RESTAURANT
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

14³⁰ – 15⁰⁰

Registration at the Faculty of Food Engineering

15⁰⁰ – 15¹⁰

Opening of the Conference

15¹⁰ – 17⁰⁰

Section: Food Chemistry, Engineering & Technology (I)

17⁰⁰ – 17³⁰

Coffee break and Posters

17³⁰ – 18³⁰

Section: Food Chemistry, Engineering & Technology (II)

18³⁰ – 18⁴⁵

Concluding Remarks and Coffee break

*„Ionel Jianu" Amphitheatre - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

19⁰⁰ - 23⁰⁰

Dinner

*"Restaurant Venue"
"Divizia 9 Cavalerie" Street 64, Timișoara 300254*

2nd Day - 24th of May, 2019 (Friday)

08³⁰ – 10⁰⁰

- Lecture (for Ph.D. students)

*Conference Hall
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

10⁰⁰ – 12⁰⁰

- Opening of the Banat Agralim – Exhibition

*"Iulian Drăcea" Auditorium
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

Scientific Programme

1st Day – 23rd of May, 2019 (Thursday)

*"Ionel Jianu" Amphitheatre - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

10³⁰ – 11⁰⁰ Registration at the Faculty of Food Engineering

*"Iulian Drăcea" Auditorium
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

11⁰⁵ – 11¹⁵ Opening of the Conference

Cosmin Alin Popescu, Rector of the Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara,
The 2nd International Conference on Life Sciences

11¹⁵ – 11²⁵ **Isidora Radulov**, Vicerektor of the Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara,
The 2nd International Conference on Life Sciences

11³⁰ – 12⁰⁰ **PL₁**: Per- & Polyfluoroalkyl Substances (PFAS) in Soil, Water, Animal Feed and Food
Thomas G. Nagel, Melanie Mechler, Melanie Zoska, Jörn Breuer - Center for Agricultural Technology Augustenberg (LTZ), Nesslerstrasse 25, 76227 Karlsruhe, Germany
The 2nd International Conference on Life Sciences

12⁰⁰ – 12³⁰ **PL₂**: **Prof. Dr. habil. Carsten Lorz** - University of Applied Sciences, Department of Forestry, Germany
The 2nd International Conference on Life Sciences

*RESTAURANT
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara*

12³⁰ – 14⁰⁰ Lunch

**"Ionel Jianu" Amphitheatre - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara**

14³⁰ – 15⁰⁰ **Registration at the Faculty of Food Engineering**

15⁰⁰ – 15¹⁰ Opening of the Conference
Adrian Riviș, *Dean of the Faculty of Food Engineering, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara*
The 8th International Conference on Food Chemistry, Engineering & Technology

Chaired by: Prof. Dr. Ersilia Călina Alexa

**"Ionel Jianu" Amphitheatre - Faculty of Food Engineering
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara**

15¹⁰ – 16²⁰ **PL₁:** Flavonoid nanotechnology in the protection of human physiology
Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology

16²⁰ – 16⁴⁰ **IL₁:** The Fipronil Egg Scandal – New Challenges in Preventing Carry-Over from Agricultural Products to Food
Johannes M. Bauer, Thomas G. Nagel - *The Center for Agricultural Technology Augustenberg (LTZ), Department 21 - Organic Analyses, Nesslerstrasse 25, 76227 Karlsruhe, Germany*
The 2nd International Conference on Life Sciences

16⁴⁰ – 17⁰⁰ **IL₂:** Cyclodextrin – edible oil complexes: Synthesis and characterization
Daniel I. Hădărugă, Cosmina A. Chirilă, Marius D. Simandi, Raymond N. Szakal, Cornelia Muntean, Geza N. Bandur, Nicoleta G. Hădărugă - *Polytechnic University of Timișoara, Timișoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology

17⁰⁰ – 17³⁰ **Coffee break and Posters**

17³⁰ – 17⁴⁵ **OC₁:** Assessing the bioactive compounds and antioxidant activity of blueberry and their processing byproducts
Cristina-Ramona Metzner, Andreea Ioana Lupitu, Cristian Moisa, Dana-Maria Copolovici, Lucian Octav Copolovici, Georgeta Pop, Mariana-Atena Poiana - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Faculty of Food Engineering, Calea Aradului 119, Timișoara, 300645, Romania*
The 2nd International Conference on Life Sciences

- 17⁴⁵ – 18⁰⁰ **OC₂:** Evaluation of β -cyclodextrin complexation of some autochthonous fish oils by thermal methods
Raymond N. Szakal, Cosmina A. Chirilă, Marius D. Simandi, Cristina Mitroi, Iulia M. Gălan, Christine A. Lucan, Daniel I. Hădărugă, Nicoleta G. Hădărugă. - *Faculty of Food Engineering, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- 18⁰⁰ – 18¹⁵ **OC₃:** Evaluation of the fatty acid profile of some autochthonous common beans lipid fractions
Marius D. Simandi, **Cristina Mitroi**, Simelda E. Zippenfening, Tamara D. Vlăduțescu, Anamaria Guran, Claudia Izabela Oprinescu, Marius I. Cugorean, Lucian Radu, Daniel I. Hădărugă, Nicoleta G. Hădărugă, Adrian Riviș - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- 18¹⁵ – 18³⁰ **Posters and Concluding Remarks**
- "Restaurant Venue"
"Divizia 9 Cavalerie" Street 64, Timișoara 300254
- 19⁰⁰ - 23⁰⁰ **Dinner**

2nd Day – 24th of May, 2019 (Friday)

- 08³⁰ – 10⁰⁰ **Lecture:** Biotechnological approaches in sustainable vegetable products. From antioxidants to smart packaging
Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Greece*
(organized by the Doctoral School on *Engineering of Vegetable and Animal Resources* from the Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara)
- "Conference Hall"*
Banat's University of Agricultural Sciences and Veterinary Medicine
"King Michael I of Romania" from Timișoara
- 10⁰⁰ – 12⁰⁰ - **Opening of the Banat Agralim - Exhibition**

POSTERS

- P₁** Evaluation of anthocyanin stability in red onion skin extract
Adina Căta, Mariana Nela Ștefănuț, Ioana Maria Carmen Ienașcu - *National Institute of Research and Development for Electrochemistry and Condensed Matter, Timișoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₂** Graphene/CuGaO₂ based aerogel synthesis
Cristina Moșoarcă, Daniel Ursu, Petrica-Andrei Linul, Bogdan-Ovidiu Țăranu, Radu Banica - *National Institute for Research and Development in Electrochemistry and Condensed Matter, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₃** Novel hydrazone/ β -cyclodextrin complex. Synthesis and characterization
Ioana Maria Carmen Ienașcu, Adina Căta, Mariana Nela Ștefănuț, M.C. Pascariu, Gerlinda Rusu, Paula Sfirloagă, Cristina Moșoarcă, Iuliana M. Popescu - *National Institute of Research and Development for Electrochemistry and Condensed Matter, Timișoara, Romania. Vasile Goldiș" Western University of Arad, Faculty of Pharmacy, Arad, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄** Some fungicide residues determination in food products by a chromatographic method
Mariana Nela Ștefănuț, Adina Căta, Ioana Maria Carmen Ienașcu - *National Institute of Research and Development for Electrochemistry and Condensed Matter, Timișoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₅** Influence of the added fat type on some nutritional characteristics of an innovative seafood pâté
Delia-Gabriela Dumbravă, Nicoleta Gabriela Hădărugă, Diana Veronica Dogaru, Diana-Nicoleta Raba, Viorica-Mirela Popa, Corina Dana Mișcă, Mărioara Drugă, Camelia Moldovan - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*
The 2nd International Conference on Life Sciences
- P₆** Microencapsulation of biologically active compounds from cornelian cherry fruits with whey proteins isolate and accacia gum
Iuliana-Maria Enache, Nicoleta Stănciuc, Camelia Vizireanu - *"Dunarea de Jos" University of Galati - Faculty of Food Science and Engineering, Galati, Romania*
The 2nd International Conference on Life Sciences
- P₇** Rheological and Nutritional Properties of Sugar-Free Roulade with Pumpkin Pulp
Monica Ioan, Gabriel-Dănuț Mocanu, Georgeta Doina Andronoiu, Ionica Dima (Gheonea), Livia Pătrașcu, Liliana Mihalcea - *Integrated Center for Research, Expertise and Technological Transfer in Food Industry, Faculty of Food Science and Engineering Faculty, Dunarea de Jos University of Galati, Romania*
The 2nd International Conference on Life Sciences

- P₈** Studies regarding the use of unconventional ingredients to obtain halva with high nutritional value and improved sensory properties
Andrei Dorel Catargiu, Despina-Maria Bordean, Dan-Dorin Raican, Loredana Alexandra Ghigulescu, Mariana-Atena Poiana - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₉** Nutraceutical quality evaluation of tomatoes, bell peppers and their processing wastes
Andreea Ilas (married Cadariu), Monica Negrea, Ileana Cocan, Ersilia Alexa, Diana Moigradean, Mariana-Atena Poiana - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₁₀** Quality Characteristics of Fresh and Reconstituted Probiotic Potatoes Purée with Sea Buckthorn Supercritical CO₂ Extract
Gabriel – Dănuț Mocanu, Oana – Viorela Nistor, Doina Georgeta Andronoiu, Oana Emilia Constantin, Viorica Vasilica Barbu, Ionica Dima (Gheonea), Livia Pătrașcu, Liliana Ceclu, Liliana Mihalcea, Elisabeta Botez - *"Dunarea de Jos,, University of Galati, Faculty of Food Science and Engineering, Galati, Romania*
The 2nd International Conference on Life Sciences
- P₁₁** Could probiotics be useful in patients with functional dyspepsia?
Mihai Ionita, Norina Basa - *First Department of Internal Medicine, University of Medicine and Pharmacy, "V. Babes", Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₁₂** Symbiotics in irritable bowel syndrome: is this the good choice?
Mihai Ionita, Mihaela Muntean - *First Department of Internal Medicine, University of Medicine and Pharmacy, "V. Babes", Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₁₃** New ingredient- Sericin influence on rheological and biscuit's sensory properties
Monica Gabriela Dinu, Irina Mihaela Mătran - *Economic College - Bucharest, Romania*
The 2nd International Conference on Life Sciences
- P₁₄** Benefits of the traditional liqueur
Veronica Filimon, Tatiana Avgust, Simona Butan - *"Dunarea de Jos" University of Galati, Cross-Border Faculty, Galati, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₁₅** Advanced catechin nanomaterials exert protective effects against amyloid segregation
Christiane M. Nday, Graham Jackson, Athanasios Salifoglou - *Department of Chemical Engineering, Aristotle University of Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology

- P₁₆** Insulin mimetic/adipogenic activity of binary-ternary Cr(III)-hydroxycarboxylic acid-aromatic chelator systems
Olga Tsave, Catherine Gabriel, Athanasios Salifoglou - *Laboratory of Inorganic Chemistry and Advanced Materials, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₁₇** Magnetic chrysin silica nanomaterial behavior in an amyloidogenesis environment
Christiane M. Nday, Graham Jackson, Athanasios Salifoglou - *Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₁₈** Flavonoid derivatives in the enhancement of antioxidant properties
Sevasti Matsia, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₁₉** Improvement of flavonoid nano-technology against Alzheimer-type neurodegeneration
Christiane M. Nday, **Graham Jackson**, Athanasios Salifoglou - *Department of Chemistry, University of Cape Town, Rondebosch, Cape Town, South Africa*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₂₀** Encapsulated naringin in pegylated nanoparticles against neurodegenerative processes
Christiane M. Nday, **Graham Jackson**, Athanasios Salifoglou - *Department of Chemistry, University of Cape Town, Rondebosch,, Cape Town, South Africa*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₂₁** Quercetin in magnetic silica nanoparticles. Application against Cu(II)-mediated neurodegenerative processes
Christiane M. Nday, Graham Jackson, Athanasios Salifoglou - *Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₂₂** Structural investigation and physicochemical properties of binary materials of Thallium with organic substrates
Sevasti Matsia, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, Thessaloniki, Greece*
The 8th International Conference on Food Chemistry, Engineering & Technology

- P₂₃** Biological activity of novel well-defined Ti(IV)-(α-hydroxycarboxylic acid) complexes in metabolic (patho)physiology
Olga Tsave, Aikaterini Iordanidou, Athanasios Salifoglou - *Laboratory of Inorganic Chemistry, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₄** The development of a new functional polynuclear Ti(IV)-carboxylic acid complex. Synthesis, characterization and in depth structure-properties investigation
Aikaterini Iordanidou, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₅** Structure-specific adipogenic activity of binary/ternary V(V)-Schiff base materials. Structure-function correlations toward insulinmimesis at the molecular level
Olga Tsave, Maria P. Yavropoulou, John G. Yovos, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₆** Vanadium downregulates autophagic flux and inhibits metastatic Niche by induction of trail-induced apoptosis in cancer cells.
Savvas Petanidis, Efrosini Kioseoglou, Doxakis Anastakis, Margarita Hadzopoulou-Cladaras, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₇** Hybrid peroxido vanadate complexes as advanced materials in biological systems
Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₈** Optimizing Peroxido-Vanadate chemotherapeutics
Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou - *Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, Thessaloniki, Greece*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)
- P₂₉** The effects of hydrocolloids addition on the rheological characteristics of the dough and gluten-free bread properties
Sorina Ropciuc, Georgiana Gabriela Codina, Ana Leahu, Cristina Damian - *„Stefan cel Mare” University of Suceava, Faculty of Food Engineering, Suceava, Romania*
[*The 8th International Conference on Food Chemistry, Engineering & Technology*](#)

- P₃₀** Increasing the Shelf Life of Alimentary Poultry Fat by β -Carotene and Ascorbic Acid Addition
Flavia Pop, Zorica Voşgan - *Technical University of Cluj-Napoca, North University Center of Baia Mare, Chemistry and Biology Department, Baia Mare, Romania*
The 2nd International Conference on Life Sciences
- P₃₁** Linear relations of the physico-chemical parameters for some natural green plant juices
Antoanela Cozma, Ariana Velciov, Iuliana Creţescu, Sofia Popescu, Liana Alda, Dacian Lalescu, Mihaela Petcu - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₃₂** Effect of osmotic dehydration on the colour parameters and chemical characteristics of apple and pear
Ana Leahu, Cristina Ghinea, Mircea Oroian, Cristina Damian, Sorina Ropciuc - *„Stefan cel Mare” University of Suceava, Faculty of Food Engineering, Suceava, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₃₃** Effect of drying techniques on the total phenolic contents and antioxidant activity of some vegetables byproducts
Cristina Damian, Mircea Oroian, Ana Leahu, Sorina Ropciuc, Laura Carmen Apostol - *„Stefan cel Mare” University of Suceava, Faculty of Food Engineering, Suceava, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₃₄** Extraction of Antioxidants from Onion By-products using Eco-friendly Solvents
Cristina Damian - *„Stefan cel Mare” University of Suceava, Faculty of Food Engineering, Suceava, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₃₅** Influence of enzymes action on chromatic characteristics and aromatic profile of pre fermented grape juice
Maria-Lidia Iancu, Ovidiu Tiţa, Anca-Maria Stoia - *"Lucian Blaga" University of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Department of Agricultural Sciences and Food Engineering, Sibiu, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₃₆** Influence of enzymes action on primary quality indicators of the pre-fermented grape juice
Ovidiu Tiţa, **Maria-Lidia Iancu**, Anca-Maria Stoia - *"Lucian Blaga" University of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Department of Agricultural Sciences and Food Engineering, Sibiu, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology

- P₃₇** Cow's milk as mineralizing food
Ana-Maria Ivana, Despina Maria Bordean, Liana Maria Alda, Maria Rada, Simion Alda, Lucian Radu, Mihai Adamescu - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₃₈** Possibilities of use and characterization of purple potatoes for creams and dessert fillings
Camelia Moldovan, Claudia Oprinescu, Mirela Popa, Diana Raba, Mărioara Drugă, Aurica Borozean, Delia Dumbravă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₃₉** The amygdalin content in kernel oils of several Rosacea Family cultivars grown in Romania
Viorica-Mirela Popa, Carmen Socaciu, Florica Ranga, Florinela Fetea, Diana Nicoleta Raba, Camelia Moldovan, Delia-Gabriela Dumbravă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₄₀** Determination of the mineral profile of some bio-accessible elements of the fruit (Quince)
Cristian Andrei Semcici, Liana Alda, Alexandru Rinovetz, Lucian Radu, David Ioan, Ducu-Sandu Ștef, Gabriel Bujancă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₄₁** Evaluation of the similarity/dissimilarity of poultry lipid profiles by Fourier transform infrared spectroscopy
Cosmina A. Chirilă, Tamara D. Vlăduțescu, Anamaria Guran, Lucian Radu, Cristina Mitroi, Marius Ioan Cugerean, Daniel I. Hădărugă, Adrian Riviș, Nicoleta G. Hădărugă
- *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering,, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₄₂** Evaluation of the moisture content of some non-homogeneous meat products by volumetric Karl Fischer titration
Simelda E. Zippenfening, Marius D. Simandi, Tamara D. Vlăduțescu, Anamaria Guran, Cosmina A. Chirilă, Daniel I. Hădărugă, Nicoleta G. Hădărugă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄₃** Evaluation of bioactive compounds from a new dietetic and functional sorbet
Cosmina M. Bogătean, Maria Tofană, Emil Racolța - *Faculty of Food Science and Technology, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology

- P₄₄** Applications of mild temperatures on a natural lipid model
Alexandru Rinovetz, Gabriel Bujancă, Mișcă Corina Dana, Ariana Velciov, Ioan David, Bogdan Rădoi, Teodor-Ioan Trașcă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 2nd International Conference on Life Sciences
- P₄₅** Functional dependence of energy intake relative to the fat content in different types of cheeses
Georgeta-Sofia Popescu, Antoanela Cozma, Dacian-Virgil Lalescu, Daniela Stoin, Mădălina-Ioana Stîngă, Ariana-Bianca Velciov - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄₆** The development of the Romanian food industry
Viorica-Mirela Popa, Diana Nicoleta Raba, Camelia Moldovan, Delia-Gabriela Dumbravă, Aurica-Breica Borozan - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄₇** The evolution of the retail market in Romania
Viorica-Mirela Popa, Diana Nicoleta Raba, Camelia Moldovan, Delia-Gabriela Dumbravă, Corina Dana Mișcă - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄₈** Cluster analysis for some different types of vegetable oils by the physicochemical characteristics
Antoanela Cozma, Ariana Velciov, Daniela Stoin, Diana Moigrădean, Dacian Lalescu, Mihaela Petcu, Iuliana Crețescu, Adrian Riviș - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₄₉** The determination of the bioaccessibility of some essential microelements from cow's cheese
Mihai Adamescu, Despina Maria Bordean, Liana Maria Alda, Maria Rada, Lucian Radu, Ana-Maria Ivana - *Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Timisoara, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology

- P₅₀** Bakery assortment functionalized by the use of a malt industry by-product
Maria Simona Chiș, Adriana Păucean, Simona Man, Muste Sevastița, Anamaria Pop, Laura Stan, Teodora Coldea - *University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₅₁** New assortments of functional gluten free products developed by using quinoa and buckwheat flours
Maria Simona Chiș, Adriana Păucean, Simona Man, Muste Sevastița, Anamaria Pop, Laura Stan, Carmen Pop - *University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₅₂** Development of new bakery product using pseudo-cereals preferment and aromatic yeasts
Adriana Păucean, Simona Man, Sevastița Muste, Simona Chiș, Vlad Muresan, Carmen Pop, Sonia Socaci, Crina Muresan - *University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology
- P₅₃** Effect of nettle leaves (*Urtica dioica* L.) addition on the quality of bread
Adriana Păucean, Simona Maria Man, Maria Simona Chiș, Sevastița Muste, Anamaria Pop, Andruța Elena Mureșan - *University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania*
The 8th International Conference on Food Chemistry, Engineering & Technology



romania2019.eu
Președinția României la Consiliul Uniunii Europene

BOOK OF ABSTRACT

The 2nd International Conference on Life Sciences
Section: Food Chemistry, Engineering & Technology



Timișoara, 2019

INDEX

Per- & Polyfluoroalkyl Substances (PFAS) in Soil, Water, Animal Feed and Food
NAGEL Thomas G., MECHLER Melanie, ZOSKA Melanie, BREUER Jörn

Influence of the added fat type on some nutritional characteristics of an innovative seafood pâté

DUMBRAVĂ Delia-Gabriela, HĂDĂRUGĂ Nicoleta Gabriela, DOGARU Diana Veronica, RABA Diana-Nicoleta, POPA Viorica-Mirela, MIȘCĂ Corina Dana, DRUGĂ Mărioara, MOLDOVAN Camelia

Microencapsulation of biologically active compounds from cornelian cherry fruits with whey proteins isolate and accacia gum

ENACHE Iuliana-Maria, STÂNCIUC Nicoleta, VIZIREANU Camelia

Rheological and Nutritional Properties of Sugar-Free Roulade with Pumpkin Pulp

IOAN Monica, MOCANU Gabriel-Dănuț, ANDRONOIU Georgeta Doina, DIMA (GHEONEA) Ionica, PĂTRAȘCU Livia, MIHALCEA Liliana

Studies regarding the use of unconventional ingredients to obtain halva with high nutritional value and improved sensory properties

CATARGIU Andrei Dorel, BORDEAN Despina-Maria, RAICAN Dan-Dorin, GHIGULESCU Loredana Alexandra, POIANA Mariana-Atena

Nutraceutical quality evaluation of tomatoes, bell peppers and their processing wastes

Andreea ILAS (CADARIU), NEGREA Monica, COCAN Ileana, ALEXA Ersilia, MOIGRADEAN Diana, POIANA Mariana-Atena

Quality Characteristics of Fresh and Reconstituted Probiotic Potatoes Purée with Sea Buckthorn Supercritical CO₂ Extract

MOCANU Gabriel – Dănuț, NISTOR Oana – Viorela, ANDRONOIU Doina Georgeta, CONSTANTIN Oana Emilia, BARBU Viorica Vasilica, DIMA (GHEONEA) Ionica, PĂTRAȘCU Livia, CECLU Liliana, MIHALCEA Liliana, BOTEZ Elisabeta

Could probiotics be useful in patients with functional dyspepsia?

