

2022 AOCS Annual Meeting & Expo

Lipid Oxidation and Quality Program

As of March 24, 2022. Subject to change.

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Identification of Novel Antioxidants and their Efficacies

LIPID OXIDATION AND QUALITY

Sponsored by Kalsec

Chairs: Ignacio Vieitez Osorio, Universidad de la República, Uruguay; and Ruchira Nandasiri, University of Manitoba, Canada

Monday, May 2, 2022 | 9:55 a.m.–Noon EDT (Atlanta, USA; UTC-4)

This session includes topics such as underexplored nuts; plant food and aquatic species; extraction of phenolics/anthocyanins; epigallocatechin as alternative to synthetic antioxidants; the antioxidant effect of quercetin in muscle foods; and the potential of rapeseed meal for developing food chelator peptides.

Antioxidants from plant food and aquatic species. Fereidoon Shahidi*, *Biochemistry, Memorial University of Newfoundland, Canada*

Effect of pressurized fluids on the extraction of phenolics/anthocyanins from crops and by-products. Marleny D.A. Saldana*, *Agricultural, Food and Nutritional Science, University of Alberta, Canada*

Bioactive ingredients from underexplored nuts. Jane Mara Block*¹, Gerson Teixeira², Gabriela Polmann¹, ¹*Food Science and Technology, Universidade Federal De Santa Catarina, Brazil* ²*UFSC, Brazil*

Antioxidant activity of EGC (epigallocatechin) ester derivatives in food and biological model system. Han Peng*¹ (**Honored Student Award Winner**), Fereidoon Shahidi², ¹*Memorial University, Canada;* ²*Memorial University of Newfoundland, Canada*

Antioxidant chelating peptides production from Rapeseed meal proteins proteolysis. Erwann Durand*¹, Pierre Villeneuve², Nathalie Barouh², Nastassia Kaugarenia³, Sophie Beaubier⁴, Romain Kapel⁵, ¹*CIRAD/UMR QUALISUD, France;* ²*CIRAD, France;* ³*LRGP, France;* ⁴*University of Lorraine, LRGP CNRS, France;* ⁵*CNRS, LRGP, France*

Evaluating Antioxidant Efficacy via Accelerated Storage for Shelf-life Determination

LIPID OXIDATION AND QUALITY

Sponsored by BTSA

Chairs: Min Hu, Corbion, USA; Leqi Cui, Florida State University, USA; and Carolin Edinger, Anton Paar, Germany

Tuesday, May 3, 2022 | 7:25–9:30 a.m. EDT (Atlanta, USA; UTC-4)

This session includes: rapid tests for identification of cannabis extract compositions; predictive model for adlehyde in mayonnaise; new, faster method for screening effect of antioxidants; and optimizing supercritical fluid technology.

Supercritical extracts from olive leaves as natural antioxidants: Extraction optimization, characterization and evaluation. Ignacio Vieitez Osorio^{*1}, Cecilia Dauber², Tatiana Carreras², Laura González², Alberto Valdés³, Adriana Gámbaro², Elena Ibañez³, ¹PEDECIBA Química-UdelaR, Uruguay, ²Universidad de la República, Uruguay; ³Institute of Food Science Research (CIAL-CSIC), Spain

Determination of oxidation stability and shelf life of cannabis formulations. Stuart Castillo, Drew Marquardt*, Chemistry and Biochemistry, University of Windsor, Canada

Quantitative and predictive modelling of lipid oxidation in mayonnaise. John Van Duynhoven^{*1}, Donny Merckx², Andries Swager³, Ewoud van Velzen², Marie Hennebelle³, ¹Unilever R&D Vlaardingen, Netherlands; ²Unilever, Netherlands; ³Wageningen University, Netherlands

Rapid small scale oxidation test: Screening the influence of antioxidants on food products. Carolin Edinger*, Anton Paar Provetec GMBH, Germany

Modeling the kinetics of tocopherol degradation during the lag phase to predict shelf-life. Jiakai Lu*, Food Science, University of Massachusetts Amherst, United States

Food Preservation Strategies: Combination of Antioxidants with Other Actives in Food Systems

LIPID OXIDATION AND QUALITY

Sponsored by BTSA

Chairs: Marie Hennebelle, Wageningen University, Netherlands; and Liyun Ye, Finless Foods, Inc., USA

Tuesday, May 3, 2022 | 9:55–Noon EDT (Atlanta, USA; UTC-4)

This session includes topics covering rosemary abstract combos; sunflower oleogels in active packaging; production of hydrolysates from cod side-streams; fractionation of potato protein hydrolysates; and plant protein-stabilized emulsions.

