

## Communication 35/2023

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### **New EFSA risk assessment: Some mineral oil residues in food remain a health concern**

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Residues of mineral oils can, among other things, migrate from cardboard boxes and other packaging materials into food if they are made from recycled waste paper. The extent to which this entails health risks for consumers has been discussed in expert circles for years.

The European Food Safety Authority (EFSA) recently updated its 2012 risk assessment to include new data and presented the preliminary result: The current intake of Mineral Oil Saturated Hydrocarbons (MOSH) via food does not cause a concern from a health perspective according to the current state of knowledge. However, EFSA still considers the intake of Mineral Oil Aromatic Hydrocarbons (MOAH) to be too high, especially for infants and young children.

The Federal Institute for Risk Assessment (BfR) agrees with the conclusions of EFSA and emphasises that the contamination of food with mineral oil components is generally undesirable. Better procedures in agricultural production, transport, storage and processing of food can help to reduce the intake of mineral oil components. The transfer of such substances from packaging – especially paper and cardboard – to food can be reduced, among other things, by using fresh fibre cardboard and mineral oil-free printing inks. Functional barriers in the packaging can also help to prevent contamination of food.

The efforts of the authorities and the industry in recent years have been quite successful in this respect. According to EFSA's new data, the daily intake of mineral oil components in all population groups has roughly halved since 2012.

Mineral oil components can enter our food in various ways: This is foreseeable, for example, if they are contained in approved food additives or additives for processing food. In addition, contamination of food by agricultural machinery, unsuitable transport or processing methods, and accumulation along the food chain can also occur. Packaging made of paper or cardboard produced using recycled fibres can also contain residues of mineral oils. This is because printed newspaper are also used as a raw material for recycling and most conventionally used newspaper inks contain mineral oil. So far, this cannot be sufficiently removed in the recycling process and thus ends up in the food packaging made from recycled cardboard.

The detected mineral oils consist of complex mixtures of saturated hydrocarbons (Mineral Oil Saturated Hydrocarbons, MOSH) and aromatic hydrocarbons (Mineral Oil Aromatic Hydrocarbons, MOAH).

It is known that MOSH, which contain up to about 45 carbon atoms, are absorbed by the body. They have been found in humans in some organs such as the liver and spleen, as well as in fatty tissue. Animal studies have also shown that some MOSHs cause deposition and inflammation in the liver of a certain strain of rats. The relevance of this finding for humans was unclear for a long time.

Based on new data, EFSA 2023 concludes in its re-evaluation (<https://connect.efsa.europa.eu/RM/s/publicconsultation2/a0109000006qqHf/pc0400>) that the observed effects are specific to this rat strain and are not relevant for humans. Apart from very high doses, EFSA has not identified any adverse effects of MOSH on humans. However, the data situation is incomplete, in particular long-term studies in animals as well as further data on MOSH levels in human organs after (lifelong) ingestion of mineral oils are missing. EFSA has based its health risk assessment accordingly on the effect of the accumulation of MOSH in organs and tissues, since an accumulation of exogenous substances is fundamentally undesirable and possible (as yet unknown) toxicological effects are most likely to be caused by the accumulating MOSH.

EFSA concludes that according to the present state of knowledge the current intake of MOSH in the EU population through food does not cause a concern. This is also a result of the successful efforts of authorities and industry in recent years to reduce the transfer of mineral oil into food. In the BfR's view, these efforts should be continued in order to further reduce the MOSH content in food or at least keep it at the current level.

MOAH are compounds that have an aromatic ring system of one or more rings and sometimes contain sulphur in addition to carbon and hydrogen. The aromatic rings also usually have one or more short or long side chain(s) of saturated hydrocarbons. The fraction with three or more aromatic rings is particularly relevant for the assessment of MOAH levels in food, as mutagenic and carcinogenic substances may be present in this fraction. However, as there is little data on the actual share of this fraction in the MOAH found in food, EFSA developed two different exposure scenarios ("best case" and "worst case"). For the "worst case" scenario, there was cause for concern for all population groups and for the "best case" especially for the group of frequent eaters among young children.

For MOAH, EFSA has mainly noted that more data on the actual occurrence of MOAH with three or more aromatic rings in food – and thus improved methods in routine analysis – are needed. In addition, there is a lack of data on the toxicology of MOAHs with one or two aromatic rings in particular.

#### **Further information on mineral oil constituents**

Questions and answers on mineral oil components in foodstuffs

[https://www.bfr.bund.de/en/questions\\_and\\_answers\\_on\\_mineral\\_oil\\_components\\_in\\_food-132254.html](https://www.bfr.bund.de/en/questions_and_answers_on_mineral_oil_components_in_food-132254.html)

## About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States ('Laender') on questions of food, chemicals and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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