IONITA Mihai, BASA Norina

Symbiotics in irritable bowel syndrome: is this the good choice?

IONITA Mihai, MUNTEAN Mihaela

Assessing the bioactive compounds and antioxidant activity of blueberry and their processing byproducts

METZNER Cristina-Ramona, LUPITU Andreea Ioana, MOISA Cristian,
COPOLOVICI Dana-Maria, COPOLOVICI Lucian Octav, POP Georgeta,
POIANA Mariana-Atena

The Fipronil Egg Scandal – New Challenges in Preventing Carry-Over from Agricultural Products to Food

BAUER Johannes Moritz, NAGEL Thomas G

New ingredient-Sericin influence on rheological and biscuit's sensory properties

DINU Monica Gabriela, MĂTRAN Irina Mihaela

Increasing the Shelf Life of Alimentary Poultry Fat by β -Carotene and Ascorbic Acid Addition

N POP Flavia, VOȘGAN Zorica

Linear relations of the physico-chemical parameters for some natural green plant juices

COZMA Antoanela, VELCIOV Ariana, CREȚESCU Iuliana, POPESCU Sofia,
ALDA Liana, LALESCU Dacian, PETCU Mihaela

Cow's milk as mineralizing food

IVANA Ana-Maria, BORDEAN Despina Maria, ALDA Liana Maria, RADA Maria, ALDA Simion, RADU Lucian, ADAMESCU Mihai

Possibilities of use and characterization of purple potatoes for creams and dessert fillings

MOLDOVAN Camelia, OPRINESCU Claudia, POPA Mirela, RABA Diana,
DRUGĂ Mărioara, BOROZAN Aurica, DUMBRAVĂ Delia

The amygdalin content in kernel oils of several Rosacea Family cultivars grown in Romania

POPA Viorica-Mirela, SOCACIU Carmen, RANGA Florica, FETEA Florinela,
RABA Diana Nicoleta, MOLDOVAN Camelia, DUMBRAVĂ Delia-Gabriela

Determination of the mineral profile of some bio-accessible elements of the fruit (Quince)

SEMCICI Cristian Andrei, ALDA Liana, RINOVETZ Alexandru, RADU Lucian,
DAVID Ioan, ȘTEF Ducu-Sandu, BUJANCĂ Gabriel

Evaluation of the similarity/dissimilarity of poultry lipid profiles by Fourier transform infrared spectroscopy

CHIRILĂ Cosmina Andrea, Vlăduțescu Tamara Daniela, GURAN Anamaria, RADU Lucian, MITROI Cristina, CUGEREAN Marius Ioan, HĂDĂRUGĂ Daniel Ioan, RIVIȘ Adrian, HĂDĂRUGĂ Nicoleta Gabriela

Applications of mild temperatures on a natural lipid model

RINOVETZ Alexandru, BUJANCĂ Gabriel, MIȘCĂ Corina Dana, VELCIOV Ariana, DAVID Ioan, RĂDOI Bogdan, TRĂȘCĂ Teodor-Ioan

**Per- & Polyfluoroalkyl Substances (PFAS) in Soil, Water,
Animal Feed and Food**

NAGEL Thomas G.^{1*}, MECHLER Melanie¹, ZOSKA Melanie¹, BREUER Jörn¹

¹*The Center for Agricultural Technology Augustenberg (LTZ), Nesslerstrasse 25, 76227 Karlsruhe, Germany*

E-mail: thomas.nagel@ltz.bwl.de(*)

Due to findings of short-chain perfluoroalkyl substances (PFAS) in ground water in the area of Rastatt/Baden-Baden (Germany) by a local water supplier the agricultural and environmental authorities of Baden-Württemberg state started a research project to find the source of contamination and solutions/strategies for the agricultural practice in this area. The possible source of contamination seems to be waste materials from paper industry which were illegally added to organic fertilizers. Nowadays soil as well as ground and surface water are widely contaminated in this area with PFAS. To ensure food and animal feed safety a monitoring program was initiated. In this program samples of prospective food and feed products are taken and analyzed a few days before harvest to decide whether they are safe for human respectively animal consumption or have to be destroyed

Keywords: PFAS, PFC, PFOA, PFOS, soil, ground water, food, feed, maize, LC-MS/MS, Rastatt, Baden-Baden

Influence of the added fat type on some nutritional characteristics of an innovative seafood pâté

DUMBRAVĂ Delia-Gabriela^{1*}, HĂDĂRUGĂ Nicoleta Gabriela¹, DOGARU Diana Veronica¹, RABA Diana-Nicoleta¹, POPA Viorica-Mirela¹, MIȘCĂ Corina Dana¹, DRUGĂ Mărioara¹, MOLDOVAN Camelia^{1*}

¹*Faculty of Food Engineering, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara (ROMANIA)*

E-mails: delia_dumbrava@yahoo.com (*), kmimol@gmail.com (*)

The purpose of the present paper was to obtain some innovative seafood pâté assortments and to determine comparatively the total polyphenol content (Folin–Ciocâlteu method), antioxidant activity (CUPRAC assay), nutritional and energy value of those. Were achieved three assortments of seafood pâté using mussels and calamari: first with cow butter as fat, second with unrefined sunflower oil and third with coconut oil. The highest concentration of total polyphenols was found in the seafood pâté with unrefined sunflower oil (5.08 ± 0.20 mg gallic acid/g) and the variant with cow butter had the lowest content (2.24 ± 0.15 mg gallic acid/g). Antioxidant activity also had the highest value in the case of seafood pâté with unrefined sunflower oil (17.26 ± 0.12 mg Trolox/g), and the smallest in the case of cow butter variant (15.35 ± 0.09 mg Trolox/g). The product with cow butter was the poorest in kcal (262 kcal/100g) and the richest in protein (9.78 g/100g). Assortments with sunflower oil and coconut oil had very close energetic values (299.11 kcal/100g, respectively 300.88 kcal/100g) and the same protein, total carbohydrates and total lipids content. Saturated fats were found in the smallest amount in the seafood pâté with sunflower oil (2.44 g/100g) and in the largest one, in the pâté with coconut oil (18.83 g/100g). For the product with cow butter the cholesterol content was over 3 times higher (67.0 mg/100g) than in the other two assortments (20.00 mg/100g).

Keywords: seafood pâté, antioxidant activity, polyphenols, nutritional value.

Acknowledgments:

PNCI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Microencapsulation of biologically active compounds from cornelian cherry fruits with whey proteins isolate and accacia gum

ENACHE Iuliana-Maria^{1*}, STĂNCIUC Nicoleta¹, VIZIREANU Camelia¹

¹*“Dunarea de Jos” University of Galati - Faculty of Food Science and Engineering, Str Domnească 111, 800201 Galati, Romania*

E-mails: enacheiulianamaria@gmail.com (*)

Cornelian cherry (*Cornus mas*) is a very important source of ascorbic acid, minerals, vitamins, fatty acids, carotenoids, iridoids, anthocyanins and flavonoids. Fresh or processed, this fruits can be used in various fields, such as human health and food industry.

The aim of this study was to obtain two functional ingredients by microencapsulation anthocyanins and flavonoids extracted from cornelian cherry fruits with whey proteins isolate and acacia gum. The powders obtained were characterized in terms of encapsulation efficiency and phytochemicals content and can be considered valuable candidates for the successful replacement of artificial pigments from different foods, from the perspective of developing value-added food products.

Keywords: cornelian cherry, biologically active compounds, accacia gum, whey proteins isolate, functional products

Rheological and Nutritional Properties of Sugar-Free Roulade with Pumpkin Pulp

IOAN Monica¹, MOCANU Gabriel-Dănuț¹, ANDRONOIU Georgeta Doina¹, DIMA (GHEONEA) Ionica¹, PĂTRAȘCU Livia², MIHALCEA Liliana^{1*}

¹*Integrated Center for Research, Expertise and Technological Transfer in Food Industry, Faculty of Food Science and Engineering Faculty, Dunarea de Jos University of Galati, Romania*

²*Integrated Center for Research, Expertise and Technological Transfer in Food Industry, Cross-border Faculty, Dunarea de Jos University of Galati, Domneasca str.47, Romania.*

E-mails: Liliana.Gitin@ugal.ro (*)

New product formulation that provides nutritional value and beneficial effects in health it's a challenge for the food industry specialists. This paper presents a new sugar-free sweet product formulation on the basis of oatmeal and wheat flours and pumpkin pulp. Oatmeal flour is a major component of infant solid foods due to lack of allergen reaction, good flavor compatibility, high nutritive value, excellent shelf life and stability. The rheological behavior of tested dough's during low amplitude oscillatory measurements showed a rather good resistance to the applied strain with the oat flour based one presenting an earlier G'/G'' intersection point in comparison to the wheat flour based one. During oscillatory temperature ramp test, both samples presented a rather similar behavior. Texture Profile Analysis was used to measure the textural parameters of both fresh and baked dough's. Firmness, adhesiveness, resilience, gumminess and chewiness were determined from the stress-displacement curve. Textural analysis revealed firmer texture for dough's with added oatmeal flour, before and after baking as well. Oscillatory tests indicated the low amplitude that revealed a stiffer structure and a high resistance to the applied strain for the wheat flour dough. After macromolecules denaturation and gel formation the G' values for the oatmeal based sample was significantly lower in comparison to wheat flour dough. Also during the same test it was observed a higher dough extension (gap increase) in the gelatinization temperature range. The antioxidant activity and the total carotenoids content indicated that the combination between wheat flour and pumpkin pulp it is a good approach for the new sweet product formulation.

Keywords: gluten free flours, pumpkin, rheological and textural properties

Studies regarding the use of unconventional ingredients to obtain halva with high nutritional value and improved sensory properties

CATARGIU Andrei Dorel¹, BORDEAN Despina-Maria^{1*}, RAICAN Dan-Dorin¹, GHIGULESCU Loredana Alexandra¹, POIANA Mariana-Atena¹

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, 119 Calea Aradului, 300645, Timisoara, Romania.

E-mails: andreidorel@yahoo.com despina.bordean@gmail.com (*); atenapoiana@yahoo.com

Sunflower halva is a widespread confectionery product specific to Eastern European countries. The purpose of this study was to identify and analyze new ingredients such as pumpkin seeds, soybeans, pumpkin pulp and apples processing waste in order to obtain new value-added halva formulas. In order to stimulate the interest for nutraceutical value of the halva, this study was designed to investigate the moisture and micro and macroelement content of some new proposed halva ingredients with the desire to optimise the halva product formulation. Based on the moisture analysis it was shown that pumpkin pulp and apple wastes can be used separately or mixed to optimize halva. Soybeans present similar dehydration curves with sunflower seeds which recommends them to be used idependently or mixed for halva production.

Keywords: biominerals, innovative product, pumpkin, soybeans, apple waste

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project:“Ensuring excellence in R&D within USAMVBT” from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Nutraceutical quality evaluation of tomatoes, bell peppers and their processing wastes

**Andreea ILAS (CADARIU)^{1*}, NEGREA Monica¹, COCAN Ileana¹, ALEXA Ersilia¹,
MOIGRADEAN Diana¹, POIANA Mariana-Atena¹**

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, 119 Calea Aradului, 300645, Timisoara, Romania.

E-mails: andreeailas@yahoo.com, negrea_monica2000@yahoo.com (*), atenapoiana@yahoo.com

In most developed countries, an increased attention is paid to the recovery of vegetable wastes and their uses as a valuable source of bioactive compounds in various food applications. This issue is also related with the fight against environmental pollution. The aim of this research was to characterize in terms of nutraceutical properties fresh cherry and large tomatoes, red and yellow bell peppers, their processing by-products as well as to evaluate the impact of conditioning by convective drying at 60°C the resulted wastes. Thus, moisture content, ash and total phenolic content were evaluated. Additionally, the lycopene content was assessed for fresh tomatoes and their processing by-products, raw and in response to drying. As regards the total phenolic content in tomatoes and red and yellow bell pepper, there were recorded values in the range 10.33-23.89 mg GAE/g d.s. Tomatoes and bell pepper by-products show a significant level of phenolic compounds, with 36-43% lower than the values of corresponding vegetables. In addition, cherry and large tomatoes samples have a high content of lycopene. Also, their processing by-products showed significant levels of lycopene, with 16, respectively 21% lower than the values of fresh samples. The losses in investigated bioactive compounds recorded in response to conditioning by drying of tomatoes and bell pepper processing by-products were below 27% reported to the initial values. Our data highlighted that the processing wastes of tomatoes and bell pepper represent a valuable source of bioactive compounds that can be used as value-added ingredients in various food applications.

Keywords: tomatoes, bell pepper, processing wastes, bioactive compounds, nutraceutical value

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Quality Characteristics of Fresh and Reconstituted Probiotic Potatoes Purée with Sea Buckthorn Supercritical CO₂ Extract

**MOCANU Gabriel – Dănuț¹, NISTOR Oana – Viorela¹, ANDRONOIU Doina Georgeta¹,
CONSTANTIN Oana Emilia¹, BARBU Viorica Vasilica¹, DIMA (GHEONEA) Ionica¹, PĂTRAȘCU
Livia², CECLU Liliana³, MIHALCEA Liliana^{1*}, BOTEZ Elisabeta¹**

¹"Dunarea de Jos., University of Galati, Faculty of Food Science and Engineering, 111 Domneasca Street, 800201, Galati, Romania

²"Dunarea de Jos., University of Galati, Cross – Border Faculty of Humanities, Economics and Engineering, 47 Domneasca Street, 800008, Galati, Romania

³"B.P. Hasdeu., Cahul State University, Faculty of Economics, Engineering and Applied Sciences, 1 Piata Independentei Street, 3909, Cahul, Republic of Moldova

E-mails: Danut.Mocanu@ugal.ro, Oana.Nistor@ugal.ro, Georgeta.Andronoiu@ugal.ro,
Emilia.Constantin@ugal.ro, Vasilica.Barbu@ugal.ro, Ionica.Dima@ugal.ro, livia.patrascu@ugal.ro,
ulik003@yahoo.com, Liliana.Gitin@ugal.ro, Elisabeta.Botez@ugal.ro, Liliana.Gitin@ugal.ro (*)

The aim of this study was to obtain a non-dairy solid probiotic product based on potato (*Solanum tuberosum* L.) puree and sea buckthorn oil obtained by supercritical carbon dioxide extraction. The potatoes purée was used as fermentation substrate for the potentially probiotic *Lactobacillus delbrueckii* Lb 12 strain. This work investigated the rheological behaviour and texture of fresh and reconstituted vegetable purée using flow, thixotropy, oscillatory rheological measurement and Texture Profile Analysis. All potatoes purée samples had a pseudoplastic behaviour characterized by two models: Herschel – Bulkley and Power law. Other investigation was the purées microstructure by laser confocal microscopy. Rheological characteristics of fresh potatoes purée varied between 34.78 – 437.7 Pa, in the case of shear stress and 348 – 4377 Pa·s, in the case of aparent viscosity. All the samples of potatoes purée showed a higher values of storage modulus (G') compared to the loss modulus (G'') in the entire studied frequency (ω) (0.1 – 100 Hz). Texture measurements revealed lower firmness of reconstituted samples comparing with the fresh ones. The results of confocal microscopy are in accordance with the rheological and texture findings showing a weakening of the puree structure. The results showed differences between the structure of fresh potatoes purée compared with the reconstituted samples. Colour parameters have not changed significantly. Probiotic potential was analyzed on the basis of viability of *Lactobacillus delbrueckii* Lb 12 during 28 days of cold storage. After 14 days at 4°C this new possible functional food contains a viable cell concentration of 8.0 log CFU/g. The antioxidant activity of fresh potatoes purée was 0.07 ± 0.0043 μ g Trolox/mL of sample. The total carotenoids content 17.749 ± 0.418 μ g/g of sample revealed that potatoes purée with sea buckthorn supercritical CO₂ extract is a good approach for non-dairy probiotic product with health benefits.

Keywords: Potatoes purée, *Lactobacillus delbrueckii*, baby food, probiotic non – dairy product, rheological properties, microstructure, colour

Acknowledgements

This work was technically supported by the 2010 - 2014 RESPIA project (695/09.04.2010, SMIS code 11377), project co-financed by the Regional Operational Programme 2007–2013 and implemented by the Faculty of Food Science and Engineering, Dunarea de Jos University of Galati.

This work was supported by the project "EXPERT", financed by the Romanian Ministry of Research and Innovation, Contract no. 14PFE/17.10.2018.

The authors are grateful for the technical support offered by the Grant POSCCE ID 1815, cod SMIS 48745 (www.moras.ugal.ro).

Could probiotics be useful in patients with functional dyspepsia?

IONITA Mihai¹, BASA Norina¹

¹*First Department of Internal Medicine, University of Medicine and Pharmacy, "V Babes", Timisoara, Romania*

E-mails: ionitamihai79@yahoo.com (*)

Functional dyspepsia (FD) and other gastro-intestinal (GI) functional conditions share a particular configuration of GI microbiota. This is why the aim of study was to investigate probiotics and their influence upon symptoms associated to FD. 34 patients (29 females, 5 males), age ranging from 18 to 59 years, with confirmed FD (Rome IV) joined this prospective open label nonrandomized study consisting in assessment of FD symptoms: nausea, bloating and epigastric burning, as well as life quality, before and after 4 weeks of treatment with the same over the counter mixture of beneficial microorganisms. Results Study population was characterized by high incidence of female gender with urban location ($p < 0,0001$) and clinical particularities with mood disorders, alcohol and smoking issues, as well as frequent alimentary allergies. Response to probiotics was satisfactory, all complaints being improved, some of them in significant range (epigastric pyrosis, bloating and life quality, $p < 0,05$), by opposite to others such as nausea were $p = 0,07$. In conclusion, participants with FD displayed demographic and clinical particularities, satisfactory results being obtained as response to probiotics. All studied symptoms were alleviated but only bloating, epigastric distress and life quality significantly improved.

Keywords: probiotics, GI microbiota, functional dyspepsia

Synbiotics in irritable bowel syndrome: is this the good choice?

IONITA Mihai¹, MUNTEAN Mihaela¹

¹*First Department of Internal Medicine, University of Medicine and Pharmacy, "V Babes", Timisoara, Romania*

E-mails: ionitamihai79@yahoo.com (*)

Irritable bowel syndrome (IBS), a functional condition with obscure underlying pathways seems to be linked to gut microbiota imbalance, which consecutively introduced new therapeutical options. Aim of the study was to assess whether synbiotics work in alleviating complaints in IBS patients. 30 patients (Men=8. Women=22), age range 31-59 years, with diarrhea or constipation forms of IBS, equal divided in two groups received synbiotics 4 weeks. They undertook a detailed clinical examination, laboratory tests, and gastro-intestinal exams (ultrasound and endoscopies). Life quality, abdominal pain, bloating and bowel habit disturbances were assessed prior and after finishing the course of treatment. Results Synbiotics significantly influenced bloating ($p=0,001$ in C-IBS, and $p=0,006$ in D-IBS) and bowel habit disorders ($p=0,03$ in C-IBS and $p=0,04$ in D-IBS). Only C-IBS group reached a satisfactory alleviation of pain score, which diminished significantly from $3,40 \pm 1,40$ to $2,13 \pm 0,99$, $p=0,008$. Life quality didn't significantly improve after receiving synbiotics alone in both C-IBS: $p=0,09$ and D-IBS: $p=0,19$. Conclusions Satisfactory mitigation of bloating and bowel habit disturbances was observed in both IBS forms, while abdominal pain was alleviated only in patients with C-IBS, but life quality didn't seem to be significantly influenced by synbiotics alone in none of the studied groups.

Keywords: gut microbiota, synbiotics, irritable bowel syndrome

Assessing the bioactive compounds and antioxidant activity of blueberry and their processing byproducts

**METZNER Cristina-Ramona^{1*}, LUPITU Andreea Ioana², MOISA Cristian²,
COPOLOVICI Dana-Maria², COPOLOVICI Lucian Octav², POP Georgeta³,
POIANA Mariana-Atena¹**

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania.

²"Aurel Vlaicu" University of Arad, Faculty of Food Engineering, Tourism and Environmental Protection, Elena Dragoi Street no. 2, Arad, 310330, Romania.

³Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Agriculture, Calea Aradului 119, Timisoara, 300645, Romania.

E-mails: cristinau222@yahoo.com; atenapoiana@yahoo.com (*)

The purpose of this study is to assess the antioxidant characteristics in terms of total phenolic content, antioxidant activity and phenolic compounds profile of fresh blueberry (*Vaccinium myrtillus* L.) and their processing fractions, juice and byproducts (husks and seeds). In this regard, blueberries from spontaneous flora were collected from two different site of Romania: Arieseni (Alba County) and Paltinis (Sibiu County). The impact of the origin area on the studied features was also tracked. Moreover, the effect of raw byproduct conditioning by convective drying on the antioxidant properties was evaluated. Our results showed that the total phenolic content was consistent with antioxidant activity, expressed as the stable radical 1,1-diphenyl-2-picrylhydrazyl scavenging capacity in the presence of antioxidants (DPPH). As a result, there were no significant differences in the investigated properties by the origin place. However, there is a slight decrease in the antioxidant potential in fruits from the region with a higher precipitation regime and lower temperatures, antioxidant properties being slightly higher in the fruits and fractions corresponding to the Arieseni site than those from the Paltinis site. The raw byproducts conditioning by convective drying at a moderate temperature of 60°C for 12 hours resulted in a loss of about 15-29% of the antioxidant properties. The recorded data are useful in selecting blueberries to obtain valuable bioactive compounds for designing of value-added food products. Thus, byproducts obtained from blueberries processing can be a stable source for the recovery of high-quality polyphenolic compounds.

Keywords: blueberry, processing byproducts, antioxidant properties, polyphenolic compounds profile, DPPH radical scavenging activity

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

The Fipronil Egg Scandal – New Challenges in Preventing Carry-Over from Agricultural Products to Food

BAUER Johannes Moritz^{1*}, NAGEL Thomas G.¹

¹*The Center for Agricultural Technology Augustenberg (LTZ), Department 21 - Organic Analyses, Nesslerstrasse 25, 76227 Karlsruhe, Germany*

E-mails: moritz.bauer@ltz.bwl.de (*)

The compound fipronil is effective against different pathogens and ectoparasites like the poultry red mite [1]. Its application on animals destined for consumption is not allowed in the European Union (EU). In 2017 contaminated eggs were found in many EU member states. In context of preventive consumer protection a method for the analysis of fipronil and its metabolite fipronil sulfone in liquid agricultural samples was developed and validated for the control of applications. Furthermore a modified variation of method VDLUFA methods book VII 3.3.7.1 [2] was successfully validated for the analysis of solid agricultural samples like feed and other special commodities.