Role of natural antioxidants for favoring dual functionality in meat and poultry products. Divek Nair*, Alessandra Pham-Mondala, Lorna Polovina, Andrew Lee, Food Protection, Kalsec® Inc., United States

Enzymatic production of antioxidative and antimicrobial hydrolysates from cod solid side-streams. Ann-Dorit Moltke Sørensen^{*1}, Dimitra Marinou², Charlotte Jacobsen¹, ¹National Food Institute, Technical University of Denmark, Denmark; ²Chr. Hansen, Denmark

Physical and oxidative stability of emulsions stabilized with fractionated potato protein hydrolysates obtained from starch production byproduct: Use of bioinformatics and proteomics. Betül Yesiltas^{*1},

Rasmus K. Mikkelsen², Pedro J. Garcia-Moreno³, Simon Gregersen⁴, Tobias H. Olsen⁵, Paolo Marcatili², Michael T. Overgaard⁴, Egon B. Hansen², Charlotte Jacobsen¹, ¹National Food Institute, Technical University of Denmark, Denmark; ²Technical University of Denmark, Denmark; ³Department of Chemical Engineering, University of Granada, Spain; ⁴Aalborg University, Denmark; ⁵University of Oxford, United Kingdom

Antioxidant and antimicrobial active packaging systems. Zhe Cheng*, Matthijs Dekker, Jenneke Heising Wageningen University & Research, Netherlands

Plant protein-stabilized emulsions: Implications of protein and non-protein components for lipid oxidation. Katharina Münch*¹, Karin Schroën², Simeon Stoyanov¹, Claire Berton-Carabin³, ¹Wageningen University, Netherlands; ²Food Process Engineering, Wageningen University, Netherland; ³INRAE Nantes, France

Antioxidant Applications: Emulsions, Biofuels, Proteins and More

LIPID OXIDATION AND QUALITY

Sponsored by BTSA

Chairs: Claire Berton-Carabin, INRAE, France; and Andrew Elder, Kalsec, Inc., USA

Tuesday, May 3, 2022 | 1:25–3:30 p.m. EDT (Atlanta, USA; UTC-4)

The Antioxidant Applications session includes topics such as soluble tempo-mediated oxidized cellulose; antioxidants in snacks; role of micelles; and protein-phenol conjugate, gentisic acid.

Lipid oxidation in emulsions and bulk oils: A review of the importance of micelles. Pierre Villeneuve*¹, Eric A. Decker², Erwann Durand³, Pierre Villeneuve¹, Julian McClements⁴, Claire Bourlieu-Lacanal⁵, ¹CIRAD, France; ²Food Science, University of Massachusetts Amherst, United States; ³CIRAD/UMR QUALISUD, France; ⁴U Mass, United States; ⁵UMR IATE, INRAE/Univ Montpellier/Institut Agro, France

Succinylated cellulose-based ampholytic amphiphiles as a novel dual-function emulsifier for the emulsions. Li Ziqian*¹, Zheng Guo², ¹Aarhus University, Denmark; ²Department of Biological and Chemical Engineering, Aarhus University, Denmark

Enhancing antioxidant capacity at the interfaces of oil-in-water emulsions stabilized by phenolic conjugated protein: protein structure and surface activity effect. Hui Li*, Bingcan Chen, Plant Sciences, North Dakota State University, United States

Lipid oxidation in pickering emulsions. Claire Berton-Carabin*, INRAE Nantes, France

Mindful snacking: Formulating antioxidant solutions to increase extruded puffed snack stability. Jennifer Young*, Food Protection, Kalsec, United States

Lipid Oxidation in Omega-3 Products and Stabilization Strategies

LIPID OXIDATION AND QUALITY

Sponsored by BTSA

Chairs: Janaka Senanayake, CFS North America, LLC, USA; and Haizhou Wu, Chalmers University of Technology, Sweden

Tuesday, May 3, 2022 | 3:55–6 p.m. EDT (Atlanta, USA; UTC-4)

The Lipid Oxidation in Omega-3 Products and Stabilization Strategies session includes talks on flavor deterioration; effect of lipid type on oxidation; co-encapsulation of fish oil with essential oils; application

of extracts/solutions to surface of fish tissue; nanoemulsions encapsulated with tocopherol; and food fortification delivery systems.

