November 3, 2011 (13:15-14:15)

VENDOR SEMINAR:

USING ADVANCED TECHNOLOGY TO SOLVE NEW CHALLENGES IN FOOD ANALYSIS

Our Message is simple – we can address your Food Safety Challenges. Join us at our free seminar at RAFA on 3 November 2011 to find out more.

We will present recent developments and advances in analytical chemistry of emerging food contaminants and residues, ranging from novel techniques for allergens determination to the analytical methods for biologically active flavorings in food.

Topics presented:

Feasibility of an Exactive Orbitrap™ system equipped with high collision dissociation chamber for a reliable identification of food allergens

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Potentials of a HPLC-High Resolution Mass Spectrometry method based on a non-hybrid Orbitrap mass analyser as an analytical tool for fast screening of milk allergens in food samples is for the first time presented. The method enables a reliable identification and characterisation of milk allergens in complex food matrices. Detection of milk allergens is based on the identification of unique casein peptide-markers in food extracts undergoing tryptic digestion. The extremely high mass accuracy (≤ 5ppm) and resolution (up to 100.000 FWHM) provided by the Orbitrap technology allows a fast preliminary identification of four peptide-markers of caseins on the base of the accurate *m/z* value of their generated ions. Besides, the availability of a high-energy collisionally activated dissociation cell integrated within the mass spectrometer enables acquisition of peptide MS/MS-like spectra through post-source fragmentation providing the final confirmation of a correct peptide attribution.

The method presented appears to be very promising as a reliable and potentially high-throughput approach to the analytical challenge represented by the detection of trace levels of protein allergen in complex food matrices.

A Solid-Phase Micro-Extraction GC/MS/MS Method for Rapid Quantitative Analysis of Food and Beverages for the Presence of Biologically Active Flavorings

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In the year 2008 the European Parliament and the Council of the European Union released the European Regulation 1334/2008 (1), which lays down rules on flavorings and food ingredients with flavoring properties for use in and on foods. Among other rules it stipulates the flavoring substances, which have the restrictions and regulatory limits for food. There have been developed a lot of methods for determination the individual flavorings

in different matrices, however no one was suitable at use for regulatory purposes. The aim of this work was preparing the method, which will be able these needs complete.

The presented method was developed using automated headspace solid-phase micro-extraction (HS/SPME) coupled with GC-MS/MS to simultaneously determine the presence of seven biologically active flavoring substances whose levels of use in processed foods is controlled by statutory limits. The method can be applied to identify and quantify the presence of 1,2-benzopyrone (coumarin), β-asarone, 1-allyl-4-methoxybenzene (estragole), menthofuran, 4-allyl-1,2-dimethoxybenzene (methyl eugenol), pulegone and thujone at levels ranging from 0.5 to 3000 mg/kg. The method has been optimized and validated for three different generic food types categorized on the basis of composition and anticipated use levels of flavorings and food ingredients. The food categories are: (1) Alcoholic & non-alcoholic beverages; (2) Semi-solid processed foods (e.g. soups, sauces, confectionary etc.) and (3) Solid foods (muesli, bakery products etc.). The method is simple, inexpensive, rapid, and eliminates the use of flammable and toxic solvents. There is no sample preparation and, using MS/MS, unequivocal confirmation of identification is achieved even in highly complex matrices containing many potential interfering volatiles. The method precision for spiked samples ranged from 2 to 21 % with the greater variability associated with solid matrices. The LODs and LOQs were well below 0.1 and 0.5 mg/kg respectively, in all cases for individual substances fulfilling requirements for enforcement purposes. The robustness of the method was demonstrated in a small survey of retail samples of spirits (4), flavored milks (5), energy drinks (3), liqueurs (5), soups (5), sauces (10), herbal teas (5) and breakfast cereals (3).

During optimization a developing method were investigated various features of food and beverages, which can have a significant influence on the effectual extraction of target compounds on the SPME fiber. Foremost the different content of ethanol and sugar in alcoholic and non-alcoholic beverages was suspected.

Reference:
Regulation (EC) No 1334/2008 of 16 December 2008 on flavorings and certain food ingredients with flavoring properties for use in and on foods and amending Council Regulation (EEC) No 1601/91, Regulations (EC) No 2232/96 and (EC) No 110/2008 and Directive 2000/13/EC. Official Journal of the European Union. (2008) L 354/34-50.