

Method for the analysis of chlorinated paraffins in food using Fourier transform ion cyclotron resonance mass spectrometry (FT-ICR-MS)

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Abstract

Chlorinated paraffins (CPs) are complex mixtures of polychlorinated n-alkanes with varying chain lengths and degrees of chlorination. CPs are classified as short-chained CPs (C10–C13, SCCPs), medium-chained CPs (C14–C17, MCCPs), and long-chained CPs (C18+, LCCPs). CPs have a broad range of industrial uses (e.g. metalworking fluid and polyvinyl chloride processing). CPs are chemically stable, highly lipophilic and can biomagnify through food webs. Exposure to CPs poses a threat to human health while several studies have assessed the presence of CPs in foods. Despite the instrumental advances, analysis of CPs remains a challenging task. Obvious drawback for applications of LRMS is its lack of selectivity CPs themselves can cause interfering MS peaks. In order to eliminate this issue, high-resolution MS (HRMS) could be used. As of now, the majority of recent CP detection methods rely on time-of-flight MS (TOFMS) or Orbitrap-MS techniques to separate and characterize CPs. In our study, we present for the first time an HPLC-FT-ICR-MS method to analyse CPs in food products. Elaborated method is a promising tool for overcoming the limitations of insufficient MS resolving power in CP analysis which ensures acceptable performance characteristics which is proved by the analysis of inter-laboratory PT materials.

Biography

Dzintars Zacs obtained a PhD in analytical chemistry in 2015 at the University of Latvia in area of analytical problems of halogenated food contaminants and has more than 10 year experience in the ultra-trace POP analysis. He is a head of a group of advanced mass spectrometry in the Institute of Food Safety, Animal Health and Environment “BIOR” (Riga, Latvia). Number of publications 34, H-index is 15 and he regularly acts as a reviewer for international journals in the field of analytical and environmental chemistry and food safety.

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