November 9, 2017 (13:30–14:15)

ThermoFisher SCIENTIFIC

VENDOR SEMINAR:

Isotope Fingerprints in Authenticity and Food Fraud

Food Integrity with Isotope Fingerprints: unlocking the truth

Christopher Brodie, Thermo Fisher Scientific

Fraud in food and beverage products include misrepresentation or tampering with packaging and labelling; adulteration, normally replacing a higher quality, original material with one of lesser quality one or extending a product by adding an adulterant; and misrepresentation of product origin. Increased complexity in the food and beverage supply chain has provided greater opportunity for economically motivated food and beverage fraud. Consequently, legislation has been enacted globally to protect food and beverage products with respect to production processes and product labelling. The combination of legislation and food fraud practices demand a reliable, high throughput and cost effective analytical technique that can identify food and beverage products that are not what they are claimed to be. Detecting food and beverage fraud can be achieved using stable isotope fingerprints because stable isotopes can differentiate between food and beverage samples which otherwise share identical chemical composition: this is called the isotope fingerprint. We briefly explore the technology available to detect isotope fingerprints before leading onto examples of how isotope fingerprints really detect food and beverage fraud.

The power of stable isotope fingerprints in authenticity control and fraud prevention

Dr. Simon Kelly, International Atomic Energy Agency (IAEA), Section of Food and Environmental Protection

Food and beverage products have unique isotopic fingerprints, which allow such products to be identified with respect to their origin, composition and processing. Isotope Ratio Mass Spectrometry (IRMS) can be used to visualize these fingerprints. Any biochemical or physical reaction in growing and processing of food can result in changes in the isotopic composition of individual compounds or the bulk isotope ratio of a food product. Major targets are the stable isotopes of carbon, nitrogen, sulfur, oxygen and hydrogen, which individually or in combination can give unique insights. The different IRMS tool sets based on coupling with GC, LC, elemental analyzers and other sample preparation technologies allow to uncover stable isotope fingerprints using several individual compounds in a food sample, multiple stable isotopes of N, C, S, O and H in bulk or parts of a sample or combinations of both. The recent improvements in sample throughput and automation allow fast and inexpensive analysis of several ten- thousands of samples per year with a single IRMS system. The presentation will focus on the principles of isotope fingerprints showing examples of applications and highlighting the latest technological improvements in IRMS.