Keywords: fipronil, pesticide analysis, special commodities

References

1. Flochlay A. S., Thomas E., Sparagano O., *Parasites & Vectors* **2017**, 10:357.
2. *VDLUFA methods book VII, 4th Edition*, VDLUFA Verlag, Darmstadt (Germany), 2011.

New ingredient-Sericin influence on rheological and biscuit's sensory properties

DINU Monica Gabriela^{1*}, MĂTRAN Irina Mihaela²

^{1*} Viilor Economic College, 38th Viilor Street, 050151, Bucharest, Romania,

²Iuliu Hatieganu University of Medicine and Pharmacy, Victor Babes 8, 40012, Cluj – Napoca, Romania,

E-mails: gabi_dinu2005@yahoo.com (*), irina.matran@yahoo.com

The processing of silk fibers produced by *Bombyx mori* (silkworm) entails large amounts of residue high in sericin – a glycoprotein that protects the silk fibers from the destructive environmental and mechanical factors.

The aim of this study was to determine the effect of sericin on the rheological properties of dough and on the sensory properties of biscuits.

White flour, with 0.65% ash, was analyzed through Alveographic curves and by Mixograph method based on Chopin protocol, in order to determinate rheological properties. Biscuit samples were prepared based on the recipe for 100 kg flour and baking samples were made for controls (M), for 0.5% sericin (P1) and for 3ppm ascorbic acid (P3) added.

The results showed that sericin added in flour improves the rheological properties and led to better shaped and well contoured biscuits.

Keywords: Sericin, flour, rheology, biscuit, sensorial analyze

Increasing the Shelf Life of Alimentary Poultry Fat by β -Carotene and Ascorbic Acid Addition

POP Flavia^{1*}, VOŞGAN Zorica¹

¹*Technical University of Cluj-Napoca, North University Center of Baia Mare, Chemistry and Biology Department, 76A Victoriei Str., 430122, Baia Mare, Romania*

E-mails: flavia_maries@yahoo.com (*)

The shelf life of poultry fat was enhanced by adding natural and synthetic antioxidants β -carotene and ascorbic acid at 0.1 and 0.5% level. For monitoring the deterioration during storage and evaluation of stability, methods as peroxide index, iodine index, acid value, refractive index, fatty acid composition and microscopic examination were used. Chemical parameters were significantly influenced by the type of fat and storage time, except refractive index value. The total content of polyunsaturated (PUFA) and monounsaturated (MUFA) fatty acids decreased significantly ($p < 0.05$) after 210 days of storage at $+2^{\circ}\text{C}$ in samples without antioxidants, while the total fatty acid content was not significantly affected by storage time. Peroxide index values and acidity index in poultry fat with added antioxidants were significantly correlated with the storage time ($r = 0.91$ and $r = 0.93$, respectively; $p < 0.01$). The highest peroxide index value was observed in the control samples, followed by 0.1% ascorbic acid and 0.1% β -carotene additivated fat. Antioxidant application had a statistically significant ($p < 0.01$) effect on the chemical parameters of the poultry fat samples. With respect to storage time, the oxidative rancidity of the fat samples increased during the storage period. β -Carotene and ascorbic acid significantly inhibited lipid oxidation in poultry fat as indicated by peroxide value. Microscopic examination may constitute a new method for assessing the intensity of the oxidation process and appreciation of animal fats quality. Lipid oxidation in poultry fat varies with antioxidant concentration and the length of storage, a higher antioxidant concentration had a greater retardation effect on rancidity during storage time.

Keywords: Poultry fat, antioxidants, oxidation, fatty acid composition, peroxide index

Linear relations of the physico-chemical parameters for some natural green plant juices

**COZMA Antoanela¹, VELCIOV Ariana¹, CREȚESCU Iuliana², POPESCU Sofia¹,
ALDA Liana¹, LALESCU Dacian¹, PETCU Mihaela^{1*}**

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania*

²*"Victor Babes" University of Medicine and Pharmacy from Timisoara, Romania*

E-mails: mihaela_petcu@usab-tm.ro (*)

Green herbal juices have an important status in the modern diet due to their exceptional nutritional, functional qualities. Due to their biological and therapeutic values, natural plant juices are foods with substantial benefits for the health and body balance. Juice therapy is one of the ways to improve the body's health, both our physical, mental and emotional state. Natural juice of green plants obtained from apples (*Malus domestica*) cucumber (*Cucumis Sativus*) spinach (*Spinacia oleracea*) and parsley (*Petroselinum crispum*) offers the nutritional benefits of components in a concentrated form easily absorbed by the human body, in a very short time. The objective of this study was to evaluate and compare some physicochemical parameters as pH, electrical conductivity, dynamic viscosity, refractive index, superficial tension and density in case of the green juice samples obtained from apples, spinach, cucumbers, parsley and lime each taken separated and both in blends. All the data was statistically analyzed using Statistica10. The results showed that there is statistically correlation between the physicochemical characteristics in case of analyzed types of juices samples. Based on these linear correlations we determined the linear dependency between the above biophysical parameters.

Keywords: physicochemical parameters, green plant juices, linear correlations

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Cow's milk as mineralizing food

**IVANA Ana-Maria¹, BORDEAN Despina Maria¹, ALDA Liana Maria¹, RADA Maria²,
ALDA Simion¹, RADU Lucian¹, ADAMESCU Mihai^{1*}**

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania*

²*University of Medicine and Pharmacy "Victor Babes" Timisoara*

E-mails: adamescumihai94@gmail.com (*)

This study aims to determine the mineral profile of cow's milk from domestic producers and assessing its mineral input. The analysis results of the pasteurized milk assortments with a 3.5% fat content reveal that this food contains high amounts of K, Ca, Na, Mg, appreciable contents of: Zn, Fe, Cu and very low contents of Mn, Ni, Cr and Co. The distribution of mineral elements is uneven, depending on the nature of the mineral and type of milk. The average concentrations of essential minerals vary within the range 0.005 mg/L (Co) - 1434 mg/L (K). The concentration of the analyzed essential minerals shows the following decreasing trend: K > Ca > Na > Mg >> Zn > Fe > Cu > Mn \cong Ni \cong Cr >> Co.

No significant amounts of Pb and Cd have been identified, the concentrations of these heavy metals being below the detection limits but also below the maximum permitted toxicity limits: <0,015 mg/L (Pb), respectively <0,002 mg/L (Cd).

The results obtained in assessing the mineral intake reveal that a daily consumption of 500 ml of milk covers a significant percentage of Ca, Zn, Mg, K: 65.80% of the required Ca, for men and women; 21.25% of Mg, for women, and 17.00% of Mg, for men; 20.94% of Zn requirements for women and 15.23% of Zn requirements for men; 16.11% of the K, for men and women.

Therefore, it can be argued that cow's milk can be considered as a mineralizing food, especially from the point of view of Ca, Zn, Mg and K contents.

Keywords: essential elements, cow's milk, mineral intake

Acknowledgments:

PNCI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Possibilities of use and characterization of purple potatoes for creams and dessert fillings

**MOLDOVAN Camelia¹, OPRINESCU Claudia¹, POPA Mirela^{1*}, RABA Diana¹,
DRUGĂ Mărioara¹, BOROZAN Aurica¹, DUMBRAVĂ Delia¹**

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania

E-mails: mirevio_gh@yahoo.com (*)

The goal of this paper was to find some possibilities to use purple potatoes as desert, and to compare of some parameters after termic treatment. Thus, we prepare a cream and a filling mix for cake. We were optimized the receipt and then we analysed the purple potatoes cream and mix by sensorial (with the scoring scale of 1-5) and physico-chemical point of view. The senzorial parameters (appearance, smell, colour, taste) were highly appreciated. The acidity of these products was situated in range of 1.52-1.68 acidity degree. Antioxidant capacity of potatoes cream and desert mix was 402.005, respectively 463.11 mg trolox/100 g. Total polyphenols found in our products were 1.217 – 1.186 mg/g sample. The highest content of antocyanins was in the purple potatoes cream. All the studied parameters recorded lower values for thermally treated samples than for crude ones (thermally untreated), confirming once again that the high temperatures cause the destruction of some antioxidant principles

Keywords: purple potatoes, cream, mix, acidity, antioxidant activity, polyphenols, antocyanins

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

The amygdalin content in kernel oils of several *Rosacea* Family cultivars grown in Romania

**POPA Viorica-Mirela¹, SOCACIU Carmen¹, RANGA Florica¹, FETEA Florinela¹,
RABA Diana Nicoleta¹, MOLDOVAN Camelia¹, DUMBRAVĂ Delia-Gabriela¹**

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania*

E-mails: mirevio_gh@yahoo.com (*)

In this study was investigated the amygdalin content of some kernel oils: apricot (*Prunus armeniaca* L.), peach (*Prunus persica* L.), plum (*Prunus domestica* L.) and kernel plums separated by-product resulted from plums processing for natural distilled romanian spirits. The oil samples were extracted using the Soxhlet apparatus from fruit kernels *Rosaceae* Family, fruits harvested from several areas of Romania: Banat, Muntenia, Maramures, Transilvania, Oltenia and Moldova. Determinations were performed by HPLC on a C18 Supelcosil 250 x 4.5 x 5µm column with methanol/water (15/85) as the mobile phase at (1 ml/min) flow rate and detection at the length wavelength of 215 nm. The experimental results showed the linearity range of 0 - 0.6 mg/ml amygdaline with a correlation coefficient of 0.9949. Retention time specific for amygdalin is $t_R = 12.45$ min. The amygdalin content detected in the oil samples analyzed ranged from 51.61-398.45 µg / ml of oil.

Keywords: amygdaline, apricot, peach, plum oils, extraction Soxhlet, HPLC

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

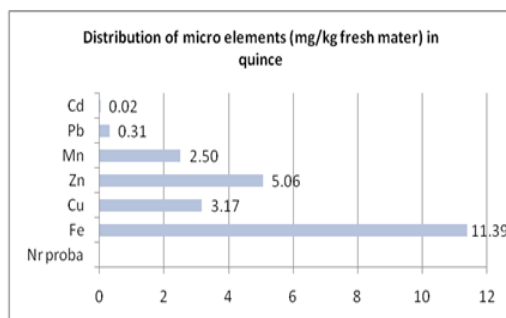
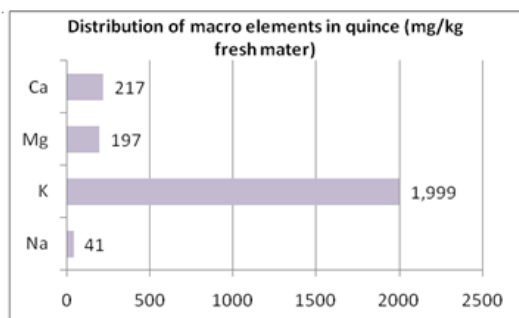
Determination of the mineral profile of some bio-accessible elements of the fruit (Quince)

SEMCICI Cristian Andrei¹, ALDA Liana¹, RINOVETZ Alexandru¹, RADU Lucian¹,
DAVID Ioan^{1*}, ȘTEF Ducu-Sandu¹, BUJANCĂ Gabriel¹

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania

E-mails: neda_university@yahoo.com (*)

The aim of this study is to enrich the knowledge of the nutritional and toxicological mineral composition of some domestic fruits such as quince (*Cydonia oblonga*) by determining the concentrations of both useful and toxic macro and micro-elements. Among the macroelements, the highest concentration was found for potassium (≈ 2000 ppm), well above the other minerals, followed by calcium and magnesium in almost equal concentrations (≈ 200 ppm). Sodium was found in low concentrations. Among the trace elements, the average value, is highlighted Fe (≈ 12 ppm), followed by Zn (≈ 5 ppm), Cu (≈ 3 ppm), Mn (≈ 2.5 ppm). Toxic heavy metals Pb and Cd have been identified in small quantities for locations without intensive industrial activities and supermarkets.



In the Oțelu Roșu and Rusca Montană areas, areas with mining and metallurgical industrial activities, significant amounts of Pb and Cd have been identified in the native quinces close to the maximum admissible limit. Also in these locations, the Cu content in native quinces reaches higher concentrations, which may sometimes exceed the maximum admissible limit. The analysis of metals by atomic absorption spectrometry and atomic absorption is a suitable method for analyzing the essential and toxic microelements of fruits, such as quince. The results obtained with respect to the concentrations are consistent with the literature data. Due to possible accumulations of toxic metals, it is imperative to control them in order to prevent possible harmful effects

Keywords: quince, composition, macroelements, microelements, FAAS

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

Evaluation of the similarity/dissimilarity of poultry lipid profiles by Fourier transform infrared spectroscopy

**CHIRILĂ Cosmina Andrea¹, VLĂDUȚESCU Tamara Daniela¹, GURAN Anamaria¹,
RADU Lucian¹, MITROI Cristina Liliana¹, CUGEREAN Marius Ioan¹, HĂDĂRUGĂ Daniel
Ioan^{2*}, HĂDĂRUGĂ Nicoleta Gabriela^{1*}, RIVIȘ Adrian¹**

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*

²*Polytechnic University of Timișoara, Timișoara, Romania*

E-mails: nico_hadaruga@yahoo.com(*)

Poultry are important source of saturated and especially unsaturated fatty acid glycerides. Unsaturated fatty acids in poultry have relative concentrations higher than 60%, which includes omega-3 fatty acids. Among them, oleic and linoleic acids are the most concentrated, but the omega-3 α -linolenic acid can also be identified in poultry lipids [1,2]. However, various concentrations of such polyunsaturated fatty acids can be identified according to the diet [2,3].

The determination fatty acid profile of poultry lipids needs complex and time-consuming methods such as derivatization and gas chromatographic analysis coupled with specific detectors. The goal of the study was to develop a rapid and non-destructive method for classifying poultry lipids based on attenuated total reflectance - Fourier transform infrared spectroscopy (ATR-FTIR) [4,5]. Lipid fractions from various parts of chicken, turkey, and duck were separated by semi-continuous Soxhlet extraction. The lipid fractions were analyzed by ATR-FTIR in the range of 4000-400 cm^{-1} and the main IR bands (wavenumber and intensity) were selected for discrimination between samples. The Principal Component Analysis (PCA) multivariate approach was applied for evaluating the similarity/dissimilarity of lipid fractions. Chicken lipid fractions were separately grouped against the other poultry lipid fractions according to IR bands of C-H (from CH_3 and CH_2 groups) symmetrical and asymmetrical stretch in the range of 2850-3010 cm^{-1} , ν (C=O) (of ester functional groups) stretching vibration at $\sim 1744 \text{ cm}^{-1}$, $\delta^{as}(\text{CH}_2)$ bending vibration from methylene groups at $\sim 1463 \text{ cm}^{-1}$, γ (CH_2) of lipids at $\sim 1156 \text{ cm}^{-1}$, or ν^s (C-O-C) of triglycerides at $\sim 1098 \text{ cm}^{-1}$.

The ATR-FTIR-PCA coupled technique can rapidly provide valuable information related to the source of poultry lipids (and even the level of degradation) used in food industry. However, a comprehensive database consisting of representative FTIR data are needed for further calibration and validation of such approach.

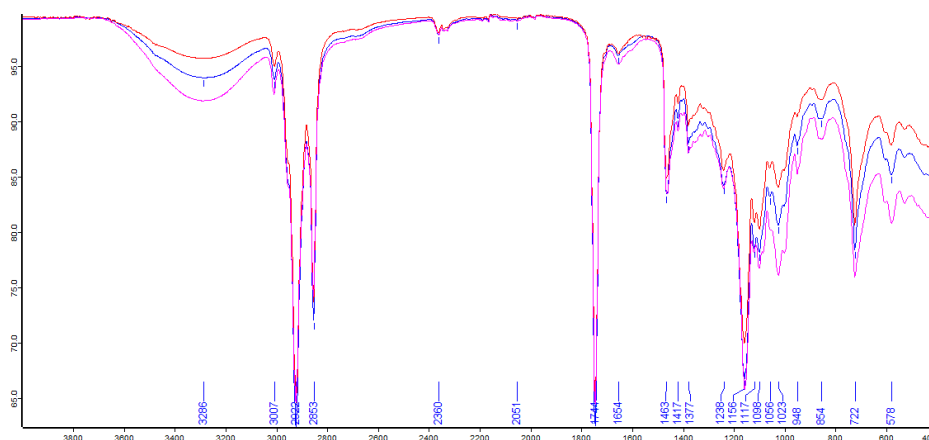


Figure 1. Representative FTIR spectra for chicken, turkey and duck lipid fractions

Keywords: lipid profiles, Fourier transform infrared spectroscopy, poultry lipids

Acknowledgments:

PNC DI III 2015-2020 – ID 368 institutional development project: “Ensuring excellence in R&D within USAMVBT” from the institutional performance subprogram 1.2, development of the R&D national system program 1.

References

- [1]. Givens, D.I.; Gibbs, R.A.; Rymer, C.; Brown, R.H., Effect of intensive vs. free range production on the fat and fatty acid composition of whole birds and edible portions of retail chickens in the UK, *Food Chemistry* 2011, 127, 1549-1554
- [2]. Kartikasari, L.R.; Hughes, R.J.; Geier, M.S.; Makrides, M.; Gibson, R.A., Dietary alpha-linolenic acid enhances omega-3 long chain polyunsaturated fatty acid levels in chicken tissues, *Prostaglandins, Leukotrienes and Essential Fatty Acids* 2012, 87, 103-109
- [3]. Kalakuntla, S.; Nagireddy, N.K.; Panda, A.K.; Jatoth, N.; Thirunahari, R.; Vangoor, R.R., Effect of dietary incorporation of n-3 polyunsaturated fatty acids rich oil sources on fatty acid profile, keeping quality and sensory attributes of broiler chicken meat, *Animal Nutrition* 2017, 3, 386-391
- [4]. Sim, S.F.; Ting, W., An automated approach for analysis of Fourier Transform Infrared (FTIR) spectra of edible oils, *Talanta* 2012, 88, 537-543
- [5]. Yang, H.; Irudayaraj, J.; Paradkar, M.M., Discriminant analysis of edible oils and fats by FTIR, FT-NIR and FT-Raman spectroscopy, *Food Chemistry* 2005, 93, 25-32
- [6]. van de Voort, F.R., Fourier transform infrared spectroscopy applied to food analysis, *Food Research International* 1992, 25, 397-403

Applications of mild temperatures on a natural lipid model

**RINOVETZ Alexandru¹, BUJANCĂ Gabriel¹, MIȘCĂ Corina Dana¹, VELCIOV Ariana¹,
DAVID Ioan¹, RĂDOI Bogdan¹, TRĂȘCĂ Teodor-Ioan¹**

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*

E-mails: c9misca@yahoo.com (*)

The new globalization context resulted in food technologies field the development of some ***structurally and functionally modified*** products, with real benefits for health consumer, beign the result of accepting the idea that: the diet has determiat role for prevention and therapy of some diseases. Lipids ***modification techniques*** (simple mixing, hydrogenation, interesterification, ***fractionation***) are not a news, they beign continuously optimized through scientific understanding of physico-chemical processes and the new equipments and technologies development. In generally the „***mild temeprature***” describe the *fractional crystallisation* and *mechanical separation processes* of ***triglycerides*** from a lipid mixture. The process is direct influenced by different melting and solidification ranges. *Stricto sensu*, *fractionation* is the process through the natural and also modified oils and fats are separated into ***solid/liquid (olein/stearin)*** fractions, different from the point of view of their composition, with the new technological and nutritional functions, lipids substitutes.

Keywords: mild temperature, fractionation, fractional crystallisation, modified lipids, olein, staerin.

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project:“Ensuring excellence in R&D within USAMVBT” from the institutional performance subprogram 1.2, development of the R&D national system program 1.



romania2019.eu
Președinția României la Consiliul Uniunii Europene

BOOK OF ABSTRACT

**The 8th International Conference on Food Chemistry,
Engineering & Technology**



Faculty of Food Engineering

Timișoara, 2019

INDEX

Flavonoid nanotechnology in the protection of human physiology

Athanasios Salifoglou

Cyclodextrin – edible oil complexes: Synthesis and characterization

Daniel I. Hădărugă, Cosmina A. Chirilă, Marius D. Simandi, Raymond N. Szakal, Cornelia Muntean, Geza N. Bandur, Nicoleta G. Hădărugă

Evaluation of β -cyclodextrin complexation of some autochthonous fish oils by thermal methods

Raymond N. Szakal, Cosmina A. Chirilă, Marius D. Simandi, Cristina Mitroi, Iulia M. Gălan, Christine A. Lucan, Daniel I. Hădărugă, Nicoleta G. Hădărugă

Evaluation of the fatty acid profile of some autochthonous common beans lipid fractions

Marius D. Simandi, Cristina Mitroi, Simelda E. Zippenfening, Tamara D. Vlăduțescu, Anamaria Guran, Claudia Izabela Oprinescu, Marius I. Cugorean, Lucian Radu, Daniel I. Hădărugă, Nicoleta G. Hădărugă, Adrian Riviș

Evaluation of anthocyanin stability in red onion skin extract

Adina Căta, Mariana Nela Ștefănuț, Ioana Maria Carmen Ienașcu

Graphene/CuGaO₂ based aerogel synthesis

Cristina Moșoarcă, Daniel Ursu, Petrica-Andrei Linul, Bogdan-Ovidiu Țăranu, Radu Banica

Novel hydrazone/ β -cyclodextrin complex. Synthesis and characterization

Ioana Maria Carmen Ienașcu, Adina Căta, Mariana Nela Ștefănuț, M.C. Pascariu, Gerlinde Rusu, Paula Sfirloagă, Cristina Moșoarcă, Iuliana M. Popescu

Some fungicide residues determination in food products by a chromatographic method

Mariana Nela Ștefănuț, Adina Căta, Ioana Maria Carmen Ienașcu

Benefits of the traditional liqueur

Veronica Filimon, Tatiana Avgust, Simona Butan

Advanced catechin nanomaterials exert protective effects against amyloid segregation

Christiane M. Nday, Graham Jackson, Athanasios Salifoglou

Insulin mimetic/adipogenic activity of binary-ternary Cr(III)-hydroxycarboxylic acid-aromatic chelator systems

Olga Tsave, Catherine Gabriel, Athanasios Salifoglou

Magnetic chrysin silica nanomaterial behavior in an amyloidogenesis environment

Christiane M. Nday, Graham Jackson, Athanasios Salifoglou

Flavonoid derivatives in the enhancement of antioxidant properties

Sevasti Matsia, Athanasios Salifoglou

Improvement of flavonoid nano-technology against Alzheimer-type neurodegeneration

Christiane M. Nday, Graham Jackson, Athanasios Salifoglou

Encapsulated naringin in pegylated nanoparticles against neurodegenerative processes

Christiane M. Nday, Graham Jackson, Athanasios Salifoglou

Quercetin in magnetic silica nanoparticles. Application against Cu(II)-mediated neurodegenerative processes

Christiane M. Nday, Graham Jackson, Athanasios Salifoglou

Structural investigation and physicochemical properties of binary materials of Thallium with organic substrates

Sevasti Matsia, Athanasios Salifoglou

Biological activity of novel well-defined Ti(IV)-(α-hydroxycarboxylic acid) complexes in metabolic (patho)physiology

Olga Tsave, Aikaterini Iordanidou, Athanasios Salifoglou

The development of a new functional polynuclear Ti(IV)-carboxylic acid complex. Synthesis, characterization and in depth structure-properties investigation

Aikaterini Iordanidou, Athanasios Salifoglou

Structure-specific adipogenic activity of binary/ternary V(V)-Schiff base materials. Structure-function correlations toward insulinmimesis at the molecular level

Olga Tsave, Maria P. Yavropoulou, John G. Yovos, Athanasios Salifoglou

Vanadium downregulates autophagic flux and inhibits metastatic Niche by induction of trail-induced apoptosis in cancer cells.