Delivery systems for omega-3 oils. Charlotte Jacobsen*¹, Ann-Dorit Moltke Sørensen¹, Betül Yesiltas¹, Pedro J. Garcia-Moreno², ¹National Food Institute, Technical University of Denmark, Denmark; ²Department of Chemical Engineering, University of Granada, Spain

Strategies to prevent hemoglobin-mediated lipid oxidation in fish. Ingrid Undeland*, Department of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden

Co-encapsulation of fish oil with essential oils, lutein, and curcumin to produce stable fish oil powders with multiple functionalities using ovalbumin-polysaccharide coacervation. Shulan Xiao*, Dong Ahn, Animal Science, Iowa State University, United States

Developing pickering and nanoemulsions for inhibiting lipid oxidation of aquatic food products. Hongshun Yang*¹, Zhongyang Ren², Xiao Feng³, ¹Food Science and Technology, National University of Singapore, Singapore; ²Ocean Food and Biological Engineering, Jimei University, China (People's Republic); ³Food Science and Engineering, Nanjing University of Finance & Economics, China (People's Republic)

Inhibitory effect of sphingoid bases on the oxidative flavor deterioration of fish oil. Kazuo Miyashita*¹, Masashi Hosokawa², ¹Obihiro University of Agric and Vet Med, Japan; ²Faculty of Fisheries Sciences, Hokkaido University, Japan

Stability of omega-3 fatty acids in different lipid forms analyzed by SPME-GC-MS, NMR and loss of antioxidants. Kaisa Linderborg*, Annelie Damerou, Eija Ahonen, Maaria Kortensniemi, Department of Life Technologies, University of Turku, Finland

Lipid Oxidation and Quality General Session

LIPID OXIDATION AND QUALITY

Sponsored by Kalsec

Chairs: Hong-Sik Hwang, USDA ARS NCAUR, USA; and Sumudu Warnakulasuriya, University of Saskatchewan, Canada

Wednesday, May 4, 2022 | 7:25–9:30 a.m. EDT (Atlanta, USA; UTC-4)

Formation of reactive aldehydes (MDA, HHE, HNE) during *in vitro* digestion of cod muscle: role of hemoglobin from trout and bovine sources. Haizhou Wu*¹, Cecilia Tullberg², Ingrid Undeland³, ¹Dept of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden; ²Biotechnology, Lund University, Sweden; ³Department of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden

Lipid oxidation in sorted herring (*Clupea harengus*) filleting co-products and its relationship to composition. Haizhou Wu*¹, Bitu Forghani², Mehdi Abdollahi¹, Ingrid Undeland¹, ¹Department of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden; ²Chalmers University of Technology, Sweden

Influence of monosodium glutamate on the oxidative stability of meat lipids. Jon Alberdi-Cedeno*, Kübra Demir, Marc Pignitter, Department of Physiological Chemistry, University of Vienna, Austria

Savoury snacks: How to improve their quality and shelf life by using naturally derived food additives? Henna Lu*, R&D, Kalsec Europe Ltd, United Kingdom

Epoxides are major products in oxidation of methyl oleate and linoleate and their triacylglycerols. Morgan Kandrac* (**Hans Kaunitz Award Winner**), Karen M. Schaich, *Food Science, Rutgers University, United States*

Quantitative evaluation of oxidative stability of biomembrane lipids in the presence of vitamin E. Atsushi Takahashi* (**Edwin N. Frankel Award for Best Paper in Lipid Oxidation and Quality Winner**), Ryota Takahashi, Kousuke Hiromori, Naomi Shibasaki-Kitakawa, *Tohoku University, Japan*

Novel Analytical Tools to Assess Oil Quality and Oxidation

LIPID OXIDATION AND QUALITY

Joint session with the Analytical Division

Sponsored by Kalsec

Chairs: Matthew Phaner, *University of Michigan–Flint, USA*; Richard Della Porta, *Pepsico/Frito-Lay, USA*; and Fernanda Furlan Goncalves Dias, *University of California, Davis, USA*

Wednesday, May 4, 2022 | 9:55 a.m.–Noon EDT (Atlanta, USA; UTC-4)

This session includes a novel method for quantitative assessment of epoxides; new tool for evaluating oxidation stability of specialty oils; green solvents for antioxidant analysis in frying oils; a rapid and efficient analytical method of oil oxidation steps; and irradiation-specific changes in irradiated meat matrices.

