Food Contamination with Mineral Oils, determined by HPLC-GCxGC-ToF-MS-FID. First Results of MOAH Ring Quantification

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Mineral oil-saturated hydrocarbons (MOSH) and aromatic hydrocarbons (MOAH) have received attention due to their possible negative effects on human health, whereby some fractions can act as genotoxic carcinogens (MOAH: 3–7 aromatic rings) [1]. Due to the toxicity of those aromatic 3-7 ring fractions, the importance of being able to quantify and differentiate has great relevance both for the industry and for the scientific community. On 21 April 2022, the Member States of SC PAFF agreed to use harmonized limits of quantification in food, whereby these limits were set as guide values for MOAH [2].

The standard analytical method to determine the amount of MOSH/MOAHs in food according to JRC Guidance [3], uses high-performance liquid chromatography-gas chromatography with a flame ionization detector (HPLC-GC-FID). However, obtaining a complete and detailed analysis to identify MOHs contaminants requires integral high-dimensional chromatography combined with time-of-flight mass spectrometry (TOF-MS), consequently, we have applied it to separate the MOAH aromatic ring systems. For the highly complex MOH fractions, the TOF-MS detector cannot provide suitable quantitative information, therefore parallel detection in combination with an FID detector has been developed for the characterization and quantification of the different MOSH/MOAHs fractions in food.

The first quantitative results of several MOAH ring systems obtained by HPLC-GCxGC-TOF-MS with parallel FID detection using a LECO ChromaTOF software approach will be presented and compared with the results of another laboratories.

References:

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[3] S.Bratinova, P.Robouch, E.Hoelkstra., JRC Technical Reports. Guidance on sampling, analysis and date reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials-2ne Edition In the frame of Commission Recommendation (EU) 2017/84.2023