Savvas Petanidis, Efrosini Kioseoglou, Doxakis Anastakis, Margarita Hadzopoulou-Cladaras, Athanasios Salifoglou

Hybrid peroxido vanadate complexes as advanced materials in biological systems

Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou

Optimizing Peroxido-Vanadate chemotherapeutics

Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou

The effects of hydrocolloids addition on the rheological characteristics of the dough and gluten-free bread properties

Sorina Ropciuc, Georgiana Gabriela Codina, Ana Leahu, Cristina Damian

Effect of osmotic dehydration on the colour parameters and chemical characteristics of apple and pear

Ana Leahu, Cristina Ghinea, Mircea Oroian, Cristina Damian, Sorina Ropciuc

Effect of drying techniques on the total phenolic contents and antioxidant activity of some vegetables byproducts

Cristina Damian, Mircea Oroian, Ana Leahu, Sorina Ropciuc, Laura Carmen Apostol

Extraction of Antioxidants from Onion By-products using Eco-friendly Solvents

Cristina Damian

Influence of enzymes action on chromatic characteristics and aromatic profile of pre fermented grape juice

Maria-Lidia Iancu, Ovidiu Tița, Anca-Maria Stoia

Influence of enzymes action on primary quality indicators of the pre-fermented grape juice

Ovidiu Tița, Maria-Lidia Iancu, Anca-Maria Stoia

Evaluation of the moisture content of some non-homogeneous meat products by volumetric Karl Fischer titration

Simelda E. Zippenfening, Marius D. Simandi, Tamara D. Vlăduțescu, Anamaria Guran, Cosmina A. Chirilă, Daniel I. Hădărugă, Nicoleta G. Hădărugă

Evaluation of bioactive compounds from a new dietetic and functional sorbet

Cosmina M. Bogătean, Maria Tofană, Emil Racolța

Functional dependence of energy intake relative to the fat content in different types of cheeses

Georgeta-Sofia Popescu, Antoanela Cozma, Dacian-Virgil Lalescu, Daniela Stoin, Mădălina-Ioana Stîngă, Ariana-Bianca Velciov

The development of the Romanian food industry

Viorica-Mirela Popa, Diana Nicoleta Raba, Camelia Moldovan, Delia-Gabriela Dumbravă, Aurica-Breica Borozan

The evolution of the retail market in Romania

Viorica-Mirela Popa, Diana Nicoleta Raba, Camelia Moldovan, Delia-Gabriela Dumbravă, Corina Dana Mișcă

Cluster analysis for some different types of vegetable oils by the physicochemical characteristics

Antoanela Cozma, Ariana Velciov, Daniela Stoin, Diana Moigrădean, Dacian Lalescu, Mihaela Petcu, Iuliana Crețescu, Adrian Riviș

The determination of the bioaccessibility of some essential microelements from cow's cheese

Mihai Adamescu, Despina Maria Bordean, Liana Maria Alda, Maria Rada, Lucian Radu, Ana-Maria Ivana

Bakery assortment functionalized by the use of a malt industry by-product

Maria Simona Chiș, Adriana Păucean, Simona Man, Sevastița Muste, Anamaria Pop, Laura Stan, Teodora Coldea

New assortments of functional gluten free products developed by using quinoa and buckwheat flours

Maria Simona Chiș, Adriana Păucean, Simona Man, Sevastița Muste, Anamaria Pop, Laura Stan, Carmen Pop

Development of new bakery product using pseudo-cereals preferment and aromatic yeasts

Adriana Păucean, Simona Man, Sevastița Muste, Simona Chiș, Vlad Muresan, Carmen Pop, Sonia Socaci, Crina Muresan

*Effect of nettle leaves (*Urtica dioica* L.) addition on the quality of bread*

Adriana Păucean, Simona Maria Man, Maria Simona Chiș, Sevastița Muste, Anamaria Pop, Andruța Elena Mureșan

PL1

Flavonoid nanotechnology in the protection of human physiology

Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Greece, Tel.: +30-2310-996-179, Fax: +30-2310-996-196.

E-mail: salif@auth.gr

Flavonoids are a family of naturally encountered compounds, amply abundant in plants throughout the planet. Their role in the maintenance of plant physiology and handling of oxidative stress reflects efforts of the various plant species to survive under environmental conditions [1] imposed by seasonal changes on location (temperature, pressure, nutrient bioavailability). Undoubtedly, the arising properties of flavonoids, as distinctly identified by the multitude of plants organisms over a wide spectrum of environmentally diverse habitats, involve important factors intimately associated with the human nutrition and influence of health. The inherent structures of flavonoids, known to date, testify to their multifaceted ability to counteract oxidative stress, thereby maintaining homeostatic mechanisms linked to organismal integrity. In that respect, the flavonoid profile of each plant species is characteristic of its own evolutionary biology and history, concurrently providing valuable information on its potential use in human nutrition. In view of the fact that the compositional profile of flavonoids in each plant reflects commensurably the antioxidant potential of its constituents and thus its collective ability to withstand and counteract oxidative stress [2], due attention should be given to their potential to effect cellular protection at the molecular level through habitual consumption and dietetic incorporation. Driven by the need to investigate the potential use of such flavonoids in human nutrition and furthermore introduce preventive measures against a multitude of pathological aberrations [3], research was launched in our lab targeting incorporation of various flavonoids in nanoparticles, followed by detailed investigation of their transport and delivery (release profiles and kinetics thereof) on target so that cellular protection can be pursued at the molecular level. Prominent among such flavonoids are catechin, naringin, and quercetin, all known antioxidants in plant species [4], with various concentrations present in a diverse spectrum of plants species. The host chosen to pursue such a feat was silica, the surface of which was modified by PEG and CTAB so as to bestow specific solubility and thus bioavailability of the particles approaching the cellular targets selected. The synthesized nanoparticles (empty and loaded with flavonoids) were characterized by a multitude of techniques, including porosimetry, zeta-potential, DLS, FT-IR, SEM, TEM and NMR, with electronic spectroscopy contributing to both identification and exploration of the release profile under physiological conditions. The ensuing *ex vivo* studies employing neuronal cells showed that the generated nanoparticle preparations are capable of protecting neurons [5] from oxidative stress conditions induced through redox active metal ions, such as Cu(II), thereby standing as credible contenders in

the prevention of oxidative stress damage and future development of a well-defined nanotechnological platform linked to nutrition and maintenance of human health.

References

- [1]. S. Gharibi, B.E. Sayed Tabatabaei, G. Saeidi, M. Talebi, A. Matkowski, *Phytochemistry*. 162 (2019) 90-98.
- [2]. C. Brunetti, F. Sebastiani, M. Tattini, *Plant Sci.* 280 (2019) 448-454.
- [3]. [B. Salehi, A. Venditti, Sharifi, M. Rad, D. Kręgiel, J. Sharifi-Rad, A. Durazzo, M. Lucarini, A. Santini, E.B. Souto, E. Novellino, H. Antolak, E. Azzini, W.N. Setzer, N. Martins, *Int. J. Mol. Sci.* 20(6) (2019 Mar 15;20(6)
- [4]. H. Manman, C. Weilan, L. Zhimin, P. Liang, H. Lixia, C. Min, *J. Inorg. Biochem.* 2019 (195) 13-19.
- [5]. B.A. Lakshmi, S. Kim, *Colloids Surf B Biointerfaces*.178 (2019) 230-237.

IL2

Cyclodextrin – edible oil complexes: Synthesis and characterization

Daniel I. Hădărugă¹, Cosmina A. Chirilă², Marius D. Simandi², Raymond N. Szakal², Cornelia Muntean¹, Geza N. Bandur¹, Nicoleta G. Hădărugă^{2*}

¹ Polytechnic University of Timișoara, Timișoara, Romania

² Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania

E-mail: nico_hadaruga@yahoo.com

Cyclodextrins are cyclic oligosaccharides having specific chemical architecture. They have structures like truncated cones with hydrophobic inner cavities and highly hydrophilic exterior. Natural cyclodextrins contain six to eight α -D-glucopyranose moieties corresponding to α -, β - and γ -cyclodextrin. They are FDA approved and GRAS recognized. Consequently, cyclodextrins are largely used in food, cosmetic and pharmaceutical fields for stabilizing and protection of bioactive compounds against thermal and oxidative degradation as well as for obtaining complexes having controlled release properties.

The present study reveals the nanoencapsulation capacity of natural or semi-synthetically modified cyclodextrins for highly hydrophobic natural compound mixtures such as vegetable and fish oils. The proper method for complexation was kneading at moderate temperature of 40-60 °C and alcohol-water solvent mixture. Various cyclodextrin : oil molar ratios of 1:1 to 3:1 have been considered, taking into account that triglycerides are the main compounds from edible oils. After drying and grinding, the cyclodextrin/edible oil complexes were analyzed by thermal (thermogravimetry-differential thermogravimetry, differential scanning calorimetry), spectroscopic and diffractometric (Fourier transform infrared spectroscopy, X-ray diffractometry) methods, as well as electron microscopy. The formation of the host-guest inclusion compounds was discussed by the means of the "surface" and "strongly retained" hydration water, modification of the calorimetric effects of the starting compounds, crystallization-amorphous characteristics and influence of the molecular inclusion process for the infrared spectra.

The use of cyclodextrins for protecting and controlled release of omega-3 based bioactive fatty acid components from edible oils by complexation to powdery nanomaterials have been proposed for food and cosmetic applications.

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

References

- [1]. Hădărugă, N.G.; Bandur, G.N.; Hădărugă, D.I., Thermal analyses of cyclodextrin complexes. In: *Cyclodextrin Fundamentals, Reactivity and Analysis*, Fourmentin, S.; Crini, G.; Lichtfouse, E. (Eds.), Springer International Publishing AG (part of Springer Nature), Cham, **2018**, pp. 155-221, doi: https://doi.org/10.1007/978-3-319-76159-6_4
- [2]. Hădărugă, D.I.; Birău (Mitroi), C.L.; Gruia, A.T.; Păunescu, V.; Bandur, G.N.; Hădărugă, N.G., Moisture evaluation of β -cyclodextrin/fish oils complexes by thermal analyses: A data review on common barbel (*Barbus barbus* L.), Pontic shad (*Alosa immaculata* Bennett), European wels catfish (*Silurus glanis* L.), and common bleak (*Alburnus alburnus* L.) living in Danube river, *Food Chemistry* **2017**, *236*, 49-58, doi: <https://doi.org/10.1016/j.foodchem.2017.03.093>
- [3]. Hădărugă, D.I.; Ünlüsayin, M.; Gruia, A.T.; Birău (Mitroi), C.; Rusu, G.; Hădărugă, N.G., Thermal and oxidative stability of Atlantic salmon oil (*Salmo salar* L.) and complexation with β -cyclodextrin, *Beilstein Journal of Organic Chemistry* **2016**, *12*, 179-191, doi: <https://doi.org/10.3762/bjoc.12.20>
- [4]. Ünlüsayin, M.; Hădărugă, N.G.; Rusu, G.; Gruia, A.T.; Păunescu, V.; Hădărugă, D.I., Nano-encapsulation competitiveness of omega-3 fatty acids and correlations of thermal analysis and Karl Fischer water titration for European anchovy (*Engraulis encrasicolus* L.) oil / β -cyclodextrin complexes, *LWT – Food Science and Technology* **2016**, *68*, 135-144, doi: <https://doi.org/10.1016/j.lwt.2015.12.017>

OC1

Assessing the bioactive compounds and antioxidant activity of blueberry and their processing byproducts

Cristina-Ramona Metzner^{1*}, Andreea Ioana Lupitu², Cristian Moisa², Dana-Maria Copolovici², Lucian Octav Copolovici², Georgeta Pop³, Mariana-Atena Poiana^{1}**

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Food Engineering, Calea Aradului 119, Timisoara, 300645, Romania.

²"Aurel Vlaicu" University of Arad, Faculty of Food Engineering, Tourism and Environmental Protection, Elena Dragoi Street no. 2, Arad, 310330, Romania.

³Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Faculty of Agriculture, Calea Aradului 119, Timisoara, 300645, Romania.

*PhD student: cristinau222@yahoo.com; **corresponding author: atenapoiana@yahoo.com

The purpose of this study is to assess the antioxidant characteristics in terms of total phenolic content, antioxidant activity and phenolic compounds profile of fresh blueberry (*Vaccinium myrtillus* L.) and their processing fractions, juice and byproducts (husks and seeds). In this regard, blueberries from spontaneous flora were collected from two different site of Romania: Arieseni (Alba County) and Paltinis (Sibiu County). The impact of the origin area on the studied features was also tracked. Moreover, the effect of raw byproduct conditioning by convective drying on the antioxidant properties was evaluated. Our results showed that the total phenolic content was consistent with antioxidant activity, expressed as the stable radical 1,1-diphenyl-2-picrylhydrazyl scavenging capacity in the presence of antioxidants (DPPH). As a result, there were no significant differences in the investigated properties by the origin place. However, there is a slight decrease in the antioxidant potential in fruits from the region with a higher precipitation regime and lower temperatures, antioxidant properties being slightly higher in the fruits and fractions corresponding to the Arieseni site than those from the Paltinis site. The raw byproducts conditioning by convective drying at a moderate temperature of 60°C for 12 hours resulted in a loss of about 15-29% of the antioxidant properties. The recorded data are useful in selecting blueberries to obtain valuable bioactive compounds for designing of value-added food products. Thus, byproducts obtained from blueberries processing can be a stable source for the recovery of high-quality polyphenolic compounds.

Keywords: blueberry, processing byproducts, antioxidant properties, polyphenolic compounds profile, DPPH radical scavenging activity

Acknowledgments:

PNCI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

P1

Evaluation of anthocyanin stability in red onion skin extract

Adina Căta^{1*}, Mariana N. Ștefănuț¹, Ioana Maria Carmen Ienașcu^{1,2}

¹*National Institute of Research and Development for Electrochemistry and Condensed Matter, Dr. Aurel Păunescu Podeanu 144, 300569, Timișoara, Romania*

²*“Vasile Goldiș” Western University of Arad, Faculty of Pharmacy, Liviu Rebreanu 86, 310045, Arad, Romania*

* email: adina.cata@yahoo.com

Onions (*Allium cepa* L.) are one of the oldest and most frequently cultivated vegetables worldwide. Onions contain high levels of flavonoids which are responsible for a great part of the health benefits of these vegetable, flavonols and anthocyanins being the main subclasses. The latter are concentrated mainly in the outer shell of red onions.

Easy incorporation of anthocyanins in aqueous media gives them a high potential for use as alternative to artificial colorants in food products. The main drawback in using anthocyanins as food colorants is their low stability.

In this study, the effect of temperature on anthocyanin stability in red onion extract was investigated. Anthocyanins extraction was carried out in ultrasonic conditions (59 kHz, 25°C, 30 min) with acidified methanol. The degradation of anthocyanin pigments from onion skin extract was followed during heating at 90°C for 5 hours and during storage in darkness at 25°C for one month. Anthocyanins content was quantified by using a pH differential method. Also, the total phenolic content and antioxidant activity were determined throughout the stability tests. Total phenolic content was assessed by the Folin-Ciocalteu assay, and the antioxidant activities were determined by the DPPH, ABTS and FRAP assays. Good correlations between the values determined by the three methods were obtained. The occurrence of some degradation products was followed by UV-Vis spectrophotometry and HPLC-DAD analysis. During heating at 90°C, a 20% decrease in the anthocyanin content was found. During storage at room temperature, the extract suffers a 47% decrease in anthocyanin content. At 90°C, total phenolic content and antioxidant activities shows an increasing trend, while a minor decrease was observed for samples stored at room temperature. Although the dry skin of red onions is non-edible, this accumulates high levels of anthocyanins which showed a fairly good stability to heat treatment thus demonstrating a good potential for their use as natural food colorants.

Keywords: anthocyanins, red onion, stability, thermal degradation, antioxidant activity

P2

Graphene/CuGaO₂ based aerogel synthesis

**Cristina Mosoarca¹, Daniel Ursu¹, Petrica-Andrei Linul^{1,2}, Bogdan-Ovidiu Taranu¹,
Radu Banica¹**

¹ National Institute for Research and Development in Electrochemistry and Condensed Matter, Dr. A. Paunescu Podeanu, no. 144, Timisoara, Romania

² Politehnica University Timisoara, Piata Victoriei, no. 2, Timisoara, Romania

Inorganic aerogels [1] are most frequently produced from silica, undergoing multiple phases of cooling and heating under high pressure (supercritical drying) or vacuum (lyophilization). Nowadays, low-cost organic aerogels such as graphene/metal oxide hydrogels are broadly used in numerous applications and fields (electronics, aerospace engineering and material science) [2]. Hybrid materials like CuGaO₂/graphene aerogels could be efficient for advanced electrodes and dye-sensitized solar cells.

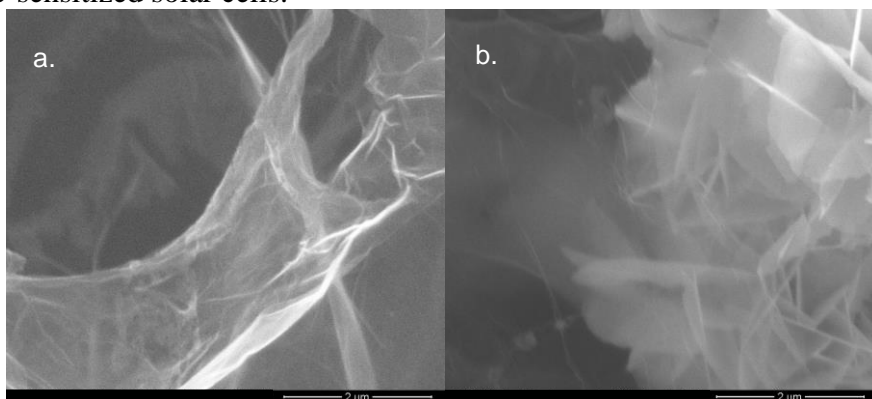


Figure 1: SEM images of graphene (a) and CuGaO₂/graphene aerogel (b)

Graphene and graphene/CuGaO₂ based aerogels, with various possible nanotechnology applications, were synthesized by lyophilization followed by thermal treatment in vacuum. The samples were characterized by X-Ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM).

An aerogel with a homogenous distribution of the semiconductor inside was obtained by mixing the aqueous suspension containing reduced graphene and graphene oxide with the CuGaO₂ compound, before freezing.

Keywords: graphene, aerogel, lyophilization, CuGaO₂.

Acknowledgements: This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI-UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0619/Contract 42/2018 “Nanostructured carbon materials for advanced industrial applications”, within PNCDI III national research program.

References:

- [1] G. Gorgolis, C. Galiotis, *2D Materials*, **7**, 032001 (2017).
- [2] D. Ursu, M. Miclau, R. Banica, N. Vaszilcsin, *Mat. Lett.* **143**, 91-93 (2015).

P3

Novel hydrazone/ β -cyclodextrin complex. Synthesis and characterization

Ioana Maria Carmen Ienaşcu^{1,2}, Adina Căta¹, Mariana Nela Ştefănuţ¹, M.C. Pascariu, Gerlinde Rusu³, Paula Sfirloagă¹, Cristina Moşoarcă¹, Iuliana M. Popescu⁴

¹National Institute of Research and Development for Electrochemistry and Condensed Matter, Dr. A. P. Podanu 144, 300569, Timişoara, Romania

²"Vasile Goldiş" Western University of Arad, Faculty of Pharmacy, Liviu Rebreanu 86, 310045, Arad, Romania

³Politehnica University of Timişoara, Industrial Chemistry and Environmental Engineering Faculty, Piaţa Victoriei 2, 30006, Timişoara, Romania

⁴Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania", from Timisoara, 119 Calea Aradului, 300645, Romania

Considering that hydrazones with hydroxybenzamide structure are water-insoluble substances exhibiting some toxicity (adverse reactions) and that the solid form in which a drug can exist may determine the type of pharmaceutical form in which it can be conditioned, and also modify properties like bioavailability and stability, the goal of this study was to obtain and characterize a new inclusion complex, formed between 2-(5-bromo-2-hydroxy-benzylidene-hydrazinocarbonylmethoxy)-N-(2-bromo-phenyl)-benzamide and β -cyclodextrin.

