



Part 2:

How can food sectors prepare for MOH maximum levels?



Agenda:

1. Who am I?
2. What are the implications for trading partners of MOAH MLs?
3. Routes of entry into foods – Toolbox
4. Practical mitigations strategies – What can we do?
5. Ways to find a good reliable lab: complexity of analytics
6. Questions / Discussion

01.

Who am I?

May I introduce myself?

Short introduction:

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Quality Senior Expert Food

Over 30 years experience in food-industry – worldwide

Independent consultant – freelancer

„Food QSafety First“

<https://foodqsafetyfirst.jimdosite.com/>

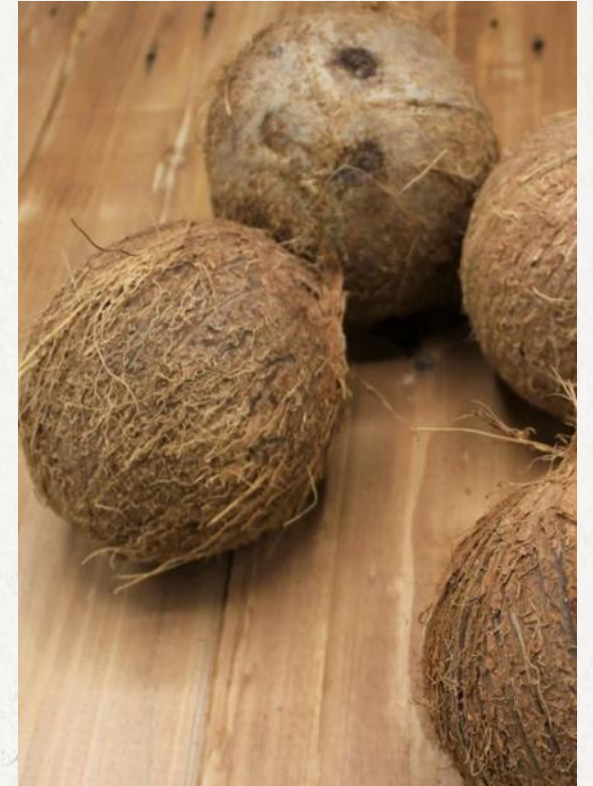


02.

What are the implications for trading partners of EU MOAH MLs?

Impact on trading partners?

- Operators must be ready by January 2027 to comply with new maximum-levels. This will require action by trading partners to ensure no negative impacts on trade.
- Mineral oil hydrocarbons **must be mitigated at source**; they cannot be significantly removed at later steps in the process.
*One exception: Refining vegetable oils can partially remove MOH.**
- Multiple paths of MOH migration into food and different solutions for each.



2. Impact on trading partners?



Some advantages of maximum levels in legislation and some challenges

- ❑ Clearer rules with specific maximum levels for specific products
- ❑ For certain foods temporary **higher enforcement limits / MLs will apply** compared with the former LOQ-limits of the SCoPAFF-statement
- ❑ Probable increase in controls of MOAH across the EU
- ❑ More consistent approach to enforcement of foods containing MOAH > ML
- ❑ Increased demands from European companies to suppliers of evidence of compliance with MOAH maximum levels

03.

Routes of entry into foods Toolbox

Sources of contamination

Toolbox*



*Food Drink Europe (2018)

3. Sources of contamination: Toolbox

ROUTES OF ENTRY INTO FOODS

From the described sources, MOSH, MOSH analogues and MOAH can migrate along the entire process chain into foods using different routes.

