

MOSH & MOAH

Know to understand

MOSH & MOAH: Definition

MOSH (**MINERAL OIL SATURATED HYDROCARBON**) and MOAH (**MINERAL OIL AROMATIC HYDROCARBON**) are compounds of fossil origin **potentially harmful to health**, which can be found in food and beverages as residues of production processes.

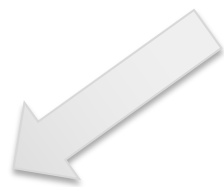
How do MOSH and MOAH enter our food?

MOSH and MOAH can contaminate food at any point in the processing chain, from raw materials, storage, transportation, production to packaging materials.

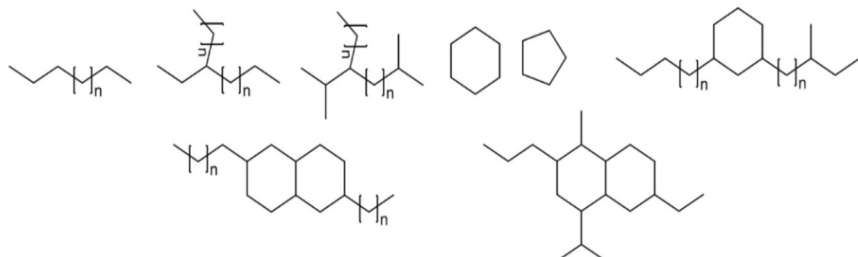
The primary sources of MOSH and MOAH are **adhesives, printer inks, and packaging materials**. It can also be found in some recycled packaging. Other sources include hydraulic oils used in machines that produce and package our food. Even gases in the environment, such as exhaust fumes from vehicles and emissions from industrial plants, can cause MOSH and MOAH contamination throughout the food production process.

MOSH & MOAH: Molecules

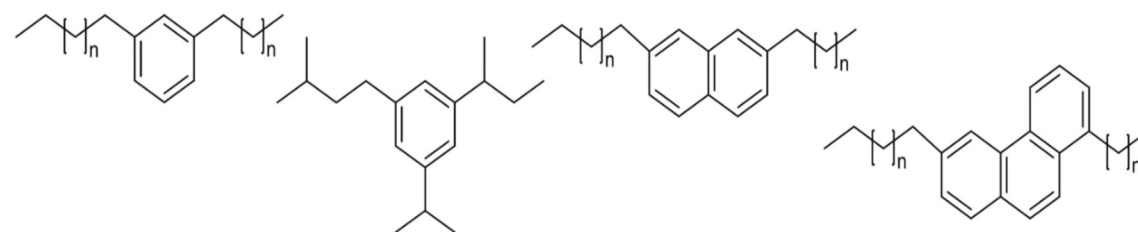
Mineral Oil Hydrocarbon (MOH)



MOSH = mineral oil saturated hydrocarbons



MOAH = mineral oil aromatic hydrocarbons



MOSH & MOAH: History...

2008



Rapid Alert System for *Food and Feed*

1. Evidence of high levels of mineral oil contamination (100 – 1000 mg/Kg) in sunflower oil imported from Ukraine;
2. Some EU government health institutions order the recall of food products with a sunflower oil content > 10%;
3. The European Commission dispensed a specific condition for importing sunflower oil: mineral paraffin content \leq 50 mg/kg.

After this case, the search for mineral oil contamination in vegetable oils and packaging began systematically!

MOSH & MOAH: more history...

2012



On 6 June 2012, the EFSA publish a scientific opinion on mineral oil hydrocarbons in food.

Definitions of MOSH & MOAH are created.

SCIENTIFIC OPINION

Scientific Opinion on Mineral Oil Hydrocarbons in Food¹

EFSA Panel on Contaminants in the Food Chain (CONTAM)^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

This scientific output, published on 28 August 2013, replaces the earlier version published on 6 June 2012*.

ABSTRACT

Consumers are exposed to a range of mineral oil hydrocarbons (MOH) via food. Mineral oil saturated hydrocarbons (MOSH) consist of linear and branched alkanes, and alkyl-substituted cyclo-alkanes, whilst mineral oil aromatic hydrocarbons (MOAH) include mainly alkyl-substituted polyaromatic hydrocarbons. Products, commonly specified according to their physico-chemical properties, may differ in chemical composition depending on the oil source. Technical grade MOH contain 15 - 35 % MOAH, which is minimised in food grade MOSH (white oils). Major sources of MOH in food are food packaging and additives, processing aids, and lubricants. Estimated MOSH exposure ranged from 0.03 to 0.3 mg/kg b.w. per day, with higher exposure in children. Specific production practices of bread and grains may provide additional MOSH exposure. Except for white oils, exposure to MOAH is about 20 % of that of MOSH. Absorption of alkanes with carbon number above C₃₅ is negligible. Branched and cyclic alkanes are less efficiently oxidised than n-alkanes. MOSH from C₁₆ to C₃₅ may accumulate and cause microgranulomas in several tissues including lymph nodes, spleen and liver. Hepatic microgranulomas associated with inflammation in Fischer 344 rats were considered the critical effect. The no-observed-adverse-effect level for induction of liver microgranulomas by the most potent MOSH, 19 mg/kg b.w. per day, was used as a Reference Point for calculating margins of exposure (MOEs) for background MOSH exposure. MOEs ranged from 59 to 680. Hence, background exposure to MOSH via food in

<https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2012.2704>

MOSH & MOAH: Current situation

At the moment there are not European or global regulations limiting the presence of MOSH and MOAH in food!

2023



Single countries, like Germany and Belgium have implemented national regulations about this topic, but without international supervision.

There are not European regulations on MOSH and MOAH in foods also because their analytical determination is very complex and, up to now, **there are no standardized methods for determining them below 10 mg/kg.**

The only method available is **UNI EN 16995:2017**, drawn up by a working group of experts in 2017, this method however does not allow to identify the small quantities of MOSH & MOAH, so its usage is very limited.

MOSH & MOAH: Lubricants

Lubricants are present in all the equipment and machinery of the food production chain. MOSH and MOAH may be present in the lubricants too.



We specify that lubricants, if used correctly, do not come into contact with food and, therefore, do not represent a source of contamination. Only in case of accidental contact (Food Grade), a minimum contamination “could” happen. The use of H1 certified NSF lubricants minimizes the risks associated with accidental contact.

Aluchem Lubricants

White oils and semi-synthetic lubricants, such as White FU, Syntene White, Syntene NT series register a presence of MOSH and MOAH <0.1%.

Our full synthetic oils and grease based on PAO, PAG and Esters (Alusynt FGC, FGR, PSL, EF-T...) are **MOSH and MOAH free**.

MOSH & MOAH: Aluchem Products



Aluchem has a large portfolio of lubricants, many of those certified food grade (H1 & 3H) are **MOSH and MOAH free**.

Product Name	MOSH	MOAH
Alusynt FGC (Compressors)	Free	Free
Alusynt FGR (Gears)	Free	Free
Alusynt FGH (Hydraulic Systems)	Free	Free
Alusynt FGL (Low Viscosity App)	Free	Free
Alusynt EF-T (High Temperature Chains)	Free	Free
Alusynt Microflon (Chains, multi)	<0.1%	Free
Alugrease FG HV (Bearings, multi)	Free	Free
Alugrease G93A (Hi-speed bearings)	Free	Free
Alugrease AS HT (Hi-temp bearings)	Free	Free

Thanks for the attention