

**November 9, 2017 (7:45-8:30)**



**VENDOR SEMINAR:**

## **GC-TOF MS - the Ideal Tool for Non-Target Screening of Food Migrants**

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Food contact materials are all materials and articles intended to come into contact with food, such as packaging and containers, kitchen equipment, cutlery and dishes.[1] The high number of authorized substances (including (semi)volatiles, non-volatiles and complex mixtures) used within the packaging materials' manufacturing together with complex physico-chemical conditions at the contact layer with food matrix can potentially result in the chemical contamination of particular food/beverage by non-intentionally added substances (NIAS).

The packaging material has to be manufactured in compliance with given legislative requirements and good manufacturing practice (GMP). Despite this fact, the migration of compounds from packaging material into food products is a strong concern for manufacturers and consumers, since the transfer of NIAS components via extraction and/or leaching can impact the quality of the product, the integrity of the packaging material, and cause concern related to consumer health and product safety.

The nature of time of flight mass-spectrometry (TOF MS) technology - fast and sensitive acquisition of unskewed full mass spectra - makes GC-TOF MS the technique of choice in non-targeted examination of NIAS components in food samples.

[1] [https://www.efsa.europa.eu/en/topics/topic/food-contact-materials?qt-quicktabs\\_field\\_collection=3#qt-quicktabs\\_field\\_collection](https://www.efsa.europa.eu/en/topics/topic/food-contact-materials?qt-quicktabs_field_collection=3#qt-quicktabs_field_collection)

## **SPME-GC-HR-TOF-MS based search for off-flavor compounds in chocolate advent calendars**

*Jaromír Hradecký, Eliska Kludská, Jana Hajslova*

*Dept. of Food Analysis and Nutrition, University of Chemistry and Technology, Prague, Technická 3, Prague, Czech Republic; E-mail: [jaromir.hradecky@vscht.cz](mailto:jaromir.hradecky@vscht.cz)*

Identification of compound(s) responsible for food off-flavor often represents a challenging analytical task, since these compounds might have a very low odor threshold. It is rather difficult to identify them, especially when present in a complex mixture. For this purpose, head-space solid-phase microextraction sampling followed by gas chromatography - mass spectrometry (SPME-GC-MS) employing time of flight (TOF) mass analyzer seems to be the optimal option.

Within our study, both low resolution TOF and high resolution (HR-TOF) MS were employed. Non-target screening in a set of advent calendars was performed with the aim to access aroma quality. Statistical compare - peak alignment tool was used and data matrix was then processed using multivariate statistical analysis. Surprisingly, styrene, a possible human carcinogen, migrating from plastic packaging was discovered at a significant level in one of the chocolate samples, dedicated

for children. Unknown off-flavor compounds in chocolate from one of the calendars were identified using HR-TOF MS. Acrylates, responsible for an unpleasant smell of chocolate were identified in green painted parts of wholesale cardboard box. According to obtained results, SPME-GC-(HR)TOF-MS proved to be a reliable tool for non-target screening and unknown identification.

## **Investigation of Extracted and Leached Analytes from Packaging Materials with GC-TOF MS**

*Tomáš Kovalczuk<sup>1</sup>, Elizabeth M. Humston-Fulmer<sup>2</sup>, Joe Binkley<sup>2</sup>*

<sup>1</sup> *LECO Instrumente Plzeň, Plaská 66, Plzeň 323 00, Czech Republic*

<sup>2</sup> *LECO Corp., LSCA Centre, St. Joseph, MI, USA*

*E-mail: [tomas.kovalczuk@leco.com](mailto:tomas.kovalczuk@leco.com)*

Migration of analytes from packaging material into food products is a concern for manufacturers and consumers because of the potential to contaminate food and beverages. The extraction and/or leaching can impact the quality of the product, the integrity of the packaging material, and cause concern related to consumer health and product safety. A general extraction of a variety of food packaging products, including sealable plastic bags and plastic food containers, was performed. Solvent was placed inside each packaging product for an extended period of time and then concentrated through evaporation prior to analysis. General screening of this extract with non-targeted analytical techniques was used to understand what analytes were present and may have the potential to migrate into the food. GC was used for separating analytes from each other and TOFMS provided full mass range data. Nominal mass TOFMS data were acquired and were searched against library databases for tentative identifications. High resolution TOFMS data were also acquired to add confidence to identifications with accurate mass information. Several analytes were determined in the various packaging types and are highlighted here.