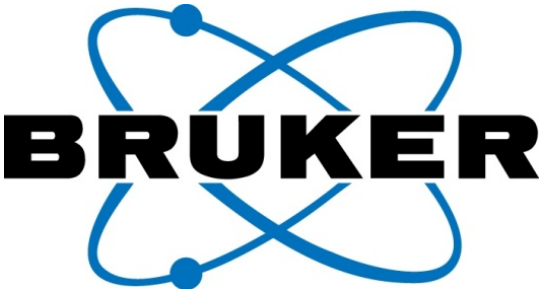
November 7, 2013 (13:15-14:15)



VENDOR SEMINAR:

BRUKER CORPORATION:
LEADING SOLUTIONS FOR MONITORING FOOD SAFETY, QUALITY AND AUTHENTICITY

An Introduction to Bruker's Market Leading Chromatography and Mass Spectrometry Portfolio of Food Quality and Safety Testing Solutions

Joe Anacleto

Bruker Daltonics

The globalization of the food supply chain poses increasingly difficult challenges to producers and governments tasked with maintaining the safety and quality of our food. With a constantly growing number of potential contaminants and a strong public demand for food quality, new stringent regulations are being introduced globally that escalate the need for advanced testing capabilities.

Modern systems based on gas and liquid chromatography coupled to tandem mass spectrometry are very well suited to meet the challenges of rapid screening, identification or quantification of trace level chemical residues in complex food matrices. In addition, inductively coupled plasma mass spectrometry is also an ideal tool for rapid, low level detection of inorganic continuants within food products. This presentation will provide an overview of Bruker's lab-based chromatographic and mass spectrometric systems and how they provide market leading performance, ruggedness and ease-of-use when used with our innovative software solutions.

FT-NIR Analysis of Food Products from Lab to the Process

Alicja Spychala

Bruker Optics, Poland

Near Infrared Spectroscopy has been a well-established technique in the agricultural sector for decades and is recently becoming more and more important in the food industry. Modern multipurpose spectrometers can analyse both, liquid and solid samples and are the ideal tool for the non-destructive and rapid analysis of incoming raw materials and finished products throughout the entire manufacturing process.

The FT-NIR technology offers a lot of advantages over classical wet-chemical and chromatographic analyses. It is quick, cost-effective and safe, since no hazardous chemicals are used. It simply measures the absorption of near-infrared light of the sample at different wavelengths. The recorded NIR spectrum is characterized by overtones and combinations of

the fundamental molecular vibrations of molecules containing C-H, N-H or O-H groups, making NIR spectroscopy first choice for the analysis of organic materials like edible oils, dairy products, condiments or meat products.

FT-NIR also avoids the typical error sources of the classical lab methods, e.g. during the sample preparation stage. With only one measurement, multiple components can be analysed in less than one minute. Although NIR spectroscopy is not a technology for trace analysis like for toxins, it will help the producer to constantly monitor the quality of the goods along the production chain - from checking the incoming raw materials, monitoring of intermediate products up to quality testing the finished product.

Beside lab and at-line analysis close to production FT-NIR is capable to analyse all kind of sample right in the process means on-line or in-line. The instrument is placed somewhere close to production and fiber probes or measurement heads are attached to it by fiber optic cables. The NIR light is send to the sampling point and back over up to 100m and multiple points can be controlled by one instrument. This allows an almost real-time monitoring of the production process. Rather than relying on single lab samples, plant operators with access to frequent results are able to dramatically reduce in-process variation and adjust the process in time to avoid the production of out of spec product.

Food analysis by means of Total Reflection X-Ray Fluorescence (TXRF) spectroscopy – Application for quality, authenticity and food fraud control

Armin Gross & Hagen Stosnach

Bruker Nano, Germany

In this study the feasibility and restrictions of TXRF spectroscopy for the analysis of trace elements in food samples are evaluated. Main target of the investigation was to perform measurements with a minimum of sample preparation and operation costs.

The analysis of solid certified reference materials (NIST 8436 – Wheat flour, DORM-3 – Fish muscle, NIST 1515 – Apple leaves) has proven that an accurate analysis of the elements P, S, Cl, K, Ca, Cr, Mn, Fe, Ni, Cu, Zn, Se, Br, Rb, Sr and Pb is possible after a simple slurry preparation and quantification by means of internal standardisation.

Liquid nutritional products were analysed by means of TXRF, inductively coupled plasma atomic emission (ICP-AES) and mass spectrometry (ICP-MS). The results show good concordances between TXRF and ICP-AES/ICP-MS methods for the investigated elements P, Ca, K, Mn, Fe, Cu, Zn and Se.

In addition to quality control measurements TXRF offers a fast and easy solution for authenticity analysis as it was demonstrated by the analysis of a batch of Californian wine samples. Combined with additional analytical methods like NIR or MALDI-TOF the TXRF method can also be a strong tool for food fraud control.

Fast and Reliable methods for food authenticity, quality and safety control

Léa Heintz

Bruker BioSpin, Rheinstetten, Germany

The transfer of metabolomics approaches to food authenticity and quality control applications has rapidly expanded in recent years.

Thanks to its unmatched reproducibility and transferability properties, the Nuclear Magnetic Resonance (NMR) established itself as a unique and powerful tool for metabolomics analysis.

The NMR allows the simultaneous detection of very small changes in concentration of many compounds in mixtures. These changes can be observed both in untargeted and targeted mode while running a single experiment.

Standard operation procedures as well as extensive databases of authentic samples have been developed for fruit juice and wine analysis.

The features of these fast and fully automated methods will be described in detail.

With the WineProfiling method, over 50 relevant parameters are quantified simultaneously, amongst which alcohols, sugars, organic acids, amino acids, polyphenols and degradation parameters. Each individual compound concentration is compared to the reference concentration distribution of authentic wines in order to support interpretation of the results.

Furthermore, the method allows the prediction of the wine grape variety. Discrimination of geographical origin and vintage are also available for German Riesling and will be extended soon to other wine grapes.

It will also be demonstrated how in the untargeted mode, any deviation from the normal model can be detected, even for compounds that had not previously been identified.
Finally it will be shown how the procedures developed for juice and wine can be taken as models for many other food materials.