Novel and Versatile Tool for Investigating the Oxidation Stability of Specialty Oils. Carolin Edinger* Anton Paar PROVETEC GMBH, *Germany*

Time Domain (TD) NMR Proton (¹H) Mobility Sensor to Assess Oil Quality and Oxidation. Zeev Wiesman*, Tatiana Osheter, Charles Linder, *Biotechnology Engineering, Ben Gurion University of the Negev, Israel*

Analysis of lipid radiolysis in irradiated dried meat products. Umut Yucel*, *Food Science Institute, Animal Sciences and Industry Department, Kansas State University, United States*

Implementation of Green Solvents to Monitor Thermal Oxidation of Common Frying Oils. Matthew Phaner*, *Department of Natural Sciences, University of Michigan–Flint, United States*

Quantitative assessment of epoxide formation in bulk oil and mayonnaise by ¹H-¹³C HSQC NMR spectroscopy. Vincent Boerkamp¹, Donny Merckx², Jianli Wang¹, Jean-Paul Vincken¹, John Van Duynhoven³, Marie Hennebelle*¹, ¹Wageningen University, *Netherlands*; ²Unilever, *Netherlands*; ³Unilever R&D Vlaardingen, *Netherlands*

Lipid Oxidation and Quality Poster Session

Sponsored by BTSa and Kalsec

Chairs: David Johnson, *Kalsec, Inc., USA*; and Marc Pignitter, *University of Vienna, Physiological Chemistry, Austria*

LOQ-01 Antioxidative functionality of natural olive extract vs. synthetic tertiary butyl hydroquinone in sunflower oil during deep frying. Mayamol Nichlavose*¹, Sergey Melnikov², Rupesh Sarfare¹, Chirag Jain¹, ¹Research & Development, *International Foods Stuff Company (IFFCO), United Arab Emirates*; ²IFFCO, *United Arab Emirates*
LOQ-02 Determination of antioxidant synergism between tocopherols and myricetin in bulk oil. Ipek Bayram* (**Lipid Oxidation and Quality Division Student Travel Grant Winner**), Eric A. Decker, *Food Science, University of Massachusetts Amherst, United States*

LOQ-03 Effect of processing and fat content on the oxidative stability and interfacial behavior of tree nut oil-bodies. Jeanne Duplessis-Kergomard¹, Mélina Robert², Gilles Paboeuf¹, Nathalie Barouh³, Pierre Villeneuve^{*3}, Olivier Schafer⁴, Tim Wooster⁴, Claire Bourlieu-Lacanal⁵, Véronique Vié¹,
¹Soft Matter, Institut de Physique de Rennes, Université De Rennes 1, France; ²LiFFhe, CIRAD/UMR QUALISUD, France; ³CIRAD, France; ⁴Institute of Material Sciences, Lipids, Nestlé, Switzerland; ⁵UMR IATE, INRAE/Univ Montpellier/Institut Agro, France

LOQ-04 Inhibitory mechanisms of quercetin against hemoglobin-mediated lipid oxidation in washed muscle model. Haizhou Wu^{*1} (**Lipid Oxidation and Quality Division Junior Researcher Travel Grant Winner**), Jie Yin², Mark P. Richards³, ¹Dept of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden; ²University of Wisconsin-Madison, United States; ³Department of Animal and Dairy Sciences, University of Wisconsin-Madison, United States

LOQ-05 Optimization of oxidative stress indicator workflows for enhanced quality control of rendered meals and fats utilizing the CDR FoodLab Analyzer: Peroxide value and free fatty acids. Jennifer Pelerin^{*1}, B.J. Bench², Madison Schaugaard², Jacob Swann², Toniese Bailey², ¹Quartz Analytics, United States; ²Tyson Food Ingredient Solutions Group, United States

LOQ-06 Review of oil quality of soybeans grown in different geographic areas. Huazhen Liu^{*1}, Micah Pope², Todd Doehring², Pradeep Kachroo¹, David Hildebrand¹, ¹University of Kentucky, United States; ²Centrec Consulting Group, United States

LOQ-07 Screening of metal-chelating peptides and hydrolysates using Surface Plasmon Resonance and switchSENSE. Mads Bjørllie^{*1}, Rachel Irankunda², Jean-Michel Girardet³, Sandrine Boschi-Müller⁴, Betül Yesiltas¹, Charlotte Jacobsen¹, Laetitia Canabady-Rochelle², ¹National Food Institute, Technical University of Denmark, Denmark; ²CNRS, LRGP, University of Lorraine, France; ³INRAE, IAM, University of Lorraine, France; ⁴CNRS, IMoPA, University of Lorraine, France

LOQ-08 Stability of novel peptides (linusorbs) in flaxseed meal fortified gluten-free bread. Youn Young Shim^{*1}, Clara M. Olivia², Xian-Guo Zou³, Young Jun Kim⁴, Martin J. Reaney², ¹Department of Plant Sciences, University of Saskatchewan, Canada; ²University of Saskatchewan, Canada; ³Zhejiang University of Technology, China (People's Republic); ⁴Korea University, Republic of Korea