The inclusion complex was prepared by kneading method with aliquot addition of ethanol and characterized by ¹H-NMR, TG/DSC, X-ray diffraction and SEM-Edax analysis. Molecular modelling was also employed to determine the inclusion compound geometry.

¹H-NMR spectra proved the formation of the inclusion complex, where the benzamide part of the hydrazone has been encapsulated in the hydrophobic cavity of β -cyclodextrin. Molecular modelling data are in agreement with the ¹H-NMR results.

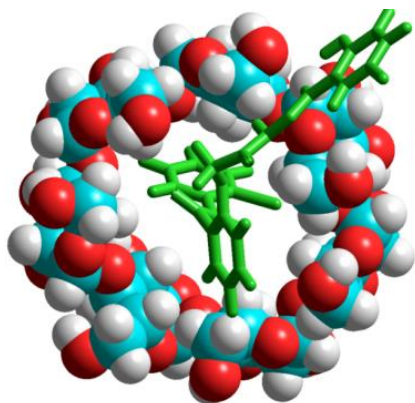


Figure 1. Molecular modelling of hydrazone/ β -CYD complex

Sem-Edax images and X-ray diffraction spectra showed changes in the degree of crystallinity of the hydrazone/ β -cyclodextrin complex due to the formation of intermolecular bonds between the two components of the complex.

The thermoanalytic data showed the modification of the thermal phenomena and enthalpy values characteristic of the two components, and the reduction of the peak area in the binary compound compared to the pure substances.

The evaluation of the inclusion complex using abovementioned techniques unequivocally demonstrates its formation.

Keywords: hydrazone/ β -cyclodextrin inclusion complex, molecular modelling, ^1H -NMR, TG/DSC, X-ray diffraction, SEM-Edax

P4

Some fungicide residues determination in food products by a chromatographic method

Mariana Nela Ștefănuț^{1*}, Adina Căta¹, Ioana Maria Carmen Ienașcu^{1,2}

¹National Institute of Research and Development for Electrochemistry and Condensed Matter, Dr. A. P. Podanu 144, 300569 Timișoara, Romania

²“Vasile Goldiș” Western University of Arad, Faculty of Pharmacy, 86 Liviu Rebreanu, 310045, Arad, Romania

*Corresponding author's email address: mariana.stefanut@gmail.com

High productivities and economic benefits in modern agriculture have been realised only by the use of pesticides. The introduction of these compounds in the food chain can be considered a risk for human health due to their toxicity [1,2]. In order to increase and ensure the security in people nutrition, we proposed a chromatographic method using an HPLC-DAD apparatus Dionex Ultimate 3000 (Dionex Corp., USA) with a quaternary pump LPG 3400A, thermostat of columns TCC-3000 and a reversed-phase column C-18 Acclaim[®] 120, for some fungicide residues detection and monitoring in some foods like: vegetables (eggplants, cucumbers, red potatoes, white potatoes, red peppers) and fruits (plums, apples, lemons, grapes, clementines). A mixture acetonitrile-water at 30°C was the mobile phase.

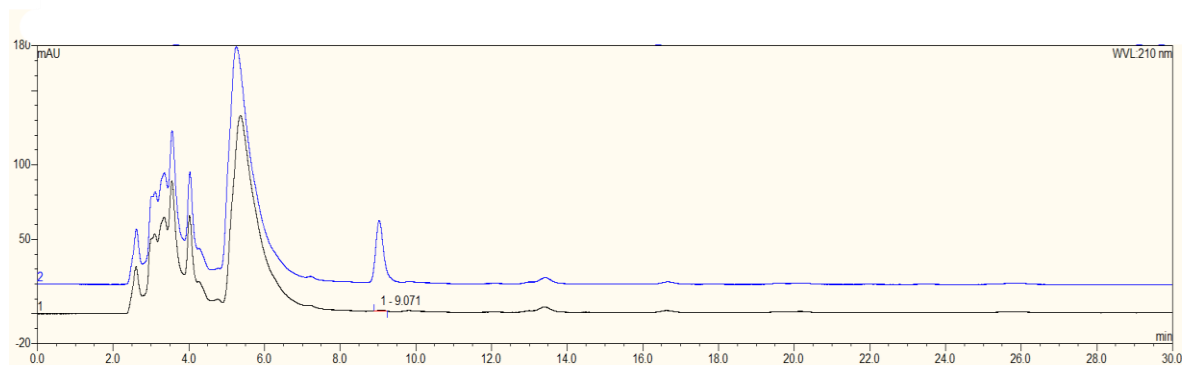


Figure 1. HPLC – DAD chromatogram of iprodione in white potatoes: 1- white potatoes; 2- white potatoes contaminated with iprodione

Key words: pesticides, fungicides, extraction, HPLC-DAD method

References

- [1]. T. Cserhati and M. Szogyi, *J. Nutr. Food Sci.*, **2012**, 2-126, DOI: 10.4172/2155-9600.1000126.
- [2]. D. Capoferi, P. Della Pelle, M. Del Carlo and D. Compagnone, *Foods*, **2018**, 7, 148; DOI: 10.3390/foods7090148.

P14

Benefits of the traditional liqueur

Veronica Filimon^{1*}, Tatiana Avgust¹, Simona Butan²

¹"Dunarea de Jos" University of Galati, Cross-Border Faculty, 47 Domneasca Street, 800008, Galati, Romania

²"Dunarea de Jos" University of Galati, Faculty of Sciences and Environment, 47 Domneasca Street, 800008, Galati, Romania

*Corresponding author: veronica.diaconu@ugal.ro

According to the traditional definition, the liqueur is the drink made from alcohol, syrup and various aromatic essences. If, initially, the liqueur was prepared only using fruits or plants, making it a 100 % natural drink, over time, according to scientific discoveries and technology development, many recipes have begun to develop into a true industry. Many of these recipes have been legislated and accepted by the laws of different times. Consumers have adapted to market supply, being attracted to the sensorial properties of new prescriptions, often forgetting the benefits that can bring to the body a low-fat and natural alcoholic beverage.

The main goal of this paper is to revert to the traditional recipes, which are based on the fruits liquor consumption with significant benefits. Nowadays, many nutritionists highlight the importance of the foods consumption according to their color. Hence, we developed a rainbow liqueur, which is consumed in small quantities and focuses all active principles together, being reproduced by various colors. Thus, this beverage could lead to the supply of various vitamins, minerals and other active compounds to the body. The fruits used to obtain the liqueur contain both vitamins and minerals, as well as many antioxidants or phytonutrients, which are in the pigment composition.

Following the colors of the rainbow, it has been experimentally observed that to form ROGVAIV, the liqueur must be obtained from red, yellow, orange, green and purple fruits. So, this paper is a preliminary study having the main objective to select the right fruits to obtain three colors of the rainbow liqueur.

Keywords: rainbow liquor, alcoholic beverages, traditional recipes

P15

Advanced catechin nanomaterials exert protective effects against amyloid segregation

Christiane M. Nday,¹ Graham Jackson,² Athanasios Salifoglou¹

¹ Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

² Department of Chemistry, University of Cape Town, Rondebosch 7700, Cape Town, South Africa
E-mail: christiane.nday@yahoo.com; christianen@auth.gr

A severe, age-associated neurodegenerative disorder, Alzheimer disease (AD), affects many people age 65 years or older, contributing to 60-70% of dementia cases [1]. Amyloid peptide (A β)-mediated oxidative stress plays a pivotal role in the development of AD [2]. Prominent among agents, inducing oxidative stress in AD brain, are a) A β ₄₀, which represents the most abundant form of A β in the brain, and b) A β ₄₂, which shows a significant increase with certain AD forms [3]. However, there are natural polyphenol agents, which may be exploited for their antioxidant activity against amyloidogenic reactivity. For instance, catechin (CAT) can act as an effective anti-oxidant agent, able to improve learning and memory ability [4]. Developing and using advanced CAT antioxidant forms, exemplified through encapsulation in silica nanoparticles, offers a) advantages of mechanical stability and low toxicity for the encapsulated flavonoid, b) prevents CAT degradation, and c) improves the pharmacokinetic optimization and controls its biodistribution in the body, collectively leading to the efficient permeation of more effective antioxidants through the blood brain barrier toward sensitive brain loci. Consequently, a) the synthesis of the base-catalyzed silica gel matrices modified with PEG 3000 was pursued and achieved, b) evaluation of the suitability of these matrices, as potential host-carrier materials for CAT controlled release, was made, and c) an investigation of the cytotoxicity and potential protective effects of the CAT-loaded nanoparticles was launched under oxidative stress conditions in the presence of A β ₄₀, notable for its influence on neurodegeneration, in *in vitro* primary hippocampal cultures. The findings suggest that the new hybrid nanomaterials contribute to the improvement of therapeutic activity, better protection against degradation, optimization in pharmacokinetics, better control of biodistribution, and decrease of cytotoxicity, as a consequence of a slower, more stable CAT release rate, thereby counteracting in a dose-dependent manner amyloid segregation and neurodegeneration.

Acknowledgements

The authors would like to acknowledge Greek IKY Financial Support of Excellence for Postdoctoral Researchers NSRF 1st Cycle for 2014-2020 -MIS 5001552.

Bibliography

- [1]. A.M. Swomley, S. Förster, J.T. Keeney, J. Triplett, Z. Zhang, R. Sultana, D.A. Butterfield, *Biochim. Biophys. Acta (BBA) - Molecular Basis of Disease* 1842 (2014) 1248-1257.
- [2]. D.A. Butterfield, A.M. Swomley, R. Sultana, *Antioxid. Redox Signal.* 19(8) (2013) 823-835.
- [3]. J. Naslund, A. Schierhorn, U. Hellman, L. Lannfelt, A.D. Roses, L.O. Tjernberg, J. Silberring, S.E. Gandy, B. Winblad, P. Greengard, *et al.*, *Proc Natl. Acad. Sci. U S A*, 91 (1994) 8378-8382.
- [4]. X.L. He, Y.H. Wang, M.G. Bi, G.H. Du, *Eur. J. Pharmacol.* 680(1-3) (2012) 41-48.

P16

Insulin mimetic/adipogenic activity of binary-ternary Cr(III)-hydroxycarboxylic acid-aromatic chelator systems.

Olga Tsave¹, Catherine Gabriel^{1,2}, Athanasios Salifoglou¹

¹Laboratory of Inorganic Chemistry and Advanced Materials, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

E-mail: salif@auth.gr

²Center for Research of the Structure of Matter, Magnetic Resonance Laboratory, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

Diabetes mellitus comprises a host of metabolic disorders characterized by lack of insulin, defective insulin secretion and/or insulin resistance. In an interplay of cause and effect relationships, obesity, Diabetes mellitus, and insulin resistance emerge prominently as partners in disease onset and progression. The enhancement of insulin action and/or its complete replacement by insulin-enhancing or insulin-mimetic agents seems to improve the treatment of metabolic diseases. Over the past decades, intensive research has focused on the investigation of such agents [1-4]. Chromium, in its trivalent form, has been shown to play a crucial role in carbohydrate metabolism by enhancing insulin signal and action and thus the sensitivity of the insulin-sensitive tissues. In an attempt to understand the aqueous interactions of Cr(III) with the low molecular mass physiological ligands and examine the role of chromium as a metallodrug against Diabetes mellitus II, the pH-specific synthesis in the binary and ternary Cr(III)-hydroxycarboxylic acid-(N,N)-aromatic chelator systems was pursued, leading to new complexes $\text{Na}[\text{Cr}\{\text{HOCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COO})_2\}_2]\cdot\text{H}_2\text{O}$ (1), $(\text{NeoH})_2[\text{Cr}\{\text{HOCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COO})_2\}_2]\cdot(\text{OH})\cdot(\text{H}_2\text{O})$ (2), $[\text{Cr}\{\text{HOCH}_2\text{CH}_2\text{N}(\text{CH}_2\text{COO})_2\}(\text{phen})(\text{H}_2\text{O})](\text{NO}_3)\cdot 3\text{H}_2\text{O}$ (3) and $(\text{NeoH})_3[\text{Cr}(\text{oxalate})_3]\cdot 3\text{H}_2\text{O}$ (4). All complexes were characterized by elemental analysis, UV-Visible, FT-IR, NMR, ESI-MS spectroscopy, cyclic voltammetry, and X-Ray crystallography. The aim of the present study was to evaluate the effect of the title chromium compounds on the a) survival of pre- and mature adipocytes (3T3-L1), b) endogenous cell motility, c) the insulin-enhancing adipogenic capacity. The overall results suggest that chromium in its well-defined complex trivalent form a) is (a)toxic in a dose- and time- depend manner, b) has no influence on cell motility and, c) can induce 3T3-L1 pre-adipocytes differentiation into mature adipocytes through elevation of tissue specific biomarkers (PPAR- γ , GLUT 4, and GYK) in a structure-specific manner. The merit of this research in health and pathophysiological therapeutics through natural and pharmaceutical interventions is ostensible.

References

- [1] American Diabetes Association, Diabetes Care 32 (2009) 62-67.
- [2] J.P. Despres, I. Lemieux, Nature 444 (2006) 881–887.
- [3] C.K. Roberts, A.L. Hevener, R.J. Barnard, Compr. Physiol. 3(1) (2013) 1-58.
- [4] J. Kaur, Card. Res. Pract. (2014) 943162.

P17

Magnetic chrysin silica nanomaterial behavior in an amyloidogenesis environment

Christiane M. Nday,¹ Graham Jackson,² Athanasios Salifoglou¹

¹ Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

² Department of Chemistry, University of Cape Town, Rondebosch 7700, Cape Town, South Africa

E-mail: christiane.nday@yahoo.com; christianen@auth.gr

During amyloidogenesis, certain amyloids aggregate with a specific β -pleated sheet structure in the brain of an organism. In progressive neurodegenerative disease, brain damage occurs along with β -amyloid and tau accumulation, affecting neuroconnectivity [1,2,3]. Flavonoids are known as the commonest chemical class of phytochemicals, which possess a multiple range of health promoting effects. Chrysin (ChR) is a flavonoid, belonging to the flavone class, which possesses potent neuroprotective activities and suppresses neuroinflammation. In addition, ChR improves cognitive decline and possesses a potent anti-amyloidogenic and neurotrophic effects [4]. Its neuroprotective activity has been proven against other neurodegenerative pathologies [5,6]. Magnetic nanoparticles allow binding of drugs by entrapment on the particles, adsorption, or covalent attachment[7]. Despite the intensive research on AD field, no cure and no early diagnosis are available. Recently, greater attention has focused on the advancement of the naturally occurring antioxidant compounds, including ChR. In our study, scientific efforts have been made to synthesize ChR-loaded magnetic PEGylated silica nanospheres (MChRPNPs) aiming at enhanced protective characteristics against amyloid. MChRPNPs have been fully physically characterized through elemental analysis, particle size, z-potential, FT-IR, thermogravimetric analysis, relaxivity measurements, TEM and SEM. Additional drug release investigation has been implemented using UV-visible spectroscopy. Furthermore, magnetic resonance imaging properties and interactions of MChRPNPs with β -amyloid were demonstrated in rat hippocampal cell cultures. Overall, the findings suggested that the a) solubility and polydispersity improvement affected relaxivity indicators, which are directly connected to MRI properties, b) magnetic physical properties were in line with MChRPNP differential magnetic efficacy profiles, as their observed magnetic core remained with the same size, and c) biological activity profile of MChRPNPs in a cellular neurodegenerative environment denotes the improved specificity of antioxidant reactivity counteracting oxidative stress reactivity.

Acknowledgements

The authors would like to acknowledge Greek IKY Financial Support of Excellence for Postdoctoral Researchers NSRF 1st Cycle for 2014-2020-MIS 5001552.

Bibliography

- [1]. A.L. Pierce, S.S. Bullain, C.H. Kawas, *Neurologic Clinics* 35(2) (2017) 283-293.
- [2]. D.R. Thal, J. Attems, M. Ewers, J. Alzheimer's Dis. 42 Suppl. 4 (2014) S421-S429.
- [3]. T.V. Andreeva, W.J. Lukiw, E.I. Rogaev, *Biochemistry* 82(2) (2017) 122-139.
- [4]. S.F. Nabavi, N. Braidy, S. Habtemariam, I.E. Orhan, M. Daglia, A. Manayi, O. Gortzi, S.M. Nabavi, *Neurochem. Intern.* 90, 2015.
- [5]. Z. Zhang, G. Li, S.S.W. Szeto, C.M. Chong, I.K. Chu, *Free Radical Biology and Medicine* 84 (2015) 331-343.
- [6]. A.T.R. Goes, C.R. Jesse, M.S. Antunes, F.V.L. Ladd, S.P. Boeira, *Chemico-Biological Interactions* 279 (2018) 111-120.
- [7]. L.L. Muldoon, M. Sandor, K.E. Pinkston, E.A. Neuwelt, *Neurosurgery* 57(4) (2005) 785–796

P18

Flavonoid derivatives in the enhancement of antioxidant properties

Sevasti Matsia, Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Tel.: 2310-996-179, Fax: 2310-996-196.

E-mail: sevi.matsia@hotmail.com, salif@auth.gr

Flavonoids are natural products encountered plentifully in the plant kingdom. Their diversity goes along with their physiological roles in the specific species of their origin. Their appearance is related to the ability of the organism developed through biological evolution and exemplifies efforts to counteract oxidative stress originating in exogenous environmental pressure [1] or endogenous anomalies linked to functional disturbance of homeostatic mechanisms. In view of their role in the plant organism of the origin, their qualitative as well as quantitative properties vary, thus projecting the a) influence of factors acting upon the plant organism over a diverse spectrum of conditions (throughout the year), and b) genetic activation of their biosynthesis triggered so as to quell the arising oxidative stress and its dire implications in the integrity and function of the host. The diversity of climatic conditions and a multitude of factors emerging from their influence on plant evolution [2] and life cycle suggest that a commensurably diverse spectrum of flavonoids exists, with each plant species generating its own flavonoid compositional profile, easily exemplified in the various parts of the plant as well as its products, with a significant number of which being edible. Cognizant of the fact that the antioxidant properties of flavonoids are distinct in their nature and application(s) in each plant (parts and products), thereby affecting human nutrition, dietetic habits and cellular protection at the molecular level, the possibility was explored that appropriate derivatization of a select group of such molecules could be modified in vitro so as to exhibit potential new properties or enhanced properties of their antioxidant-therapeutic potential [3] in averting deleterious cellular chemical reactions from taking place. The repercussions of such reactivity are known to develop in humans in the form of disease (cancer, diabetes, neurodegeneration, etc.) [4] with often precarious outcome. To that end, a select group of such flavonoids was chosen for experimentation, essentially targeting improvement of antioxidant potential through derivatization. The chosen flavonoids were the following: quercetin, naringin, chrysin and naringenin [5]. The specific polyphenolic compounds underwent chemical modifications in their substituents peripheral to the A and C rings, thereby inducing new functional modalities capable of exerting influence over the function of bacterial physiology. The derived products, mainly involving ether and oxime moieties, were subsequently employed in microbiological studies seeking to evaluate their antimicrobial properties and evaluate the extent of their antioxidant potential. The result of the study set the stage for the development of new hybrid flavonoids and derivatives thereof, so as to enhance the antimicrobial arsenal of options when

bacterial insurgents find their way into a) nutritional resources, traditionally used in human diet or products destined for human consumption, and b) humans, thereby affecting their health.

References

- [1]. S. Gharibi, B.E. Sayed Tabatabaei, G. Saeidi, M. Talebi, A. Matkowski, *Phytochemistry*. 162 (2019) 90-98.
- [2]. C. Brunetti, F. Sebastiani, M. Tattini, *Plant Sci.* 280 (2019) 448-454.
- [3]. B. Salehi, A. Venditti, Sharifi, M. Rad, D. Kręgiel, J. Sharifi-Rad, A. Durazzo, M. Lucarini, A. Santini, E.B. Souto, E. Novellino, H. Antolak, E. Azzini, W.N. Setzer, N. Martins, *Int. J. Mol. Sci.* 20(6) (2019 Mar 15;20(6)
- [4]. B.A. Lakshmi, S. Kim, *Colloids Surf B Biointerfaces*.178 (2019) 230-237.
- [5]. [H. Manman, C. Weilan, L. Zhimin, P. Liang, H. Lixia, C. Min, *J. Inorg. Biochem.* 2019 (195) 13-19.

P19

Improvement of flavonoid nano-technology against alzheimer-type neurodegeneration

Christiane M. Nday,¹ Graham Jackson,² Athanasios Salifoglou¹

¹ Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

² Department of Chemistry, University of Cape Town, Rondebosch 7700, Cape Town, South Africa

E-mail: christiane.nday@yahoo.com; christianen@auth.gr

Alzheimer's disease (AD) is directly linked to neurodegenerative processes triggered by a variety of genetic and environmental factors, including oxidative stress [1]. The treatment of the latter pathology is a long-time problem for early prevention of neurodegeneration initiation. Furthermore, it constitutes a research challenge for the diagnosis and potential treatment of AD. The research into the field of oxidative stress has so far attracted attention to the emergence of new antioxidants for potential treatments in Alzheimer's neurodegeneration, aiming at the ability of these substances to (a) cross the blood-brain barrier (BBB), and thus b) provide neuroprotection, the antioxidant shield against histological lesions. Hence, the research challenge of addressing oxidative stress in the neurodegeneration process with natural antioxidants, emerges as a dominant research topic, with flavonoids (natural polyphenol compounds) being the starting point for new approaches. To promote effective antioxidants through BBB toward sensitive brain loci, new technological advancements in materials are needed at the molecular level. Herein, the synthesis of base-catalyzed silica gel matrices modified with PEG 3000, comparison and evaluation of the suitability of matrices as potential carrier materials for the controlled release of the antioxidant flavonoids were achieved [2,3]. The new hybrid nanomaterials have contributed to a) the achievement of improved therapeutic activity, protection against flavonoid degradation, pharmacokinetic optimization, and control of its biodistribution, and b) decreased cytotoxicity as a result of a slower yet efficient flavonoid release, counteracting oxidative stress in AD. Collectively, the current study draws in and expands knowledge from bio-inorganic approaches applied into neuroscience, thereby exemplifying multidisciplinary strategies of therapeutic significance in AD.

Acknowledgements

The authors would like to acknowledge Greek IKY Financial Support of Excellence for Postdoctoral Researchers NSRF 1st Cycle for 2014-2020 -MIS 5001552.

