Mineral oil hydrocarbons in food

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EU to set maximum levels for mineral oil aromatic hydrocarbons in food

Draft Commission Regulation amending Regulation (EU) 2023/915 as regards maximum levels of mineral oil aromatic hydrocarbons in food

Draft Annex [PLAN/2023/2345 ANNEX CIS]

Update

The European Union (EU) has notified the World Trade Organization Sanitary and Phytosanitary Measures (WTO SPS) Committee (G/SPS/N/EU/930) that it intends to set maximum permitted limits (maximum levels) of mineral oil aromatic hydrocarbons (MOAH) in certain foods that will apply from **1 January 2027**.

The foods affected by the proposal are oilseeds, oil fruits, animal and vegetable fats and oils, tree nuts, pulses, cereal grains and products derived from cereals, milk, dairy products, cocoa beans and cocoa products, confectionary, spices, dried herbs, teas and herbal infusions, foods for infants and young children, food supplements, and food additives.

For further background on the proposed new measures, see these AGRINFO resources:

- Guide with further information on mineral oil hydrocarbons (MOH), their origins and effects, the EU's regulatory intentions, the sectors most affected, and actions required to prepare for compliance with new rules (available in English, French, Spanish, and Portuguese)
- Video recordings of MOH webinars (in English, French, Spanish, and Portuguese)
- Questions and answers arising from the webinars (in English, French, Spanish, and Portuguese).

Please note that these resources were produced before the notification of this proposal, and should be read together with the details below on the new proposal.

Impacted products

Oilseeds and oil fruits, animal and vegetable fats and oils, tree nuts, pulses, cereal grains (including rice), milk, dairy products, milk, dairy products, cocoa beans, cocoa products, spices, dried herbs, dry tea and herbal infusions, food supplements, food additives, foods for infants and young children.

What is changing?

EU Proposal

As mineral oil aromatic hydrocarbons (MOAH) are dangerous to humans, the European Union (EU) is proposing to set maximum permitted levels of MOAH in certain foods, as set out in Table 1.

The rules today

The EU proposal is a significant change compared to the situation today. There are currently no maximum levels for MOAH under EU law. EU Member States have agreed a common approach to controlling food containing MOAH, as set out in a joint statement in the Summary Report of 21 April 2022: when MOAH are found during official controls of food, Member States should "withdraw and, if necessary, [...] recall products from the market" when the limit of quantification (LOQ) is exceeded.

These LOQs are:

- 0.5 mg/kg for dry foods with a low fat/oil content (≤4% fat/oil)
- 1 mg/kg for foods with a higher fat/oil content (>4% fat/oil, ≤50% fat/oil)
- 2 mg/kg for fats/oils or foods with >50% fat/oil.

While not set in EU law, this agreed approach helps EU Member States to ensure that food is safe, as required by the General Food Law Regulation 178/2002 (Art. 14).

Currently no EU limits are in place for mineral oil saturated hydrocarbons (MOSH). There are discussions on establishing *indicative* levels for MOSH rather than maximum levels. These levels will not be thresholds for removing products from the market, but will be values that trigger investigations of the sources of contamination, and the application of mitigation measures.

In response to questions raised by stakeholders, the European Commission has published frequently asked questions (FAQs) on the draft regulatory measures on MOH in food (European Commission 2024).

Why?

In 2023, the European Food Safety Authority (EFSA) updated its risk assessment on MOH in food (EFSA 2023). The regulatory focus is mainly on MOAH, which EFSA considered to have potential genotoxic and carcinogenic activity.

There is also discussion about MOSH, which bioaccumulate in various organs. EFSA considers that, according to present knowledge, the current exposure to MOSH does not raise concerns for human health (EFSA 2023). However, the consequences of long-term accumulation of MOSH have not yet been investigated and remain uncertain.

Maximum levels for contaminants are set taking into account the maximum levels that can be met according to the best available practices. This is known as the “ALARA” (as low as reasonably achievable) principle. Maximum levels are generally set at the LOQ. However, for certain foods it has been demonstrated that, even if good practices are applied, meeting a maximum level at the LOQ cannot be achieved. For these products, timetables have been set (see Table 1) for lowering the maximum levels.

Timeline

The new maximum levels are expected to apply from **1 January 2027**, except in the specific cases listed in Table 1 where a later application date applies.

What are the major implications for exporting countries?

There are numerous potential sources of MOAH, and testing for them is complex. Although controls for mineral oils are already in place in the EU, setting maximum levels is likely to mean buyers will request suppliers to demonstrate compliance with the new levels. In the short term, there may be significant work required in many value chains to identify sources of MOAH and strategies to prevent their presence. This in turn may require an increase in analytical capacity to test for MOAH.

Recommended Actions

Suppliers of food in all sectors should increase monitoring of MOAH to identify any presence of these substances in their products. When MOAH or MOSH are identified in food, suppliers should check all steps of the supply process, identify the sources of contamination, and develop measures to avoid further contamination of their production. Guidance is available on preventing the transfer of undesired MOAH into food (FoodDrink Europe 2018).

In many non-EU countries, the capacity for analysing MOAH may be limited. The European Commission's Joint Research Centre (JRC) has published Guidance on sampling, analysis, and data reporting for monitoring MOH in food and food contact materials (Bratinova et al. 2023).

Currently, no EU limits are in place for MOSH in food. However, some EU Member States have established national benchmark levels, so food business operators are recommended to also monitor foods for MOSH and develop measures to prevent contamination.

Background

Mineral oil hydrocarbons

Mineral oil hydrocarbons fall into two main classes:

- mineral oil saturated hydrocarbons (MOSH)
- mineral oil aromatic hydrocarbons (MOAH).

