



POSITION PAPER: MINERAL OIL HYDROCARBONS IN FOOD

21 March 2023

This position paper forms the Management Summary in the *Fact Sheet Mineral Oil Hydrocarbons in Food* of the FFI German Folding Carton Association.

The “mineral oils” discussed here are MOSH (Mineral Oil Saturated Hydrocarbons) and MOAH (Mineral Oil Aromatic Hydrocarbons). Both MOSH and MOAH are complex combinations of very similar chemical compounds with different chain lengths, molecule sizes and branch patterns.

Potential sources in food are contamination via the food manufacturing process itself, the environment and migration from packaging materials. The level of migration from the packaging to the food depends in particular on the physical and chemical properties of the food (fatty, dry, moist etc.), the shelf life and thus the duration of contact with the packaging material, the processing, transport and storage conditions (ambient, chilled, frozen), the type of transport packaging and the packaging design (e.g. the surface/mass ratio of the packaging and food, and the presence of different layers and their properties) as well as the way the food is handled by the consumer.

Information from Toolbox¹ projects indicate ways to minimise the entry routes. They provide summaries in table form of the potential entry routes for mineral oil hydrocarbons that are known at the present time.

Various national and European monitoring programmes have aimed to give an overview of food exposure and pinpoint possible connections to packaging materials. As awareness of contamination has increased, so the measurable concentration levels of mineral oil hydrocarbons in many foods have been reduced substantially.

¹ <https://www.lebensmittelverband.de/de/lebensmittel/verpackung/mineraloeluebergaenge/toolbox-vermeidung-mosh-moah>

In close co-operation with paper manufacturers and processors, the folding carton industry supplies a variety of solutions for protecting packaged products against mineral oil hydrocarbons. The objective is to find the optimum solution for the food in question via close liaison between all the market players. Such solutions can be:

- An inner layer or a barrier coating on the reverse side of the cartonboard
- Inner or intermediate barrier bags in the packaging system
- Cartonboard from recycled material with a functional adsorbent
- Cartons made of virgin board (for the most applications and packaging designs)

In all these cases suppliers should provide supporting documents that demonstrate compliance of the barrier material (Council of Europe (CoE) Resolution CM/res (2020)9 on the safety and quality of food contact materials and articles; published in 2021): description of the barrier, process used to apply it, the criterion used to determine its effectiveness, the method of testing and the resulting data proving the absence of migration (for the considered application and pack construction according to the specification that the converter has communicated to the supplier in advance), etc.

In addition to containing the migration which might come from the used substrates, the characteristics of all parts of the packaging need to be taken into consideration. It is important that products which contain no mineral oils are used in all packaging components, such as printing inks, lacquers, or adhesives.

Identification and quantification of MOSH and MOAH in food and packaging are demanding expensive analytical assignments. In order to obtain comparable results, a number of conventions and specifications therefore need to be observed. With the standard processes, it is possible to reach MOSH and MOAH detection limits of 0.5 mg/kg reliably in dry foods.

At the current time, there are no conclusive toxicological and health analyses of MOSH and MOAH in food.

The European Food Safety Authority (EFSA) has expressed its concern about both MOSH (e.g. with reference to accumulation) and MOAH (suspected to be potentially carcinogenic). An updated opinion is expected in 2023.

Between 2011 and 2022, the German Ministry of Food and Agriculture (BMEL) compiled a number of draft regulations about food contact materials based on recovered paper and board. In spite of the efforts made by the BMEL over a period of many years, a legal regulation has not been issued. An ordinance of the Federal Government for a national

"Mineral Oil Ordinance" (22nd Amendment to the Consumer Goods Ordinance) was not approved by the Federal Council of Germany ("Bundesrat") on December 16, 2022.

The current legal and scientific situation requires distributors of food and packaging manufacturers to minimise MOSH.

Concerning MOAH the member states in the Standing Committee on Plants, Animals, Food and Feed (SCoPAFF) agreed on April 21 and October 19, 2022 on an EU wide common, source-independent and strict assessment of MOAH in food, which leads de facto to compliance in the relevant economic circles as SCoPAFF agreed on withdrawing and, if necessary, recalling products from the market when the sum of the concentrations of MOAH in food, i.e. without considering fractions, are at or above the following maximum LOQs (= limits of quantification):

- 0,5 mg/kg for dry foods with low fat/oil content ($\leq 4\%$ fat/oil)
- 1 mg/kg for foods with higher fat/oil content ($> 4\%$ fat/oil, $\leq 50\%$ fat/oil)
- 2 mg/kg for fat/oils ($> 50\%$ fat/oil)

The total MOAH concentration in this context includes the components of MOAH $\geq C_{10}$ to $\leq C_{50}$. This SCoPAFF assessment is related to the General Food Law Regulation (EC) No 178/2002 and the included Article 14 "Food shall not be placed on the market if it is unsafe ...". Thus, a de facto agreement on MOAH maximum levels of contamination in food in the EU has been set – but not for potential migration from packaging material into food.

It is of elementary importance and must be clearly emphasised again at this point that the previously mentioned limits of quantification for MOAH refer to the final concentrations in the food. In other words, the values mentioned do neither refer to the MOAH content in the cartonboard or folding carton, nor to the possible migration from the packaging into the food. The food business operator must therefore assess all entry routes (food raw materials, processing, storage and transport of raw materials, packaging materials) as part of his responsible risk management with the aim of complying with the stated values in total across all possible entry routes.

Cartonboard and folding carton manufacturers are committed to support those downstream operators in complying with the contamination limits for mineral oils in food published by national and EU authorities.

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