Literature

- [1]. Z. Liu, T. Zhou, A.C. Ziegler, P. Dimitrion, L. Zuo, *Oxid. Med. Cell Longev.* (2017) 2525967.
- [2]. E. Halevas, C. M. Nday, A. Salifoglou, *J. Inorg. Biochem.* 163 (2016) 240-249.
- [3]. C. M. Nday, E. Halevas, G. Jackson, A. Salifoglou, *J. Inorg. Biochem.* 145 (2015) 51-64.

P20

Encapsulated naringin in pegylated nanoparticles against neurodegenerative processes

Christiane M. Nday,¹ Graham Jackson,² Athanasios Salifoglou¹

¹ Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

² Department of Chemistry, University of Cape Town, Rondebosch 7700, Cape Town, South Africa

E-mail: christiane.nday@yahoo.com; christianen@auth.gr

It is well-known that during Alzheimer's disease (AD) onset and progression, gradual yet extensive neurodegenerative lesions occur in the human brain, subsequently affecting cognition and memory functions in patients [1]. Among a multitude of causative factors, oxidative stress induces changes that are eventually accompanied by a gradual irreversible loss of synaptic connectivity, leading to the death of neurons [2]. However, with increasing age and oxidative stress, the blood brain barrier (BBB) becomes progressively compromised, to the degree that undesirable substances are more easily transported in and out of brain sensitive loci [3]. Until today, no therapy has been available for Alzheimer's disease patients. Lately, mounting scientific efforts have focused and led to research experimentation taking advantage of the beneficial antioxidant properties of natural products, thereby retarding progression of the disease. Such substances include natural polyphenol agents involving flavonoids, which inherently could stand against processes leading to neurodegenerative (bio)chemical activity [4,5,6]. For that reason, in the current investigation, molecular approaches were brought up in order to enhance the antioxidant capacity of flavonoids against neurodegeneration. To that end, efforts were made to develop more effective flavonoid agents by encapsulating naringin into modified PEG 3000 silica nanoparticles. Overall, our findings revealed rising protective effects of naringin encapsulated in pegylated silica nanoparticles. The latter were employed to counteract copper-linked oxidative stress mediating neurodegeneration in primary rat neuronal and glial hippocampal cultures. The functional biological reactivities of the novel flavonoid nanoparticles were in line with their physicochemical features, reflecting the a) differential nature of the structural assemblies of the new nanoparticles, thereby distinguishing them from other polymeric and liposomal drug carriers, and b) significance and impact of PEG-associated surface modifying chemistry in the synthetic assembly of the nanocarriers. The encapsulated flavonoid nanoparticles deserve further inquiry into applications, including *in vivo* work, as they may be useful in the pursuit of encapsulation of (pro)drugs with a relatively high therapeutic dose and release rate at specific sensitive loci, thereby delivering therapeutic efficacy linked to locus-specificity.

Acknowledgements

The authors would like to acknowledge Greek IKY Financial Support of Excellence for Postdoctoral Researchers NSRF 1st Cycle for 2014-2020-MIS 5001552.

Bibliography

- [1]. G.M. Kerbler, J. Fripp, C.C. Rowe, V.L. Villemagne, O. Salvado, S. Rose, E. Coulson, *J NeuroImage: Clinical* 7 (2015) 105-113.
- [2]. R.H. Takahashi, E. Capetillo-Zarate, M.T. Lin, T.A. Milner, G.K. Gouras, *Neurobiol. Aging* 31 (2010) 1145-1152.
- [3]. L.E. Scott, C. Orvig, *Chem. Rev.* 109 (2009) 4885-4910.
- [4]. J. Hong-Fang, Z. Hong-Yu *J. Mol. Struct.-THEOCHEM* 7 (2006) 673-679.
- [5]. R.J. Williams, J.P.E. Spencer, *Free Radical Biol. Med.* (2012) 5235-5245.
- [6]. W.Luo, Y.B. Su, C. Hong, R.G. Tian, L.P. Su, Y.Q. Wang, Y. Li, J.J. Yue, C.J. Wang *Bioorg. Med. Chem.* 21 (2013) 7275-7282.

P21

Quercetin in magnetic silica nanoparticles. application against Cu(II)-mediated neurodegenerative processes

Christiane M. Nday,¹ Graham Jackson,² Athanasios Salifoglou¹

¹ Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

² Department of Chemistry, University of Cape Town, Rondebosch 7700, Cape Town, South Africa

E-mail: christiane.nday@yahoo.com; christianen@auth.gr

Neuronal connectivity, which promotes learning and memory functions, deteriorates progressively during brain neurodegenerative pathological conditions, such as Alzheimer's disease (AD) [1,2]. Cu(II)-mediated oxidative stress has been shown to play a pivotal role in regulating redox reactions, leading to the formation of RNS/ROS, major culprits in AD [3,4]. The antioxidant properties of flavonoid quercetin in neurodegenerative processes have been well-documented [5,6]. However, quercetin magnetic encapsulation in nanoparticles (MQNPs) may further protect neuronal survival and morphological connectivity, all properties that have been poorly demonstrated. To investigate potential effects of nano-encapsulated quercetin on neuronal survival and synaptic morphology in primary rat hippocampal neurons, PEGylated silica nanoparticles were synthesized. Quercetin was loaded on silica nanoparticles in a concentration-dependent fashion, and release studies were carried out using UV-Visible spectroscopy. Further physicochemical characterization of the novel MQNPs included elemental analysis, particle size, z-potential, FT-IR, BET, TGA, and SEM analysis in order to optimize material composition linked to the delivery of loaded quercetin in the hippocampal cellular milieu. The findings reveal that, under Cu(II)-induced oxidative stress, the loading ability of the MQNPs was concentration-dependent, based on their quercetin release profile. The overall bio-activity profile of the new hybrid nanoparticles a) denoted their enhanced protective activity against oxidative stress as well as hippocampal cell survival in comparison to previous results on quercetin, b) revealed that the emerging synaptic loss cannot be effectively counterbalanced at high copper concentrations, and c) established the basis for in-depth perusal of molecular events in synaptic processes, thus promoting preventive medical nanotechnology in neurodegeneration.

Acknowledgements

The authors would like to acknowledge Greek IKY Financial Support of Excellence for Postdoctoral Researchers NSRF 1st Cycle for 2014-2020 -MIS 5001552.

References

- [1]. G.S. Bloom, JAMA Neurol. 71 (2014) 505-508.
- [2]. T.L. Spires-Jones, B.T. Hyman, Neuron 82 (2014) 756-771.
- [3]. M.G. Savelieff, S. Lee, Y. Liu, M.H. Lim, ACS Chem. Biol. 8 (2013) 856-865.
- [4]. X. Huang, R.D. Moir, R.E. Tanzi, A.I. Bush, J.T. Rogers, Ann. N. Y. Acad. Sci. 1012 (2004) 153-163.
- [5]. T. Nakagawa, T. Yokozawa, K. Terasawa, S. Shu, L.R. Juneja, J. Agric. Food Chem. 50 (2002) 2418-2422. Y. Huang, N.W. Chan, C.W. Lau, X.Q. Yao, F.L. Chan, Z.Y. Chen, Biochim. Biophys. Acta 1427 (1999) 322-328.

P22

Structural investigation and physicochemical properties of binary materials of Thallium with organic substrates.

Sevasti Matsia, Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Tel.: 2310-996-179, Fax: 2310-996-196.

E-mail: sevi.matsia@hotmail.com, salif@auth.gr

Thallium is a heavy p-block metal. It is a toxic element and especially interesting because of its uncommon chemical reactivity properties [1]. This metal forms compounds in the monovalent and trivalent state, with Tl(I) emerging as the most stable one. So, it has been used in the synthesis of organometallic compounds [2] and semiconductor materials, superlattices, and quantum dots [3]. The stability of monovalent thallium is based on the stereo-chemically active lone pair of electrons [1]. Thallium exists in the earth's crust in the form of salts and minerals or usually combined with other elements. It is used in a plethora of manufacturing processes, such as electronic devices, smelting plants, cement factories and in common medical applications [4]. As a consequence, thallium could be released to the atmosphere and can affect several tissues and systems (epidermal, cardiovascular, reproductive etc.) [4]. Despite the aforementioned, thallium has been used as a radiopharmaceutical for myocardial imaging [5], in scintigraphy, in peripheral and intrathoracic lymphoma (Hodgkin and non-Hodgkin) [6], and myocardial perfusion tomography in clinical cardiology, taking into consideration its toxicological profile [7]. Moreover, ignoring the fact that it is a toxic metal, a number of investigations demonstrate that both Tl(I) and Tl(III) can interact with membrane phospholipids, thereby changing their physical properties [8]. Related to these and the few studies that have been carried out around this field, we were prompted to investigate the structural speciation of binary thallium(I)-hydroxycarboxylic acid systems in aqueous media. The organic ligands employed in this study include a) mandelic acid, with a bulky and hydrophobic phenyl group on one side and a hydrogen atom on the other side of the central α -hydroxycarboxylic acid moiety, b) citric acid with two $-\text{CH}_2\text{COOH}$ groups, c) glycolic acid with two hydrogens, and d) lactic acid with a $-\text{CH}_3$ and a hydrogen atom attached to the central α -hydroxycarboxylic acid moiety. The arising and isolated crystalline materials were characterized physicochemically by elemental analysis, FT-IR and X-ray crystallography, NMR (in the solid state and in solution) and Mass Spectroscopy. The overall results suggest that thallium, in its stable Tl(I) oxidation state, forms binary interacting polymeric systems in the presence of α -hydroxycarboxylic acids, thus promoting further investigation of its toxicity profile at low concentrations (1-100nM) and the possible interaction with potassium-dependent processes, such as the ones developing entirely through gap junction proteins (potassium channels). The arising interactions of Tl(I) with selective physiological organic ligands and

the Tl-induced interactions with distinct biological targets emerge as significant contributors of its diverse biological profile.

References

- [1]. K. Akhbari, A. Morsali, *Inorg. Chim. Acta* 362 (2009) 1692-1700.
- [2]. McKillop, J.D Smith, I.J. Worrall, *Organometallic Compounds of Aluminum, Gallium, Indium and Thallium*. Springer-Science+Business Media, B.V., 1985.
- [3]. S. Aldridge, A.J Downs, *The Group 13 Metals Aluminium, Gallium, Indium and Thallium: Chemical Patterns and Peculiarities*. John Wiley & Sons, Ltd., 2011.
- [4]. S.V. Verstraeten, *J. Toxicology* 222 (2006) 95-102.
- [5]. F.J.T. Wackers, *Thallium-201 and Technetium-99m-Pyrophosphate Myocardial Imaging in the Coronary Care Unit*. Nijhoff Publishers, The Hague, 1980.
- [6]. A.D. Waxman, D. Eller, G. Ashook, L. Ramanna, M. Brachman, L. Heifetz, P. McAndrews, H. Bierman, R. Taub, M. Avedon, F. Wall, *The J. Nuclear Medicine* 37 (1996) 46-50.
- [7]. D.J. Pennell, R. Underwood, D.C. Costa, P.J. Ell, *Thallium Myocardial Perfusion Tomography in Clinical Cardiology*. Springer-Verlag, London Limited, 1992.
- [8]. M.S. Villaverde, S.V. Verstraeten, *Arch. Biochem. Biophys.* 417 (2003) 235–243.

P23

Biological activity of novel well-defined Ti(IV)-(α -hydroxycarboxylic acid) complexes in metabolic (patho)physiology.

Olga Tsave, Aikaterini Iordanidou, Athanasios Salifoglou

Laboratory of Inorganic Chemistry, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

E-mail: salif@auth.gr

Over the past decades, extensive research has focused on the discovery of novel metal elements, complexes of which with organic substrates could potentially provide an alternative choice in the treatment of certain diseases. Platinum (cisplatin and oxaliplatin), was the first metal used in platinum-based complexes, with remarkable anticancer properties used in the treatment of many types of tumors until now. After that tremendous discovery, efforts were made in the design and synthesis of novel metal-based complexes with anticancer, antimicrobial properties, etc [1-3]. Pt(II,IV), Ru(II,III), Au(I,III) and Ti(IV) are the metals that have been studied mostly due to their special physicochemical characteristics and their favorable biological response. Following the success of platinum-based chemotherapy, titanium (IV) complexes were among the first non-platinum compounds to be tested for cancer treatment. The advantage of titanium compounds lies in their high efficacy and low toxicity. In a cellular milieu, hydrolysis leads to the safe and inert titanium dioxide [1-3]. Despite these advantages the first candidate compounds failed clinical trials. Further research resulted in the creation of potentially effective, selective, and stable titanium-based drugs. Unfortunately, their mode of action is not yet well-understood. More specifically, budotitane (bzac)₂Ti(OEt)₂ and titanocene dichloride (Cp₂TiCl₂) have been the first most promising titanium complexes that were led into clinical trials. However, formulation issues, i.e. the fast hydrolysis of titanium compounds to the irreversible formation of the inert TiO₂ and the loss of their labile groups in aqueous solution under physiological conditions resulted in the obstruction of the clinical trials. Based on the similarities that Ti(IV) and V(V) ions exhibit (similar electronic configuration, structural similarities on titanium and vanadium complexes, etc.) prompted us to investigate/improve the biological profile of novel soluble Ti(IV) complexes with low molecular mass α -hydroxycarboxylic acids, which were isolated and fully physicochemically characterized in our lab. Experiments in representative in vitro models of metabolism (3T3-L1, C2C12 and Saos-2) were run with respect to cell viability, cell migration, cell morphology, and apoptosis/necrosis. The obtained results signify the importance of the substrate, to which the metal ion is ligated (bioavailability, solubility), with the biological profile of the titanium biobehavior being concentration-, time- and tissue-dependent. The overall results suggest that titanium complexes can be further used in metallodrugs research (anticancer, antidiabetic, antimicrobial).

References

- [1] N. Muhammad, Z. Guo, Current Opinion in Chemical Biology 19 (2014) 144–153.
- [2] M. Dakanali, E.T. Kefalas, C.P. Raptopoulou, A. Terzis, G. Voyiatzis, I. Kyrikou, T. Mavromoustakos, A. Salifoglou, Inorganic Chemistry, 42 (2003) 4632-4639.
- [3] E. Melendez, Clinical Reviews in Oncology/Hematology 42 (2002) 309-315.

P24

The development of a new functional polynuclear Ti(IV)-carboxylic acid complex. Synthesis, characterization and in depth structure-properties investigation

Aikaterini Iordanidou, Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, 54124, Tel. 2310-996-179, Fax: 2310-996-196.

E-mail: theskiordani@yahoo.com, salif@auth.gr

The discovery of novel metal compounds with special lattice architectures and functional properties has always been at the center of the scientific interest. Titanium is a versatile transition metal with tremendous merit in the field of biomaterials. It is a metal element known for its attractive biological and more importantly biomedical properties. High corrosion and mechanical resistance, lightness, excellent biocompatibility, favorable biological response with live tissues and low toxic profile are among some of titanium's unique characteristics [1]. Titanium is considered as a material of choice for many industrial applications, with a prominent role in the manufacture of medical and dentistry artificial implants [2,3,4]. Besides, it is a promising metal element in medicinal chemistry as well, offering a new choice for chemotherapy etc [5,6]. The most representative titanium compound is Cp_2TiCl_2 , exhibiting strong antiproliferative activity in initial studies against many types of cancer. Moreover, other titanium compounds with antiproliferative activity were synthesized as halides and pseudo halides of titanocene Cp_2TiX_2 , $\text{X}=\text{F}, \text{Br}, \text{I}$, etc [6].

The synthesis and isolation of novel titanium coordination complexes with favorable structural characteristics and special potential properties is our major scientific target. In this study, we report the synthesis and isolation of a new polynuclear Ti(IV)/citrate/2,2'-bipyridine compound in aqueous media. The compound was fully physicochemically characterized. It is worth pointing out the fact that addition of the aromatic chelator 2,2'-bipyridine leads to the synthesis of lattice matrices with potential applications (luminescence, porosity, etc.).

The study of the link between the structure of the compound, and thus its lattice, with its special features and the potential biological as well as other functional (luminescent) properties currently ongoing reveals structure-chemical reactivity attributes that formulate the basis for the establishment of a new class of poly(functional) water soluble Ti(IV)-compounds.

References

- [1] M. Niinomi, Met. Mater. Trans A. 32A (2001) 477–486.
- [2] J.R.P. Jorge, V.A. Barao, J.A. Delben, • L.P. Faverani, • T.P. Queiroz, W.G. Assuncao, J. Indian Prosthodont. Soc. 13(2) (2013) 71–77.
- [3] J. Acero, et.al., J. Cranio-Maxilofacial Surgery 27 (1997) 117-123.
- [4] M. Geetha, A.K. Singh, R. Asokamani, A.K. Gogia, Progress in Materials Science 54 (2009) 397–425.
- [5] T.A. Immel, M. Grützke, E. Batroff, U. Groth, T. Huhn, J. Inorg. Biochem. 106 (2012) 68–75.
- [6] E. Melendez, Critical Reviews in Oncology/Hematology 42 (2002) 309–315.

P25

Structure-specific adipogenic activity of binary/ternary V(V)-Schiff base materials. Structure-function correlations toward insulinmimesis at the molecular level

Olga Tsave¹, Maria P. Yavropoulou², John G. Yovos², Athanasios Salifoglou¹

¹*Laboratory of Inorganic Chemistry and Advanced Materials, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece. E-mail: salif@auth.gr*

²*Division of Clinical and Molecular Endocrinology, 1st Department of Internal Medicine, AHEPA, University Hospital, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece. E-mail: margia@med.auth.gr*

Although vanadium is not an endogenous metal ion for humans, it exerts significant biological activity in certain (patho)physiologies [1]. Among its roles in the regulation of intracellular signalling, energy metabolism, and insulin mimesis, its exogenous activity stands as a contemporary challenge currently under investigation and a goal to pursue as a metallodrug against Diabetes mellitus II. In this regard, the adipogenic activity of vanadium linked to the development of well-defined insulin mimetic vanadodrugs has been investigated through: a) specifically designing and synthesizing Schiff base organic ligands L, bearing a variable number of tethered terminal alcohols and, b) a series of well-defined soluble binary/ternary V(V)-L compounds synthesized and physicochemically characterized, c) a study of their cytotoxic effect and establishment of adipogenic activity in 3T3-L1 fibroblasts differentiating into mature adipocytes, and d) biomarker examination (PPAR- γ , GLUT 1,3,4, ADIPOQ) of closely-linked molecular targets involving or influenced by the specific V(V) forms, cumulatively delineating factors involved in potential pathways linked to V(V)-induced insulin-like activity. The overall results a) project the importance of specific structural features in Schiff ligands bound to V(V), thereby influencing the emergence of its (a)toxicity and for the first time its insulin-like activity in pre-adipocyte differentiation, b) contribute to the discovery of molecular targets influenced by the specific vanadoforms seeking to induce glucose uptake and thus metabolism, and c) indicate an interplay of V(V) structural speciation and cell-differentiation biological activity, thereby gaining insight into vanadium's potential as a future metallodrug in Diabetes mellitus [2].

References

- [1] K.H. Thompson, Y. Tsukada, Z. Xu, M. Battell, J.H. McNeill, C. Orvig, *Biol. Trace Elements Res.* 86 (2002) 31-44.
- [2] E. Halevas, O. Tsave, M. Yavropoulou, J.G. Yovos, A. Hatzidimitriou, V. Psycharis, A. Salifoglou, *J. Inorg. Biochem.* 152 (2015) 123-137.

P26

Vanadium downregulates autophagic flux and inhibits metastatic Niche by induction of trail-induced apoptosis in cancer cells.

Savvas Petanidis¹, Efrosini Kioseoglou¹, Doxakis Anastakis², Margarita Hadzopoulou-Cladaras³, Athanasios Salifoglou^{1*}

¹Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece, E-mail: salif@auth.gr

²Laboratory of General Biology, Medical School, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece.

³Department of Genetics, Development and Molecular Biology, School of Biology, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece.

The antitumor characteristics of vanadium and its ability to inhibit cancer cell growth and metastasis is known [1]. However, the molecular mechanism by which vanadium inhibits carcinogenesis is still unknown. The present study shows that a newly synthesized and characterized well-defined ternary vanadium-peroxido-betaine form down-regulates autophagy and EMT transition through augmentation of TRAIL-induced apoptosis in breast epithelial MCF-7 and lung adenocarcinoma A549 cells. Inhibition of autophagy by siRNA or 3-MA increases TRAIL-mediated apoptosis and inhibits the invasive phenotype of cancer cells. Moreover, vanadium reduces NF- κ B binding to *Becn1* promoter, thereby preventing initiation of autophagy and abnormal proliferation. In search of a mechanistic insight into the above observations, it is demonstrated that vanadium directly targets autophagosome formation and reduces LC3-I and II expression, both of them important molecules involved in autophagy. The accruing results suggest that inhibition of autophagy by vanadium allows cancer cells to undergo apoptosis, thereby contributing to reduction in cancer cell invasion and metastasis [2,3]. Collectively, the work a) identifies a biologically active antitumor novel vanadoform containing peroxido and betaine moieties, and b) reveals a crucial role for vanadium in autophagy inhibition, thereby providing new molecular perspective(s) into finely configuring vanadoforms for cancer drug research and therapy.

Acknowledgments

Financial support by “IKY Fellowships of Excellence for Post Doctoral studies in Greece – Siemens Program” is gratefully acknowledged.

References

- [1] S. Petanidis, E. Kioseoglou, M. Hadzopoulou-Cladaras, A. Salifoglou, *Cancer Lett.* 335 (2013) 387-396.
- [2] L. Qiang, Y.Y. He, *Autophagy* 10 (2014) 1864-1865.
- [3] Z. Su, Z. Yang, Y. Xu, Y. Chen, Q. Yu, *Mol. Cancer* 14 (2015) 48

P27

Hybrid peroxido vanadate complexes as advanced materials in biological systems

Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry and Advanced Materials, Aristotle University of Thessaloniki, 54124, Tel . 2310-996-179, Fax: 2310-996-196, E-mail: efi.kioseoglou@gmail.com, salif@auth.gr

Nowadays, cancer is the second most common cause of death after heart disease. It is a multifunctional disease and its development takes place in many stages. During those stages, cells differentiate from their initial form, ultimately being led to uncontrolled cell division, abnormal cell differentiation, avoiding cell death. Metal compounds have shown, over the past decades, that they are an important source of therapeutic agents for effective cancer treatment.

