TEF-5

Programme & Book of Abstracts

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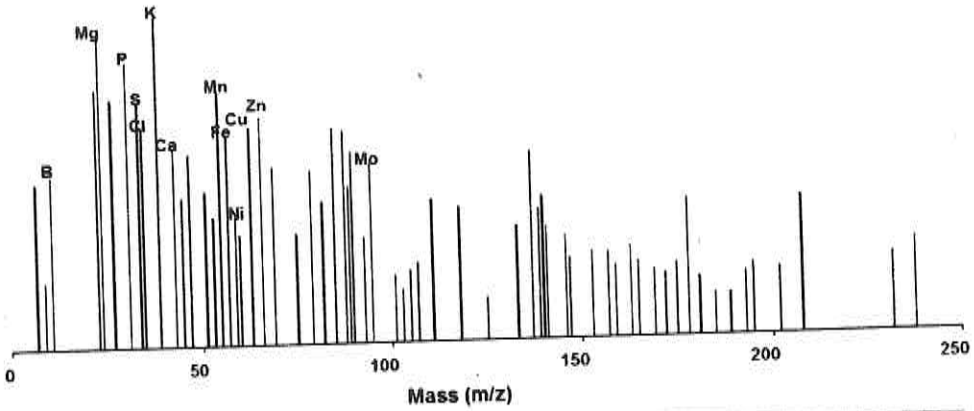

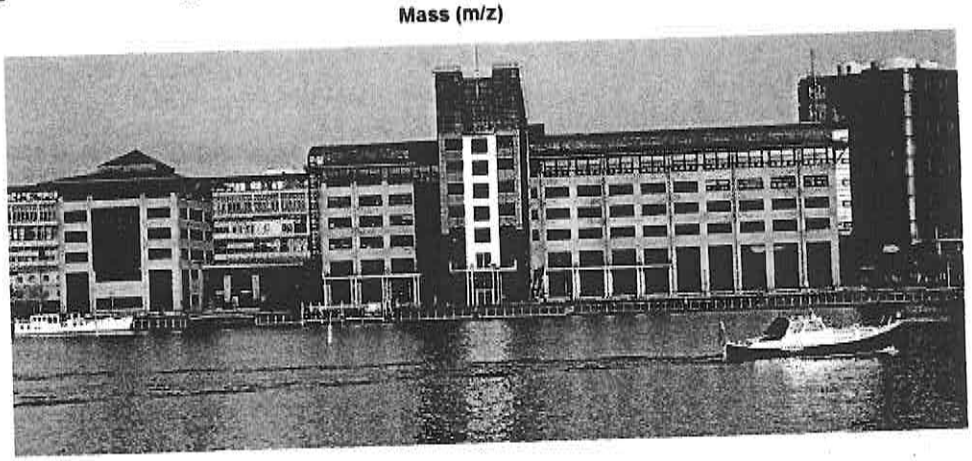

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P9.

Using minerals and the stable isotope of C to trace the origin of tannins

Alice Barbero, Fondazione E. Mach – Istituto Agrario San Michele
Italy
Co-authors: Daniela Bertoldi, Fondazione E. Mach – Istituto Agrario San Michele; Mauro Paolini, Fondazione E. Mach – Istituto Agrario San Michele; Federica Camin, Fondazione E. Mach – Istituto Agrario San Michele; Roberto Larcher, Fondazione E. Mach – Istituto Agrario San Michele

Commercial tannins are widely used in food and beverage production, being recognised as flavourings and food ingredients by the European Union (EU Regulation No. 2232/96, EC No 1334/2008). Tannins can be added to juices and ciders to improve taste or colour, but they are mainly used in winemaking as clarification agents. These polyphenolic compounds are extracted from numerous botanical sources and each product has particular chemical and technical characteristics and oenological properties, but also a commercial value. For this reason, the ability to correctly recognise the real botanical origin of tannins is a key tool in effectively fulfilling the technical and economic requirements of the food and wine industry.
This research aims to show that joint use of the mineral profile and the isotopic ratio of C is capable of discriminating between tannins of different botanical origin.
100 commercial tannins from 8 different botanical sources (grapes, oak, gall, chestnut, fruit trees, quebracho, tea, acacia) were analysed using ICP-MS for the quantification of 57 mineral elements after acid mineralisation and EA-IRMS to determine the 13C/12C isotopic ratio.
On the basis of 27 parameters (Li, Be, B, Na, Mg, P, K, Ca, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Rb, Mo, Cd, Ba, Sm, Re, Tl, U and δ13C) forward stepwise discriminant analysis provided very good discrimination of the samples in the 8 botanical groups, with 100% correct re-classification. The effectiveness of the model was verified on 5 different and randomly selected subsets of 10% of the whole dataset, with good results.

P10.

Physicochemical characterization of nanomaterials in foodstuff products by A4F-MALS-ICPMS

Dr. Véronique Vacchina, UT2A
France
Co-authors: Dr. Mathieu MENTA, UT2A

Currently, applications of nanotechnology in the food sector are intensely studied and developed. Nanomaterials are already used as food additive or directly in materials in contact with food. However, the knowledge about the potential impact of nanoparticles on health is very limited. The European Parliament has asked the labeling of products that contain ingredients of manufactured nanomaterials and acknowledged that specific methods for testing the safety of nanomaterials are needed. Thus, the development of for reliable analytical methods for the detection and quantitative determination of nanomaterials (size, size distribution, shape and chemical composition) of such materials is a fundamental issue for coming years.
To meet these needs UT2A has developed new analytical approaches. The first one is focused on the determination of the size distribution of nano-scale particles using a splitting system (by size and weight) such as Asymmetric Flow Field Flow Fractionation hyphenated with a Multi Angle Laser Light Scattering detector (A4F-MALLS). The second approach is based on a comprehensive physicochemical characterization made by the combination of A4F-MALLS with an Inductively Coupled Plasma Mass Spectrometer (ICP-MS).
Different kinds of commercial samples and matrices such as wine, milk and dairy products have been studied.. This work has enabled to develop and validate an approach to global physicochemical characterization of nanomaterials in complex matrices. In addition, this methodology can meet in a single analysis with the essential requirements of the regulations.