Mineral oil hydrocarbons enter the food chain at various points: through environmental contamination during harvesting, through accidental contact with lubricants during processing, or as a result of migration from food contact materials. Recycled paperboard may contain residues of printing ink solvents that can easily migrate to food.

For more information see the European Commission webpage Mineral Oil Hydrocarbons (MOH).

Analysis of MOAH

The analyses for MOAH in food are typically carried out by coupling liquid and gas chromatography with subsequent flame ionisation detection (LC-GC-FID). However, in cases where naturally occurring/biogenic substances interfere with the analysis, a confirmatory analysis with two-dimensional gas chromatography (GCxGC) is needed to confirm the concentration of MOAH (Bratinova et al. 2023).

Resources

Bratinova, S., Hoekstra, E. and Robouch, P. (2023) Guidance on sampling, analysis and data reporting for the monitoring of mineral oil hydrocarbons in food and food contact materials. European Commission, Joint Research Centre.

EFSA (2023) Update of the risk assessment of mineral oil hydrocarbons in food. EFSA Journal, 21(9): e08215.

European Commission (2022) Standing Committee on Plants, Animals, Food and Feed: Section Novel Food and Toxicological Safety of the Food Chain, 21 April 2022. Summary Report

European Commission (2024) FAQ document on the draft regulatory measures on mineral oil hydrocarbons (MOHs) in food-Rev.2.

FoodDrink Europe (2018) Toolbox on reducing the transfer of mineral oils into food.

Sources

Draft Commission Regulation (EU) as regards maximum levels of mineral oil aromatic hydrocarbons in food

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Table & Figures

Table 1
Proposed maximum levels for mineral oil aromatic hydrocarbons[1,2]

Product	Maximum levels (MLs) (mg/kg)	Notes
Oilseeds and oil fruits	2.0	
Animal and vegetable fats and oils	2.0	
Maize, rapeseed, sunflower, soyabean, linseed oils; dairy butter and fat	2.0	
Groundnut, sesame, coconut, cereal germ oils	6.0 from 1 Jan 2027 4.0 from 1 Jan 2028 2.0 from 1 Jan 2030	
Grape seed, cotton seed, blackcurrant seed, argan oils	10.0 from 1 Jan 2027 5.0 from 1 Jan 2028 2.0 from 1 Jan 2030	
Olive pomace oil; refined olive pomace oil	10.0 from 1 Jan 2028 5.0 from 1 Jan 2029 2.0 from 1 Jan 2030	
Fish oils; oils from other marine organisms and algae	10.0 from 1 Jan 2027 5.0 from 1 Jan 2030	
Other oils and fats	4.0 from 1 Jan 2027 2.0 from 1 Jan 2028	Includes cocoa butter; does *not* include essential oils and crude olive pomace oil
Products from maize, rapeseed, sunflower, soyabean, and linseed oils; and dairy butter and fat or "other oils and fats", where these contain: >80% of fats and oils ***or*** >50% fat/oil content (and only contain these fats and oils)	2.0 from 1 Jan 2028	
Tree nuts	2.0	
Pulses	0.50	
Cereal grains	0.50	
Products (except oils, see MLs above) containing >80% cereals with fat/oil content:[3,4]		
<4%	0.50	
≥4% and ≤50%	1.0	
Milk	0.50	
Dairy products with fat/oil content:[3]		
<4%	0.50	
≥4% and ≤50%	1.0	
>50%	2.0	

Continued…

Table 1 Continued		
Product	Maximum levels (MLs) (mg/kg)	Notes
Cocoa beans	2.0 from 1 Jan 2030	
Cocoa mass	2.0	
Cocoa powder and fat-reduced cocoa powder	1.0	
Other confectionery, cocoa, and chocolate with fat/oil content:[3]		
<4%	0.50	
≥4% and ≤50%	1.0	
>50%	2.0	
Spices, dried herbs, dry tea, dry herbal infusions[5]	10.0 from 1 Jan 2027 5.0 from 1 Jan 2030	
Foods for infants and young children[6] with fat/oil content:[3]		
<4%	0.50	
≥4% and ≤50%	1.0	
>50%	2.0	
Food supplements	10.0 from 1 Jan 2027 5.0 from 1 Jan 2030	
Food additives	Raw materials from which food additives are derived must comply with the MLs in this Regulation	
Processed and compound foods[7] containing ingredients for which there are MLs in this Regulation with fat/oil content:		
<4%	0.50 from 1 Jan 2030	MLs apply only to instant tea, instant herbal infusions, and tea,[5] not to other teas and herbal infusions
≥4% and ≤50%	1.0 from 1 Jan 2030	
>50%	2.0 from 1 Jan 2030	

1. Mineral oil aromatic hydrocarbons (≥C10 to ≤C50).
2. To be added to Annex of Regulation 2023/915.
3. "Fat/oil content": declared fat/oil content or, if not present, content determined by the competent authority.
4. ML does not apply to cereals used for the production of beer or distillates, provided the remaining cereal residue is not placed on the market as food.
5. MLs also apply when used as an ingredient in food.
6. Includes infant formulas, follow-on formulas, young-child formulas, food for special medical purposes intended for infants and young children, baby food, processed cereal-based food for infants and young children, and drinks for infants and young children.
7. Until 31 December 2029, the ML for processing compound foods should be the ML for the raw material, taking into account the processing factor (the increase or reduction in MOAH that occurs); For further details see AGRINFO: *Questions and Answers: Upcoming EU rules on mineral oil hydrocarbons (MOH)*, Q11.

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Source: based on Draft Annex

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