

November 5, 2026 (13:30-14:15)



VENDOR SEMINAR:

Next gen Orbitrap MS solutions for isotope ratio and POPs analysis

Introducing new, streamlined Orbitrap-IRMS workflow for deeper isotopic insights

Maura Pellegrini, Thermo Fisher Scientific

Food integrity testing increasingly requires analytical tools that can provide deeper insight into the origin, authenticity, and production history of food-related compounds. Isotope ratios are well suited to this challenge because they can help reveal where compounds come from and how they were produced or transformed. Orbitrap-based isotope ratio analysis builds on this foundation by adding molecular context, enabling isotope and isotopologue ratios to be measured directly from intact molecular ions while preserving structural information.

In this presentation, we will introduce the new Orbitrap-IRMS workflow, which brings together Thermo Scientific™ Orbitrap™ Isora™ Mass Spectrometers, the Vanquish™ Duo UHPLC System, and the Isotope Discoverer™ Software. The workflow is designed to streamline method development, isotope ratio acquisition, calibration, visualization, and reporting while reducing manual data processing steps.

The presentation will highlight key workflow benefits and show how Orbitrap-based IRMS can be applied to compounds such as caffeine and vanillin, where molecular-level isotope information may provide deeper insights in product origin and authenticity. We will also discuss advanced capabilities, including multi-isotopic profiling, position-specific isotope analysis through controlled fragmentation, and investigation of multiply substituted isotopes. Together, these capabilities help users move toward a more comprehensive view of isotopic composition and gain deeper insight from complex food-related samples.

Improved detection capabilities for polychlorinated dibenzo-p-dioxins/furans (PCDD/Fs) using GC Orbitrap MS

Dominic Roberts, Thermo Fisher Scientific

Polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) are among the most toxic persistent organic pollutants and remain an analytical challenge because of stringent regulatory limits. Their determination in food and feed requires high sensitivity, selectivity, and mass resolution for reliable quantification at ultra-trace levels in complex matrices. Advances in high-resolution mass spectrometry and ionization technology offer the potential to improve detection capabilities while maintaining confidence in regulatory analysis.

In this presentation, we will introduce an improved PCDD/F workflow using gas chromatography coupled to a Thermo Scientific™ Orbitrap™ Exploris™ GC S mass spectrometer operated at 60,000 resolving power. Food and feed samples prepared using accelerated solvent extraction and

automated multi-column cleanup were analysed, with results compared against GC-HRMS values. Thermo Scientific™ Chromeleon™ Chromatography Data System with the integrated Dioxin Analyzer eWorkflow™ was used for instrument control, quantification, and reporting.

The presentation will highlight sensitivity, quantitative performance, and productivity. Detection was demonstrated down to 15 fg on-column, with strong repeatability and response factor stability across all 17 toxic PCDD/F congeners. Results agreed with GC-HRMS across food and feed matrices, while key congeners, including 2,3,7,8-TCDD, were quantified at 10 fg on-column. Automated pass/fail assessment and Thermo Scientific™ NeverVent™ technology reduced intervention and downtime, supporting regulatory-compliant PCDD/F analysis.