LC-GC×GC TOF-MS/FID:
A POWERFUL PLATFORM FOR MOSH & MOAH DETERMINATION

Mineral oil hydrocarbons (MOHs) are a very complex mixture of isomers mainly associated with two classes of compounds, namely MOSH (composed of linear, branched, and alkyl-substituted cyclo-alkanes) and MOAH (which includes primarily alkyl-substituted (poly)aromatic hydrocarbons at a different number of fused rings). The analysis of such a contaminant in food is a challenging task, mainly due to the high complexity of the matrices and the high affinity with the lipid fraction and many of its components. Moreover, FID detection needs to be employed since it gives a virtually equal response per unit of mass for all hydrocarbons, avoiding the calibration problems encountered with mass spectrometry (MS) (reference standards not available). Nevertheless, the lack of a confirmatory method and the capability to discriminate natural interferences from real contamination remains still an actual problem. In this context, the hyphenated LC-GC-FID method, longly proposed as the most suitable solution for this determination, fails to provide a solution. On the other side, GC×GC has been proposed for confirmatory purposes and improved the separation of interferents. Moreover, the improved separation in the 2D space also allows a more detailed characterization of the contamination, providing information relevant to the toxicological evaluation. However, GC×GC failed to provide quantitative data in the specific MOSH and MOAH case.

A powerful LC-GC×GC-ToFMS/FID platform has been proposed to merge the two separation techniques' assets, achieving an extraordinary performance level for both qualitative and quantitative purposes. Moreover, a novel quantification strategy has been proposed to overpass the limitation of the usual two-dimensional software to deal with the specific requirement of MOSH and MOAH quantification (i.e., mainly the subtraction of the riding peaks). Therefore, such a platform seems the most suitable candidate to meet the EFSA and the European Union's current requirements for a full characterization of the MOH contamination in food.

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