LOQ-09 Valorization of oilseeds: Impact of pH, hot air, and pressurized cooking on major phenolic derivatives

Ruchira Nandasiri^{*} (**Lipid Chemistry and Nutrition Award Winner**), Olamide Fadairo, Thu Nguyen, N. A. Michael Eskin, Food and Human Nutritional Sciences, University of Manitoba, Canada

LOQ-10 Assessing the effects of sunlight on the photooxidation of tropical oils with experimental and computational approaches. Daniel Dodoo^{*1}, Samuel K. Tulashie², Thomas Dodoo³, Francis Kwaw⁴,
¹Department of Chemistry, Aix-Marseille University, Ghana; ²Industrial Chemistry Section, Department of Chemistry, University of Cape Coast, Ghana; ³Department of Computer Science and Engineering, University of Mines and Technology, Ghana; ⁴Quality Assurance Department, Ghana Nuts Company Limited, Ghana

LOQ-11 Comparison of the fatty acid composition of different culinary oils with high saturated coconut oil towards the improvement of public health. Ruchira Nandasiri^{*1}, Buddhika Silva², Nethmi Senevirathene³, Helani Munasinghe⁴, Shiromi De Silva⁴, Renuka Jayatissa⁴, ¹Food and Human Nutritional Sciences, University of Manitoba, Canada; ²Department of Nutrition, Medical Research Institution, Sri Lanka; ³Department of Botany, University of Sri Jayewardenepura, Sri Lanka; ⁴Department of Electron Microscopy, Medical Research Institute, Sri Lanka

LOQ-12 ESR photochemical method for evaluating oil oxidation by spin trapping method. Hiromi Kameya*, *The Institute of Food Research, NARO, Japan*

LOQ-13 Extrusion 3D printing and oxidative stability of high-oil-content printing paste formulated with waxes-based oleogels. Lingyi Liu*, Ozan Ciftci, *Food Science and Technology, University of Nebraska-Lincoln, United States*

LOQ-14 Free fatty acids in commercial krill oils: Concentrations, compositions, and implications for oxidative stability. Ioan D. Fuller*¹, Adam H. Cumming², Asli Card², Elaine J. Burgess², Colin J. Barrow³, Nigel B. Perry¹, Daniel P. Killeen², ¹*Department of Chemistry, University of Otago, New Zealand*; ²*Plant & Food Research, New Zealand*; ³*School of Life & Env Sciences, Deakin University, Australia*

LOQ-15 Kinetic and thermodynamic studies of the thermal-degradation of tocopherol in lipid systems with different unsaturation degree. Liyou Zheng*¹, Hongyan Guo¹, Jun Jin², Qingzhe Jin², ¹*Anhui Polytechnic University, China (People's Republic)*, ²*Jiangnan University, China (People's Republic)*

LOQ-16 Lingonberry press-cake inhibits lipid oxidation during pH-shift processing of herring co-products and subsequent ice storage of recovered protein isolates. Bovie Hong, Jingnan Zhang*, Mehdi Abdollahi, Marie Alminger, Ingrid Undeland, *Department of Biology and Biological Engineering-Food and Nutrition Science, Chalmers University of Technology, Sweden*

LOQ-17 Pulsed electric field treatment enhances lipid bioaccessibility while preserving oxidative stability in *Chlorella vulgaris*. Greta Canelli*¹ (**Processing Division Student Award Winner**), Isabelle Kuster¹, Luc Jaquenod¹, Patricia Murciano Martínez², Zhen Rohfritsch³, Fabiola Dionisi², Paolo Nanni⁴, Christoph J. Bolten⁵, Alexander Mathys¹, ¹*ETH Zurich, Switzerland*; ²*Nestlé Research, Switzerland*; ³*Analytical science, Nestlé Research, Switzerland*; ⁴*Functional Genomics Center Zurich, Switzerland*; ⁵*NPTC Food Singen, Switzerland*

LOQ-18 Study of the oxidative stability of oleogels structured with beeswax fractions. Roman Sobolev*, Yuliya Frolova, Varuzhan Sarkisyan, Alla Kochetkova, *Federal Research Center of Nutrition, Biotechnology and Food Safety, Russia*

LOQ-19 Wheat and rice bran as natural additives for the protection of fish oil from oxidation. Zhen Rohfritsch*¹, Greta Canelli², Philippe Pollien³, Rachid Bel-Rhlid⁴, ¹*Analytical science, Nestlé Research, Switzerland*; ²*Laboratory of Sustainable Food Processing, ETH Zurich, Switzerland*; ³*IMS, Nestlé Research, Switzerland*; ⁴*Institute of Material Sciences, Nestlé Research, Switzerland*