

1st ISO-FOOD International Symposium on Isotopic and Other Techniques in Food Safety and Quality

Portorož, Slovenia

April 1-3, 2019



Organised by
ERA Chair ISO-FOOD in Isotope Techniques in Food Quality,
Safety and Traceability
Department of Environmental Sciences
Jožef Stefan Institute

Programme and Book of Abstracts

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Edited by:

David Heath, Milena Horvat, and Nives Ogrinc

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IN-11

Foodomics: a milestone in food and nutritional studies

Urška Vrhoušek

Fondazione Edmund Mach, Food Quality and Nutrition Department, Italy

Metabolomics is applied to a variety of biological fields from medical science to agriculture. Most of human beneficial properties of plants, be they foods, medical resources, or industrial raw materials, are ascribed to plant metabolites. One of the most important class of compounds are the polyphenols, due to compelling evidences of their beneficial health properties and to their impact on food quality. The complexity and remarkable diversity of polyphenols has challenged the analytical performances of the separation and detection methods in terms of resolving power, selectivity and sensitivity required for the identification and quantification of these compounds in different matrices. Targeted metabolomics is a strategy based on the use of predefined metabolite-specific signals, such as MRM transitions, that can be used to accurately and selectively determine the concentrations of a wide range of known metabolites. A targeted metabolomics method using UPLC/MS/MS system has been developed for the quantification >150 polyphenols and for the quantification of some polyphenols catabolites associated with the consumption of fruits. The validated method was found to be particularly flexible, since it can be easily expanded and adapted to the needs of different experiments. It was successfully applied to the analysis of various fruits and wine, as well as in nutritional studies, providing a valuable tool for the metabolite profiling of both the native compounds present in food and some nutritionally important bioactive catabolites in biofluids and organs.

For a mechanistic understanding of the action of polyphenols in living organisms it is fundamental in nutritional studies to include also untargeted metabolomics, a powerful tool to study processes in organisms and to detect new biologically important biomarkers. In our study, a un-targeted high resolution mass spectrometry-based investigation was chosen to monitor the metabolic effects induced by administration of different dietary polyphenols, at a physiologically relevant dose.

Invited Lectures

**Wednesday Late Morning
Invited Lectures
Apr 03, 10:30 - 11:30**

IN-12

Development of honey, vegetable oil, flour, and collagen stable isotope reference materials

Arndt Schimmelmann¹, Federica Camin², Simon Kelly³, Nives Ogrinc⁴

¹Indiana University, Department of Earth and Atmospheric Sciences, United States

²Fondazione Edmund Mach, Department of Food Quality and Nutrition, Italy

³IAEA Food and Environmental Protection Laboratory

(FEPL), Austria

⁴Jožef Stefan Institute, Department of Environmental Sciences, Slovenia

Stable isotope analysis has been used to detect economically motivated adulteration and substitution of food products since the early 1970s. However, no chemically complex agricultural plant or animal-derived food materials have been offered so far as isotopic reference materials (RMs) by major organizations such as the International Atomic Energy Agency (IAEA) or the National Institute of Standards and Technology (NIST). The fundamental analytical principle of identical treatment of sample and standard advocates chemical similarity of sample and RM, and thus calls for the development of food matrix isotopic RMs. The analytical mandate of two-point normalization along isotopic scales requires at least pairs of isotopically divergent RMs. This presentation describes a current ring-test effort to develop pairs or triplets of (i) honey RMs from tropical Vietnam and Saskatoon in Canada, (ii) flours from C3 and C4 plants, (iii) vegetable oils from C3 and C4 plants, and (iv) collagen powders from marine and terrestrial fauna. Our project places strong emphasis on proper storage of bulk supplies of the future RMs under vacuum or noble gas to exclude oxygen and to extend the shelf life to decades when RMs are stored frozen in the dark. End-users will be able to obtain 0.5 to 1 g or mL aliquots of RMs with recommended isotopic compositions for applications of stable isotope analysis to confirm food authenticity and provenance.

IN-13

The role of research infrastructures in supporting Metrology in Food – the experience of METROFOOD-RI

Claudia Zoani

ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic, Italy

In the food sector, measurement reliability is a key factor to address technological innovation, sustainability, food safety and security actions. Metrology in Food is an emerging discipline enabling the introduction and spread of metrological principles and concepts into the food & nutrition area. Furthermore, high-quality data on the food chain are of fundamental importance to populate the expanding data technologies with useful contents and, according to the FAIR principles, enable advanced research on food and food metrology. Research infrastructures (RIs) play a central role in the progress and application of knowledge in Europe, and the establishment of a landscape of first-class sustainable RIs and services open to researchers, industry, and other interested groups is of strategic importance in the context of the European Research Area.

METROFOOD-RI (ESFRI Roadmap 2018 – Domain Health and Food) provides high-quality metrology services in food and nutrition, comprising an important cross-section of highly interdisciplinary and interconnected fields throughout the food value chain, including agrifood, sustainable development, food safety, quality, traceability and authenticity, environmental safety, and human