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HARRPA Statement on the JRC Guidance Document

HARRPA welcomes the "JRC guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials". The initiative provides guidance for sampling and analysis of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) in food and food contact materials (FCM). The guidance recognises that supplementary test methods may be needed. Indeed, HARRPA has shown that a simple analytical technique (referred to as LC-GC-FID or 1D-GC), does not sufficiently distinguish between mineral oils and other low molecular weight hydrocarbons, such as resins.

Food can be contaminated by microbial organisms or chemicals such as mineral oil that can unintentionally enter the food at various points in the supply chain, for example through recycled food packaging paper. The presence of MOSH/MOAH in food has been subject of debate[i]. Certain components in mineral oil can cause adverse health effects as they may bioaccumulate or are considered carcinogenic. Regulations might be pursued that limit their content in packaging materials.

Hydrocarbon, Rosin and Terpene resins are a distinct class of amorphous products that are characterized by a high glass transition temperature in relation to their molecular weight. As such, they are different from oils, waxes or plasticisers. Resins can also be found in food contact materials but are not MOSH or MOAH.

HARRPA members are committed to meeting stringent EU regulatory safety expectations on their products, particularly those which may come in to contact with food. We are encouraged that the JRC guidance recommends that in some instances more sophisticated analytical techniques should be used, especially in the case of samples with difficult or complex matrices as illustrated in Annex II of the guidance [page 31].

HARRPA supports a two-stage approach to testing with the LC-GC-FID as a first stage and an additional testing method capable to distinguish between mineral oil and resins (or other substances) as the second. With that in mind, HARRPA engaged in 2017 with Laboratory Lommatzsch & Säger to develop a proof of concept based on 2-Dimensional Gas Chromatography (2D-GC) to distinguish mineral oil and resins in cereals. This was so successful that it was extended to the main resin families on the market.

The JRC guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials gives performance requirements and references to current analytical approaches. The JRC refers to a LC-GC-FID (1-Dimensional GC) method as the method of choice for the quantification of mineral oils in routine analysis. The LC-GC-FID cannot distinguish between mineral oils and other low molecular weight hydrocarbons such as resins, polymer oligomers, and waxes.

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As such the JRC guidance recognises that supplementary testing methods exist which can better identify non-MOSH/MOAH substances in complex matrixes. For example, the guidance states:

- "With difficult samples and matrices, further characterisation of the MOSH/MOAH fractions can be performed by using additional analytical techniques, e.g. GC-MS, LC-GC-FID/MS or GCxGC FID/MS" [Section 4.3, page 12]
- "If an interference is suspected even after purification, the characterisation of the MOSH or MOAH fraction has to be verified by using additional analytical methods, such as (LC-)GC-MS or GCxGC FID/MS" [Figure 1 and Section 4.4, page 14]

Proper adherence to the JRC guidance will help avoid any unjustified dismissal of evaluated and approved food contact materials, e.g. materials in the EU list of the Plastics Regulation. The 2D-GC is more sophisticated in analyzing resins in food contact materials compared to the 1D-GC. The 2D-GC shows clusters of resins species that can be distinguished from mineral oil. HARRPA intends to work with other stakeholders to pursue the adoption of a two-stage approach for food and FCM which would allow for greater transparency in the supply chain. The objective is to improve consumer confidence that potentially harmful substances and other substances are correctly identified and quantified.

[i] Although mineral oil varies considerably in composition due to the differences in level of refinement, the European Food Safety Authority has concluded that the mineral oil intake is a potential concern. In a review published in 2018, the Dutch National Institute for Public Health and the Environment reduced the concerns about the saturated hydrocarbons in food and advised to focus on the aromatic hydrocarbons.