However, hybrid metal-containing agents, capable of providing high selectivity and inhibition of defined cancer mechanisms, remain a subject of intense research. For the development of such materials targeting carcinogenicity processes, vanadium metalloforms, which are characterized by specificity in the inhibition of tumorigenesis, metastases, and immune system activation in tumor tissue samples are proposed [1-5].

Vanadium is known for its anticancer properties. It plays an important role in cellular processes and affects specific biomolecules involved in tumor cell physiology. The peroxido-vanadate materials are nowadays an intensely investigated subject mainly due to the importance of their activity in biological systems. The need for well-defined such binary-ternary material enhances the use of vanadium in biological systems, thus providing a fertile field of research with concrete applications. The new hydrolytically stable and highly effective complexes were characterized by elemental analysis, FT-IR, Raman, NMR spectroscopy in solution and the solid state, UV-Visible, cyclic voltammetry, thermal gravimetric analysis (TGA) and X-ray crystallography, gas chromatography–mass spectrometry total ion chromatogram (GC-MS-TIC) and gas chromatography–flame ionization detection (GC-FID) [6,7]. The physicochemically characterized materials possess properties that render them competent candidates for further experimental work at the in vitro and in vivo level against cancer initiation and propagation processes.

References

- [1]. V. Tayal, B.S. Kalra, Eur. J. Pharmacol. 579 (2008) 1–12.
- [2]. V.S. Wheeler, Semin. Oncol. Nurs. 12 (1996) 106–114.
- [3]. A. Sahoo, S.H. Im, Int. Rev. Immunol. 29 (2010) 77–109.
- [4]. M. Ferrari, Nat. Rev. Cancer 5 (2005) 161–171.
- [5]. D.T. Marie-Egyptienne, I. Lohse, R.P. Hill, Cancer Lett. 341 (2013) 63–72.

- [6]. E. Kioseoglou, C. Gabriel, S. Petanidis, V. Psycharis, C.P. Raptopoulou, A. Terzis, A. Salifoglou. Zeitschrift für Anorg. und Allgem. Chemie 639(8-9) (2013) 1407–1416.
- [7]. C. Gabriel, M. Kaliva, J. Venetis, P Baran, I. Rodriguez-Escudero, G. Voyiatzis, M. Zervou, A. Salifoglou, Inorg. Chem. 48 (2009) 476–487.

P28

Optimizing peroxido-vanadate chemotherapeutics

Efrosini Kioseoglou, Savvas Petanidis, Athanasios Salifoglou

Department of Chemical Engineering, Laboratory of Inorganic Chemistry, Aristotle University of Thessaloniki, 54124, Tel . 2310-996-179, Fax: 2310-996-196, E-mail: efi.kioseoglou@gmail.com, salif@auth.gr

The use of V(V)-peroxido species in binary as well as ternary complex formulations with zwitterions substrates emerged as a promising idea into the development of vanadium-based metallodrugs against various malignancies and especially diabetes type 1 and 2 (Diabetes mellitus I and II) and cancer. To this end, several V(V)-peroxido compounds have been designed and synthesized as potential insulin mimetic and anticancer agents. From these interactions, those of low molecular mass ligands are a challenging case of biomolecules, perhaps of comparable biological significance to those resulting from high molecular mass biomolecules, such as peptides and proteins. Understanding the interactions between such hybrid vanadium-peroxido molecules and cellular biotargets was one of the major goals of research in the past, with specific objectives aspiring to the bioavailability and solubility of vanadium complexes with organic ligands in biological fluids.

It is a well-known fact that the anticarcinogenic behavior of vanadium-peroxido complexes can be associated with the chemistry of the peroxido group bound to vanadium centers. In this research effort, the designed complexes have been examined for their anti-proliferative properties. The biological activity of these complexes, however, is not clear yet and further study of their biochemistry is needed. Formation of peroxido vanadates is very fast in acidic solutions and slower at higher pH. Simultaneous interactions of compounds containing both V(V) vanadate and hydrogen peroxide (H₂O₂) appear to enhance the biological effects of the metal in various cell lines, probably due to the well-defined peroxido-vanadate complex formation. Therefore, significant merit emerges toward further studies attempting to clarify the potential role of V(V)-peroxido species in interactions with immune system modulators as well as other transcription factors influencing immune signaling. Concurrently, vanadodrug regulation for reversing drug resistance and targeting immunosuppressive tumor networks emerges as a useful tool with (in)direct implication in immunotherapeutics [1-4]. The emerging species possess the chemical components-ingredients that could render vanadium, in its V(V) oxidation state, capable of promoting chemistries that inflict apoptotic damage to cancer cells in a structure-specific fashion.

References

- [1]. B. Desoize, *Anticancer Res.* 24 (2004) 1529–1544.
- [2]. C.R. Waidmann, A.G. Di Pasquale, J.M. Mayer, *Inorg. Chem.* 49 (2010) 2383–2391.
- [3]. V. Conte, F. Di Furia, S. Moro, in: A.S. Tracey, D.C. Crans (Eds.), *Vanadium Compounds: Chemistry, Biochemistry and Therapeutic Applications*, ACS Symposium Series, vol. 711, ACS Publications, Washington DC, 1998 (Chapter 10).
- [4]. A. Morinville, D. Maysinger, A. Shaver, *Trends Pharmacol. Sci.* 19 (1998) 452–460.

P29

The effects of hydrocolloids addition on the reological characteristics of the dough and gluten-free bread properties

Sorina Ropciuc, Georgiana Gabriela Codina, Ana Leahu, Cristina Damian

Stefan cel Mare University of Suceava/Faculty of Food Engineering, Suceava, Romania
sorina.ropciuc@fia.usv.ro, sorinaropciuc@yahoo.com

The aim of this study was to analyze the effects of including hydrocolloids and gums in a bread recipe gluten free flour rye and oats on the rheological properties of gluten-free dough on some quality characteristics of bread. Due to the structure-forming properties, gums and hydrocolloids are essential ingredients in gluten-free bread formulations to improve the dough consistency and gas retention capacity, texture and bread appearance and extend the freshness of the products. The sample preparation mixture was formed in the following variants of prescription: a. 100 g rye flour, 2.5 g salt, 2.5 g yeast and 1-2% sodium alginate; b. 100 g oat flour, 2.5 g salt, 2.5 g yeast and 1-2% xanthan gum. The amount of water was set for each mixture based on the hydration capacity. The rheological properties of the dough were determined, the viscoelastic module using the HAAKE MARS 40 rheometer. Bread samples were analyzed in terms of volume, porosity, color and humidity. The addition of hydrocolloids has generally produced positive effects on the texture of the bread by increasing the specific volume and core porosity. Many previous studies have shown that hydrocolloids can improve volume and texture of gluten-free bread. The largest increase in specific volume was observed for bread with oat alginate.

Keywords: gluten free, porosity, color, viscoelastic modules, texture.

P32

Effect of osmotic dehydration on the colour parameters and chemical characteristics of apple and pear

Ana Leahu, Cristina Ghinea, Mircea Oroian, Cristina Damian, Sorina Ropciuc

Food Engineering Faculty, Stefan cel Mare University of Suceava, Romania

**Corresponding author: analeahu@fia.usv.ro*

Osmotic dehydration is the pre-treatment method of preservation the fruit and vegetable to increase its shelf-life in which these are immersed in concentrated salt or sugar solutions.

The effect of an osmotic dehydration was investigated on the colour and chemical characteristics of dehydrated fruits (apple and pear) in fructose osmotic solutions. Difference in CIE-LAB, chroma - C^* and hue angle H^* were performed with a Chroma Meter CR-400/410. Three aqueous solution of fructose (40, 60 and 80%) were used for dehydration, during 3 h of process at temperatures of 25 °C, with fruit/osmotic agent ratio of 2:1. Water loss and solids gain showed significant differences depending on the concentration of the osmotic agent and process time. The use of highly concentrated osmotic solutions induced losses of phenolic content (TPC) and ascorbic acid in sliced apple, pears and quince. Fructose concentration and osmosis time induce significant increase of a^* and b^* colorimetric parameters but did not affect the lightness (L^*) of pear slices.

Keywords: Osmotic dehydration, apple, pear, colour, polyphenols.

P33

Effect of drying techniques on the total phenolic contents and antioxidant activity of some vegetables byproducts

Cristina Damian^{1*}, Mircea Oroian¹, Ana Leahu¹, Sorina Ropciuc¹, Laura Carmen Apostol¹

¹*Faculty of Food Engineering „Stefan cel Mare” University of Suceava
Universităţii street, no.13, Suceava county, 720229, Romania*

^{*}*Corresponding author, e-mail: cristinadamian@fia.usv.ro*

Vegetables are considered a rich source of antioxidants (flavonoids, carotenoids, vitamins), which are frequently added to stop the process of oxidation in processed food systems. The solid waste generated in food industry was considered as a low cost raw material for the extraction of natural antioxidants. The effect of drying techniques (ambient-drying and oven-drying) on the total phenolic contents and antioxidant activity of selected vegetables byproducts (garlic (*Allium sativum* L.), tomato (*Lycopersicon esculentum* L.) and avocado (*Persea Americana* Mill.)) were studied. Tomato byproducts contained similar amount of total polyphenols and exhibited similar DPPH radical scavenging activity with tomatoes. Avocado seed is a byproduct that contains a large amount of extractable polyphenols, which have attracted the attention of food industry due to their high antioxidant capacity. The amounts of total phenolics (TP) were higher in avocado byproducts followed by tomato and garlic byproducts. The tested vegetables exhibited appreciable radical scavenging capacity ranging from 27.8% to 56%. The results of this study revealed that the amounts of total phenolics and antioxidant activity of all tested vegetables decreased after thermal treatment; more pronounced decline was observed for the ambient-dried samples as against oven-drying.

Keywords: Vegetables, Drying, DPPH scavenging, Phenolic acids

P34

Extraction of Antioxidants from Onion By-products using Eco-friendly Solvents

Cristina Damian^{1*}

¹Faculty of Food Engineering, „Stefan cel Mare” University of Suceava
Universității street, no.13, Suceava county, 720229, Romania

*Corresponding author, e-mail: cristinadamian@fia.usv.ro

Onion solid wastes (OSW) were used as raw material to produce polyphenol and extracts with antioxidant activity. In this study, the antioxidant property of 20% ethanol, 40% ethanol, 60% ethanol, 80% ethanol, 100% ethanol and aqueous extracts of onion (*Allium cepa* L.) byproducts were measured using *in vitro* assays. Among the onion byproducts extracts tested, the 80% ethanol extract showed the best DPPH radical scavenging power. The extracts in question exhibited total phenolic contents ranging from 171,9 to 453,2mg GAE/g of extract. The recovery of value-added substances from onion wastes is an issue with importance pertaining to both the reduction of the waste load released to the environment, and the development of novel, natural food additives with functional properties.

Keywords: Antioxidant activity, Onions, Total phenolic contents, Wastes

P35

Influence of enzymes action on chromatic characteristics and aromatic profile of pre fermented grape juice

Maria-Lidia Iancu^{1*}, Ovidiu Tița¹, Anca-Maria Stoia¹

**"Lucian Blaga" University of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Department of Agricultural Sciences and Food Engineering, 5-7, Ion Rațiu Street, Sibiu, 550012, Romania*

Was tested the limit of perception, the amplitude of the aromatic profile on nine flavor descriptors and the chromatic characteristics for the liquid obtained from white and black grapes, table varieties, which were processed by the action of the enzymes which acted as pectin lyase, pectin esterase, polygalacturonase, hemicellulase, in the form of enzymatic preparations of known action. The chromatic features were highlighted by means of the spectrophotometric technique with optical density measurements in the UV/Vis range and calculating color intensity and hue. The odorants were identified by sensory analysis with the development of the aromatic profile. Although only the Lallzyme EX-V enzymatic preparation has been recommended for the improvement of the chromatic properties, others such as Lallzyme HC (for clarification) and Rohavin Clear (for clarification) have contributed to changing the color perception of pre-fermented juices. They were highlighted the following flavor descriptors: a (fruit, apple, wax), b (citrus, floral, lemon, wax, magnolia), e (lilac, citrus, floral, woody); f (mint, cold, woody), h (sweetish, fruit tutti frutti). The highest values in the intensity of the perception of the flavor components were obtained in the Rohavin Clear variant and ranged between 2.4 and 2.5 out of maximum 3 points, thus proving a synergistic action of the pectinase and the polygalacturonase.

Keyword: grapes, pectinolytic enzymes, UV/Vis spectrophotometer, pre-fermented juices, ODE (odor description)

P36

**Influence of enzymes action on primary quality indicators
of the pre-fermented grape juice**

Ovidiu Tița¹, Maria-Lidia Iancu^{1*}, Anca-Maria Stoia¹

¹"Lucian Blaga" University of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, 5-7, Ion Rațiu Street, Sibiu, 550012, România, Tel: +40-(269) 21.13.38.

The synergistic effects of the combination of pectin lyase, pectinesterase, and polygalacturonase were studied to obtain pre-fermented grape juice. We investigated the production yield of the pressed juice, the density of the sample, the relative density of the sample and of the total extract, the concentration of alcohol, the total extract, the pH, the kinematic viscosity. The methods used were the results of instrumental determination, the Near-infrared spectroscopy (NIRs) combined with the DMA densitometer and the mathematical calculation, for 2 grapes varieties, 3 enzymatic products and 4 work variants (enzyme dosage) for each preparation. Thus, at the minimum addition of enzyme to the recommended dose, the yield increases with: 0.92% (LallzymeEX-V); 13% (Lallzyme HC); 0.96% (Rohavin Clear). After the enzyme action period and the 3 day storage period, an increase in relative density of 0.21-0.25% is observed. For the studied work variants, the action of the enzyme does not influence the variation of the alcohol concentration, other factors of influence being identified. The substances which contribute to increasing the flow resistance of the liquid turn into really volatile compounds and therefore the correlation of the viscosity with the relative density of the sample is below 50%. The total extract increased by 3.5% when using ROHAVIN Clear; by 0.1-0.2% when using Lallzyme HC and by 23% for Lallzyme EX-V. It is modified by the specific action of the enzymes and the fermentation, the pH. For good results the following doses are recommended: LallzymeEX-V - 4 g/100 kg black grapes, Lallzyme EX-V -1g/hl (white grapes), Rohavin Clear -1g/hl.

Keywords: pectinolytic enzymatic activity, NIR measurement, grape juice, production yield, density

P43

Evaluation of bioactive compounds from anew dietetic and functional sorbet

Cosmina M. Bogătean^{1*}, Maria Tofană¹, Emil Racolța¹

¹ *Faculty of Food Science and Technology, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania*

* Corresponding author, e-mail: cosmina.bogatean@usamvcluj.ro

The purpose of this paper was to identify the effect of the addition of blueberries in the finished dietary and functional product, sorbet with isomalt and maltitol, regarding the content in polyphenols and antioxidant activity.

Total polyphenols were determined by the Spectrophotometric method Folin-Ciocalteu using Spectrophotometer (UV-1700, Pharma Spec, Shimadzu).

Antioxidant capacity was determined by evaluating the Free Radical Scavenging effect on the 1,1-difenyl-2-picrylhydrazyl (DPPH) radical. The absorbance of the samples was measured at 515 nm (UV-1700, Pharma Spec, Shimadzu).

In the case of atomized blueberries, the content of polyphenols decreases significantly compared to whole blueberries fruit (“362,26/339,55 mg/100g; 575,00/636,01 mg/100g; 642,65/985,00 mg/100g”) and the functional product (“222,54/310 mg/100g; 421,05/573,90 mg/100 g; 600,91/780,65 mg/100 g”), which means that by atomization the total surface of oxygen in the air increases, increasing the risk of oxidation of phenolic compounds, and it would be desirable for the blueberries to be added whole.

There are no significant differences in the determination of antioxidant activity between the blank samples (57.82%, 72.79%, 83.99%, 72.20%, 75.88%, 83.84) and dietary product variants (61.72%, 74.33%, 84.58%, 77.43%, 82.59%; 87.53%), also there are no significant differences between samples with the whole and atomized blueberries.

Keywords: antioxidant capacity, polyphenols, dietary and functional sorbet, blueberries.

P45

Functional dependence of energy intake relative to the fat content of different types of cheeses

Sofia Popescu¹, Antoanela Cozma¹, Dacian Lalescu¹, Daniela Stoin, Ariana- Bianca Velciov^{*1}

¹ Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania

Corresponding author: e-mail: ariana.velciov@yahoo.com

Nowadays, on the market, consumers could find a large number of cheese types, whose diversity is based on differences in texture, functional properties, flavor and aroma. High energy intake provided by placing cheese in the diet is due to its high content of nutrients. The goal of this paper is to test if there are any functional dependencies between some nutritional characteristics (energy input relative to the fat content) in case of 20 different cheeses (including fresh, soft-ripened, semi-hard, hard, pasta filata, blue cheese and low fat varieties).

The samples were analyzed for their chemical composition (proteins, fat, and carbohydrates). The protein content of the samples was estimated by the Kjeldahl method; the fat was determined by Soxhlet extraction method; total carbohydrates were calculated by difference. The caloric values in case of analyzed cheese types were calculated by using the Atwater energy conversion factors.

The data were statistically processed using Statistica 10. The results look for the existence for statistically significant linear correlations and functional dependencies between some nutritional characteristics of the analyzed cheese types. From the obtained data we can observe a strong linear relationship between energy and fat values, aspects on which the linear dependence of energy relative to fat content is based.

Keywords: cheese, energy, fat, functional dependence

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

P46

The development of the Romanian food industry

**Viorica-Mirela Popa^{1*}, Diana Nicoleta Raba¹, Camelia Moldovan¹,
Delia-Gabriela Dumbravă¹, Aurica-Breica Boroza¹**

¹ Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania

* Corresponding author, e-mail: mirevio_gh@yahoo.com

At the beginning of 2016, the local food industry is dominated by 50 large companies, accounting for less than 1% of the total of approximately 8,400 firms active in the field. The 50 companies make over 40% of the Romanian food production and earn a profit of over 4 billion euros. The food industry accounts for 27% of the total value of agricultural production. It provides over 180,000 jobs, ie 11.6% of the total number of employees in the Romanian industry and 2.1% of the total workforce in Romania. The food and beverage industry in Romania, a market of over 10 billion euros, registered a 6.1% increase in production in 2008, namely 8.1% of the turnover compared to the same period in 2017, figures that rank the country first in the European Union, according to Eurostat data quoted by Food Drink Europe.

Keywords: food industry, agricultural production, the romanian industry, fiscal value

Acknowledgments:

PNCI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

P47

The evolution of the retail market in Romania

**Viorica-Mirela Popa^{1*}, Diana Nicoleta Raba¹, Camelia Moldovan¹,
Delia-Gabriela, Dumbravă, Corina Dana Mișcă¹**

¹ Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania

* Corresponding author, e-mail: mirevio_gh@yahoo.com

Lately, the trend of large retailers has been reflected in the expansion of proximity and supermarket segments, a direction that will continue and will mainly affect the small grocery stores of local entrepreneurs.

According to a large census conducted in 2014 on the outlets of non-food food and non-food goods in Romania, the traditional trade is 86222 stores, followed by HoReCa - 34,526 units and modern retail - 1,353 stores. The total area of retail space was 6,857,514 square meters, of which 44.5% traditional retail, 30.5% HoReCa and 25% modern trade. Also, the 12 large retail networks cumulated at the end of 2013 half of the total turnover of the retail market (modern trade and traditional trade).

In 2009, the world economic crisis is making its presence felt in Romania, and as a result of falling consumption, most retailers opt to expand, either by opening smaller shops or by entering other segments, in order to maintain or increase sales market.

Keywords: retail, supermarket, hypermarket, traditional trade, modern trade

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

P48

Cluster analysis for some different types of vegetable oils by the physicochemical characteristics

Antoanela Cozma¹, Ariana Velciov¹, Daniela Stoin¹, Diana Moigrădean¹, Dacian Lalescu¹, Mihaela Petcu¹, Iuliana Crețescu², Adrian Riviș¹

¹*Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timișoara, Timișoara, Romania*

²*"Victor Babes" University of Medicine and Pharmacy from Timisoara, Romania*

Corresponding author: e-mail: iuliana.cretescu@gmail.com

Vegetable oils are a class of natural products commonly used and appreciated due to their nutritional, sensorial, technological principles. Vegetable oils constitutes an important component of human diet often used in daily consumption with beneficial effects for the body balance. The aim of this study was to evaluate and compare some of the physicochemical characteristics (dynamic viscosity, refractive index, surface tension, relative density and acidity index) in case of six food consumption vegetable oils, cold pressed. The analysed oil assortments, in these work were soybean, rapeseed, corn oil, almond, sesame and pumpkin seed oil purchased from the speciality stores with natural products, having different origins. The refractive index was measured using the refractometry method, and the dynamic viscosity using the Ostwald-type viscometer. From the physicochemical analyzed characteristics, it was observed that the values differ from one category of oil to another. Oils density varies from species to species and at the same oil with the conservation conditions (conservation period, climatic conditions in which the plant has developed). Viscosity gives relevant indication of the degree of oil fluidity. The experimental results showed that the highest value for viscosity was registered in rapeseed oil (38,7088cP) and the smallest in soybean oil (34,0174cP). All the data was statistically analyzed using Statistica10. The results showed that there is statistically significant correlation between the physicochemical characteristics for the analyzed types of oils. The purpose of the statistical analysis was to highlight the analysed parameters expressed by cluster analysis.

Keywords: vegetable oils, physicochemical characteristics, statistical evaluation data

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1.

P49

The determination of the bioaccessibility of some essential microelements from cow's cheese

**Mihai Adamescu¹, Despina Maria Bordean¹, Liana Maria Alda¹, Maria Rada²,
Lucian Radu¹, Ana-Maria Ivana^{1*}**

¹*University of Agricultural Sciences and Veterinary Medicine of Banat "King Mihai I of Romania" Timisoara*

²*University of Medicine and Pharmacy "Victor Babes" Timisoara*

**Corresponding author: e-mail: anne_maryutzza@yahoo.com*

The objective of this study was to determine the bioaccessibility of some essential microelements: Fe, Mn, Zn and Cu from cow's cheese purchased from the local market.

To achieve this goal, the total and bioaccessible contents of Fe, Mn, Zn and Cu from the cow's cheese were determined. The minerals total quantities were analyzed by flame atomic absorption spectrometry (FAAS), after calcinations and ash extraction with HNO₃. The bioaccessible amounts were determined using an in vitro gastrointestinal model.

The preliminary results obtained by assessing the bioaccessibility of Fe, Mn, Zn and Cu in the cow's cheese samples taken in the experiment depend on the nature of the element and show values between 10.42% (Zn) and 64.32% (Fe). These differences can be explained by the interactions that are established between the mineral elements and the analyzed cheese matrix components. The study shows that the bioaccessible fraction of microelement in cheese, present the following ascending trend: Zn < Mn < Cu < Fe.

Keywords: bioaccessibility, in vitro gastrointestinal model, microelements, cow's cheese.

Acknowledgments:

PNCDI III 2015-2020 – ID 368 institutional development project: "Ensuring excellence in R&D within USAMVBT" from the institutional performance subprogram 1.2, development of the R&D national system program 1

P50

Bakery assortment functionalized by the use of a malt industry by-product

**Maria Simona Chiș¹, Adriana Păucean¹, Simona Man¹, Sevastița Muste¹, Anamaria Pop¹,
Laura Stan¹, Teodora Coldea¹**

*¹University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology,
3-5 Mănăștur street, 3400, Cluj-Napoca, Romania;
Corresponding author: e-mail address: adriana.paucean@usamvcluj.ro*

This work aimed to produce a new functionalized bakery product by replacing the whole white wheat flour with a by-product from the food industry: barley rootlets. Therefore, protein, amino acid, minerals, total fibre, total phenols and antioxidant activity were analyzed. Also, rheological analyzes like: wet gluten, gluten deformation index, gluten extensibility, water absorption capacity of the mixed samples were determined. With the objective to analyze the acceptability of the new product on the market, sensorial analysis was also made.

In 2008 European Parliament and Council, decided as the first priority for the EU member states the food waste prevention. For every 1000 tons of EU processed material were generated 323 tons of waste (1). For the environmental protection and sustainability, food waste generated from the food industry represent a big problem, according to (2). This work focus in the valorification of a by-product by replacing the whole wheat flour in order to obtain a new functionalized bakery product.

Barley (*Hordeum Vugar L.*) is the main raw material for malting industry, used in the production of beer, malt extracts, whiskey and barley wines. Due to its technological properties and flavour compounds obtained through the malting process of barley, barley malt is used in beer and alcohol industry (3). Malting process of barley includes the following technological operations like: steeping, germination, drying and degermination. During the degermination process, the rootlets results as a by-product.

The total world production of malt is 12MT which means a total amount of 420 KT of rootlets (4). Barley malt rootlets are normally used as an animal feed supplement, but nowadays the researchers attention is focused on the valorification of this by-product in the human diet. According to (5), (4), rootlets are rich in protein (21-25%), crude fibre (14%), free phenolic content and antioxidant activity. Due to its rich chemical composition in protein, amino acids, fatty acids, minerals, dietary fibre and fatty acids, vitamins, rootlets can have positive influence on the human health (6), (7).

In order to replace the whole white wheat flour with rootlets it was used the following ratios: 95:5, 90:10, 85:15. The contents of proteins, amino acids, minerals, total fibre, total phenols and antioxidant increased as the amount of

rootlets increase, but the overall acceptability of the consumers indicates that the product with 5% rootlets is accepted by being the most appreciated by the consumers.

Also, the wet gluten content (%), gluten deformation index (mm), gluten extensibility (cm) decrease as the amount of rootlets increased, except the water absorption capacity which increased as the ratios of rootlets increased.

Keywords: bread, rootlets, by-product, protein, amino acids, minerals

References

1. Hutner P, Thorenz A, Tuma A. Waste prevention in communities: A comprehensive survey analyzing status quo, potentials, barriers and measures. *J Clean Prod.* 2017;141:837–51.
2. Taylor P, Russ W, Meyer-pittroff R, Russ W, Meyer-pittroff R. Processing Industries Utilizing Waste Products from the Food Production and. 2010;(March 2013):37–41.
3. Reis G, Carvalho D, Carregari T, Darros-barbosa R, Bon J, Telis-romero J. Effect of intermittent high-intensity sonication and temperature on barley steeping for malt production. 2018;82(February):138–45.
4. Budaraju S, Mallikarjunan K, Annor G, Schoenfuss T, Raun R. Effect of pre-treatments on the antioxidant potential of phenolic extracts from barley malt rootlets. *Food Chem [Internet].* 2018;266(February):31–7. Available from: <https://doi.org/10.1016/j.foodchem.2018.05.110>
5. Cejas L, Romano N, Moretti A, Mobili P, Golowczyc M, Gómez-Zavaglia A. Malt sprout, an underused beer by-product with promising potential for the growth and dehydration of lactobacilli strains. *J Food Sci Technol.* 2017;54(13):4464–72.
6. Waters DM, Kingston W, Jacob F, Titze J, Arendt EK, Zannini E. Wheat bread biofortification with rootlets, a malting by-product. *J Sci Food Agric.* 2013;93(10):2372–83.
7. Hattingh M, Alexander A, Meijering I, van Reenen CA, Dicks LMT. Malting of barley with combinations of *Lactobacillus plantarum*, *Aspergillus niger*, *Trichoderma reesei*, *Rhizopus oligosporus* and *Geotrichum candidum* to enhance malt quality. *Int J Food Microbiol [Internet].* 2014;173:36–40. Available from: <http://dx.doi.org/10.1016/j.ijfoodmicro.2013.12.017>

Acknowledgements:

We gratefully acknowledge the funding source Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI) within the framework of PNCDI III- PN-III-P2-2.1-CI-2018-1503, project No. 260CI/2018

P51

New assortments of functional gluten free products developed by using quinoa and buckwheat flours

Maria Simona Chiș¹, Adriana Păucean¹, Simona Man^{1*}, Sevastița Muste¹, Anamaria Pop¹, Laura Stan¹, Carmen Pop¹

¹University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania;
Corresponding author: e-mail address: simona.man@usamvcluj.ro

This present study aimed to produce new assortments of functional gluten free products by using pseudocereal flours like quinoa and buckwheat. The market of gluten free products is very poor in bioactive compounds and rich in sugar, salt and calories. A long gluten free diet could have nutritional consequences like micronutrient and mineral deficiencies, folic acid deficiency, malnutrition, vitamin D and calcium deficiencies (1). Therefore, there is a necessity in producing gluten free products that could help to cover the human organism necessities.

Quinoa (*Chenopodium quinoa Willd.*) is a pseudocereal with a very rich chemical composition in protein, amino acids, fatty acids, minerals, dietary fibre, vitamins, antioxidants such as polyphenols and which can have positive effects in human health like: cardiovascular diseases, gastrointestinal health and metabolic diseases (2), (3). Due to its excellent nutritional value, quinoa is named the „mother grain” and *Food and Agriculture Organization of the United Nations* dedicated the year 2013 to this crop (4). Buckwheat (*Fagopyrum esculentum*) has also a precious chemical composition, being rich in amino acids like lysine, in antioxidants such as rutin (3-8%), tocopherols, catechins (5), (6). Also, buckwheat has a good quality protein, a high content in dietary fibre and unsaturated fats being considered as a vasculator protector (5), (7).

Quinoa and buckwheat are raw materials used in the production of gluten free products like bread, pasta, noodles, but to the best of our knowledge, little research were focused on the utilization of the both pseudocereals in pizza dough and lava cake.

In this study products like pizza dough and lava cake were produced with different ratios of quinoa and buckwheat flours. For pizza dough were used 7,5% quinoa flour and the following ratios for buckwheat flour: 7,5% and 10%. For lava cake were used 5% of quinoa flour and 5% respectively 10% of buckwheat flour. In order to analyze the bioactive compounds of the raw materials and of the final baked products there were determined the amount of the protein, antioxidant activity, total phenols, total fat, protein fractions, minerals and the microbial activity. Also, a sensorial analysis with 35 panelits, using hedonic test was made.

Using quinoa and buckwheat flours, the amount of bioactive compounds like protein, antioxidant activity, total phenols and minerals increased due to their rich chemical composition. After the sensorial analysis, the panelists appreciated that lava cake with 5% quinoa flour and 5% buckwheat flour and pizza dough with 7,5 % quinoa flour and 7,5% buckwheat flour are the „tasted” products, reaching the highest acceptability score.

To conclude, it can be said that quinoa and buckwheat could be successfully used in the production of gluten free products.

Keywords: lava cake, pizza dough, quinoa, buckwheat.

References

1. Theethira TG, Dennis M, Leffler DA, Daniel A. gluten-free diet Nutritional consequences of celiac disease and the gluten-free diet. 2017;4124(November).
2. Graf BL, Rojas-silva P, Rojo LE, Delatorre-herrera J, Balde ME. Innovations in Health Value and Functional Food Development of Quinoa (*Chenopodium quinoa* Willd .). 2015;14:431–45.
3. Nowak V, Du J, Charrondire UR. Assessment of the nutritional composition of quinoa (*Chenopodium quinoa* Willd.). Food Chem. 2016;193:47–54.
4. Pellegrini M, Lucas-Gonzales R, Ricci A, Fontecha J, Fernández-López J, Pérez-Álvarez JA, et al. Chemical, fatty acid, polyphenolic profile, techno-functional and antioxidant properties of flours obtained from quinoa (*Chenopodium quinoa* Willd) seeds. Ind Crops Prod. 2018;111(July 2017):38–46.
5. Quettier-deleu C, Gressier B, Vasseur J, Dine T, Brunet C, Luyckx M, et al. Phenolic compounds and antioxidant activities of buckwheat (*Fagopyrum esculentum* Moench) hulls and flour. 2000;72:35–42.
6. Holasova M, Fiedlerova V, Smrcinova H, Orsak M, Lachman J, Vavreinova S. Buckwheat — the source of antioxidant activity in functional foods. 2002;35:207–11.
7. Alvarez-Jubete L, Wijngaard H, Arendt EK, Gallagher E. Polyphenol composition and in vitro antioxidant activity of amaranth, quinoa buckwheat and wheat as affected by sprouting and baking. Food Chem. 2010;119(2):770–8.

Acknowledgements:

We gratefully acknowledge the funding source Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI) within the framework of PNCDI III- PN-III-P2-2.1-CI-2018-1479, project No. 254CI/2018.

P52

Development of new bakery product using pseudo-cereals preferment and aromatic yeasts

**Adriana Păucean¹, Simona Man¹, Sevastița Muste¹, Simona Chiș¹, Vlad Muresan¹,
Carmen Pop¹, Sonia Socaci¹, Crina Muresan¹**

¹University of Agricultural Sciences and Veterinary Medicine, Faculty of Agriculture,
3-5 Mănăștur street, 3400, Cluj-Napoca, Romania;
Corresponding author: e-mail address: simona.chis@usamvcluj.ro

This work aimed to develop new bakery product (ciabatta type) with improved nutritional value and sensorial quality making use of the fermentation process produced by aromatic yeasts on pseudo-cereals (quinoa, amaranth) as substrate. The innovative aspect is related to the utilization of non-conventional yeast strains (from wine and brewery process) and the total replacement of the conventional bakery yeast. Aromatic yeasts (Lallemand Baking) are special strains of wine and beer yeasts, produced in active dry form, that have been selected for their sensory characteristics in baking products.

Yeasted preferments are used more commonly than acidic wheat sourdoughs all over the world. In USA, it is known as „sponge”, while in France it is named „polish”. Briefly, the preferment is obtained partly from flour, water and the yeast during a 5-18 h of fermentation. The acidity value is low and originates from the natural flora of flour, yeast or bakery equipment [1]. In the second stage, the preferment is combined with the rest of the formula ingredients and mixed into developed dough (indirect method).

Quinoa (*Chenopodium quinoa* Willd.) and amaranth (*Amaranthus* sp.) flours were used as fermentative substrate due to their rich content in bioactive compounds with important health benefits. Quinoa is a valuable ingredient for breadmaking due to their high content in protein, dietary fibre, minerals (P, Mg, Fe), vitamins. The protein content of quinoa seeds range from 12% to 18% and is balanced in essential aminoacids. Quinoa is rich in E vitamin and from the complex B of vitamins, it contains high concentrations of pyridoxine, folic acid and riboflavin. The health benefits related to quinoa consumption are cholesterol lowering, antioxidant, antimicrobial, anti-carcinogenic effects due mainly to the saponins and phytosterols content [2]. The nutritional quality of amaranth seed is higher than that of most cereal grains, owing to its high protein content and balanced essential amino acid composition. Moreover, amaranth grain protein is rich in lysine, which is usually deficient in cereal grains. It contains high concentrations of calcium and magnesium, dietary fibres and fatty acids [3].

Preferements were obtained by inoculating the two aromatic yeast strains (wine and beer yeasts) in blends of quinoa (QF) and wheat (WF) flours containing the

following ratios: 100:0; 70:30; 50:50, along with 3% amaranth flour reported to the blend and the necessary amount of water to obtain a ratio between flours/water= $\frac{1}{2}$. After a fermentation period of 18h, the preferments were used in bread formulation at a level of 26% reported to 100 kg of dough.

The microbial dynamics of the yeast strains during the fermentation of pseudo-cereals preferments, along with the fermentation parameters (pH, acidity and % ethanol) and the aromatic profile revealed a great potential for breadmaking.

Through the fermentation process, a substantial enhancement of the proteins, fibres, macro/microelements, total polyphenols content and of the antioxidant capacity were obtained. Due to the aromatic compounds (3-methyl butanal, 2-methyl butanal, 1-butanol, 3-methyl, 1-butanol, 2 methyl) generated by the non-conventional yeast strains and due to baking process, the sensorial quality of the bread was improved. These results were supported by the sensorial analysis; for both wine and beer special yeast strains, the hedonic test pointed out a very good sensorial quality of bread samples. Also, from the qualitative point of view the textural profiles (TPA analysis) of the bread crumb and crust were improved while the starch retrogradation was slowed down leading to prolonged shelf-life. It could be considered that the preferment works as natural additives eliminating the current practice of flour's additivation.

Keywords: bread, quinoa, aromatic yeast, nutritional and sensorial characteristics

References:

1. Katina, Kati. Sourdough: a tool for the improved flavour, texture and shelf-life of wheat bread. Espoo 2005. VTT Publications
2. Paucean, A., 2017, Tendinte modern privind cresterea valorii nutritive a fainii de grau si a produselor de panificatie, Ed Mega, Cluj-Napoca, Romania
3. J.M. Sanz-Penella, M. Wronkowska, M. Soral-Smietana, M. Haros, 2013, Effect of whole amaranth flour on bread properties and nutritive value, LWT - Food Science and Technology 50: 679-685

Acknowledgements:

We gratefully acknowledge the funding source Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI) within the framework of PNCDI III- PN-III-P2-2.1-CI-2018-1316, project No. 225CI/2018

P53

Effect of nettle leaves (*Urtica dioica* L.) addition on the quality of bread

**Adriana Păucean¹, Simona Maria Man^{1*}, Maria Simona Chiș¹, Sevastița Muste¹,
Anamaria Pop¹, Andruța Elena Mureșan¹**

¹University of Agricultural Sciences and Veterinary Medicine, Faculty of Agriculture, 3-5 Mănăștur street, 3400, Cluj-Napoca, Romania

*Corresponding author, e-mail: simona.man@usamvcluj.ro

Nettles (genus *Urtica*, family *Urticaceae*) are of considerable interest as preservatives in foods for both human and animal consumption. They have also been used for centuries in traditional medicine [2]. In Romania, as in the whole of Europe, North of Africa, Asia and North America, the nettle (*Urtica dioica*) is spread in uncultivated lands, in the plains, hillsides or mountains, on the edges of forests or roads, at the base of trees, being one of the many species of “spontaneous flora”. The presence of valuable biologically important compounds such as proteins, vitamins, phenolic components, macro and microelements, tannins, flavonoids, sterols, fatty acids, carotenoids and chlorophylls contributes to the utilization of stinging nettle in different ways [4]. The high nutritive values caused stinging nettle leaves to be included in the human consumption, as a tonic for strengthening the body, in the preparation of soups and various dishes and as a natural source of food flavoring [5]. The purpose of this study is the assessment of the quality characteristics of bread obtained at three levels of added nettle leaves powder (2%, 5% and 8%). Nettle leaves (*Urtica dioica*) were collected from Alba, Romania and cleaned and washed so that the foreign particles are removed. Then were put inside the cabinet drier, for drying at 40°C for 24 hours, till the crispy texture was observed. Dried leaves were ground in a laboratory mill and sieved through the 80 size mesh until a fine nettle powder resulted. The samples placed in dark glass bottles were stored at 3-4°C in a refrigerator. The wheat flours, yeast and salt were purchased from the local market. Bread samples were obtained according to Man et al. 2016 [3]. The experimental variants were analyzed for physico-chemical parameters, according to AACC Approved Methods [1]. The sensory attributes, were evaluated by a group of un-trained panelists, using a 9-point Hedonic scale. The substitution of wheat flour with 5% nettle leaves powder, improved the physicochemical properties of bread and not affects porosity, which is an important textural characteristic of breads. Up to now nettle leaves are being used quite a bit in human food, especially in culinary foods, although their consumption offers more health benefits. It has been reported that the natural phenolic compounds play an important role in cancer prevention and treatment. Various bioactivities of phenolic compounds are responsible for their chemopreventive properties (e.g., antioxidant, anticarcinogenic, or antimutagenic and anti-inflammatory effects). Therefore, nettle leaves powder can be used to

partially replace wheat flour. Bread produced from nettle leaves/wheat composite flour would be a valuable contribution for a healthy diet.

References:

1. AACC. 2000. Approved Methods of the American Association of Cereal Chemists. Method 38-12, 11 th edition. American Association of Cereal Chemists, St. Paul, MN, USA
2. Kregiel D., Pawlikowska E. and Antolak H. 2018. *Urtica* spp.: Ordinary Plants with Extraordinary Properties-Review. *Molecules*, 23. 1664.
3. Man S., Păucean A., Muste S., Pop A., Mureșan E.A. 2016. Quality Evaluation of Bread Supplemented with Millet (*Panicum Miliaceum* L.) Flour, *Bulletin UASVM Food Science and Technology* 73(2),161-162.
4. Rafajlovska V., Kavrakovski Z., Simonovska J., Srbinoska M. 2013. Determination of protein and mineral contents in stinging nettle. *Quality of life*. 4(1-2):26-30.
5. Wetherilt H. 2003. Nutritional Evaluation of *Urtica* Species. In: *Urtica*, edited by Kavalali, G. Taylor & Francis, London and New York. 84-92.

SCIENTIFIC COMMITTEE

- Prof. Dr. Dr. H.C. Petru Alexe** – “Dunărea de Jos” University of Galați, Romania
- Prof. Dr. Ersilia Alexa** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” - Timișoara, Romania
- Prof. Dr. Sonia Amariei**, ”Ștefan cel Mare” University of Suceava, Faculty of Food Engineering, Suceava, Romania
- Prof. Dr. Carmen Boeriu**, Wageningen University and Research Center, Agrotechnology and Food Sciences Group, Division Biobased Products, Netherlands
- Assoc. Prof. Dr. Despina Bordean** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” - Timișoara, Romania
- Prof. Dr. Dr. H. C. Horia Cernescu** – corresponding member of the Romanian Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu – Sisești”, Romania, BASeVA former member, Romania
- Prof. Dr. Ducu Ștef** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” - Timișoara, Romania
- Prof. Dr. Sophie Fourmentin**, Unité de Chimie Environnementale et Interactions sur le Vivant (UCEIV), Dunkerque, France
- Prof. Dr. Zeno Gârban** – corresponding member of the *Romanian Academy*
- Prof. Dr. Nicoleta Hădărugă** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” – Timișoara, Romania
- Assoc. Prof. Dr. Daniel Hădărugă** – Polytechnic University of Timișoara, Romania
- Prof. Dr. Dr. H. C. Heinz-Dieter Isengard** – University of Hohenheim, Germany
- Prof. Dr. Călin Jianu** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” – Timișoara, Romania
- Prof. Dr. Mohamed Mathlouthi**, University of Reims Champagne-Ardenne, France
- Prof. Dr. Sevastita Muste** – University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania
- Prof. Dr. Ileana Denisa Nistor** – “Vasile Alecsandri” University of Bacău, Romania
- Prof. Dr. Mariana Atena Poiană** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” - Timișoara, Romania
- Prof. Dr. Mona Popa** – University of Agricultural Sciences and Veterinary Medicine Bucuresti, Romania
- Prof. Dr. Delia Perju** – corresponding member of the Romanian Academy of Technical Sciences
- Prof. Dr. Adrian Riviș** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” – Timișoara, Romania
- Prof. Dr. Athanasios Salifoglou** – Aristotle University of Thessaloniki, Greece
- Prof. Dr. Teodor-Ioan Trașcă** – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” – Timișoara, Romania
- Prof. Dr. Camelia Vizireanu**, ”Dunărea de Jos” University of Galati, Galati, Romania

ORGANIZING COMMITTEE

Prof. Dr. Adrian Riviş – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania, *President of the Organizing Committee*

Prof. Dr. Nicoleta Gabriela Hădăruță – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania, *Secretary of the Organizing Committee*

Prof. Dr. Teodor-Ioan Trașcă – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Gabriel Hegheduș-Mîndru – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Maria Drugă – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Daniela Stoin – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Ioan David – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Ariana Velciov – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Diana Dogaru – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Florina Radu – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Corina Megyesi – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Ramona Hegheduș-Mîndru – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assoc. Prof. Dr. Corina Mișcă – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Delia Dumbravă – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Antoanela Cosma – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Bogdan Rădoi – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Alexandru Rinovetz – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Liana Alda – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Diana Moigrădean – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Camelia Moldovan – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Mihaela Cazacu – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Ileana Cocan – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Mirela Popa – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Dacian Lalecsu – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Assist. Prof. Dr. Gabriel Bujancă – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Teach. Assist. Dr. Sofia Pintilie – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Teach. Assist. Dr. Laura Rădulescu – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania

Teach. Assist. Dr. Monica Negrea – Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" - Timișoara, Romania