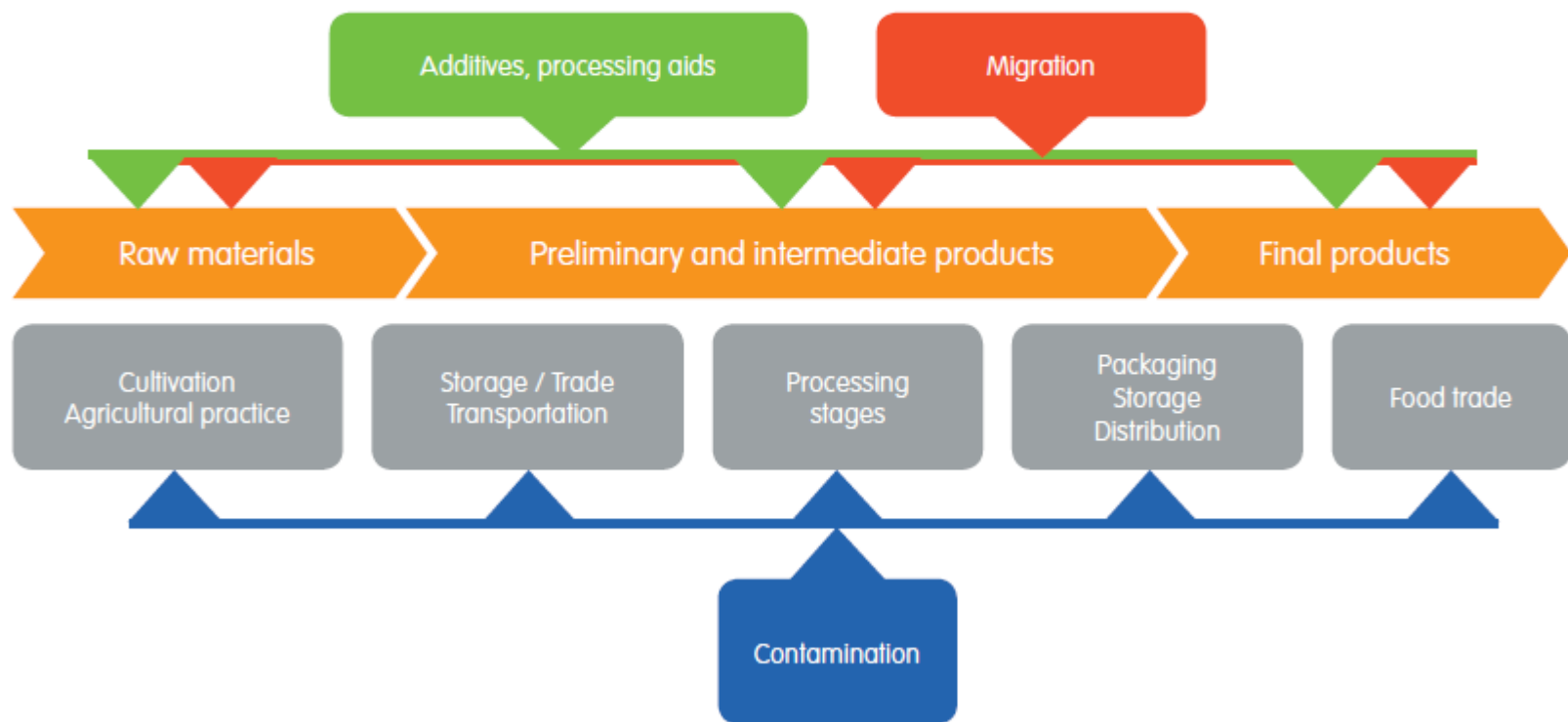


Figure 1: Systematic illustration of the routes of entry of MOSH/MOSH analogues and MOAH into food (according to [4])

Sources of contamination

Toolbox: Migration – mainly packagings



Source	Route of entry/ cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Notes/examples
Paper/ carton/board	Primary packaging	MOSH/MOAH	Where necessary, use fresh fibre products: Bags, folding boxes and corrugated board made from fresh fibres 	- Consider recommendations (BfR or CoE) for the production and use of papers, cartons and cardboard that come into contact with food; GMP guidelines of the associations for folding boxes and prints. - Not all fresh fibres are free from MOSH/MOAH because entry through processing aids used in paper production is possible; fresh fibre fraction can absorb MOSH/MOAH during storage; fresh fibre is not a barrier. - Ex: Specified primary fibre cartons according to DIN, such as GC1, GC2, GN4 and others.
Paper/ carton/board	Primary packaging	MOSH/MOAH	Where necessary, use functional barriers for final product packaging: coatings, bag-in-box systems or liners (Kraft bags), corrugated boards Applies also to packaging of upstream products 	- Use barrier materials suitable for raw materials/ upstream and intermediate products: - coatings: co-extruded plastics or surface finish of cartons, e.g. in cartons or paper bags - Ex: Barrier optimised products, e.g. for folding boxes or corrugated paper cartons. - EVOH, PVDC, PA, PET, BOPP for bag-in-box

Recycled paper / cardboard:

MOSH/MOAH is contained via the printing inks (pure MOH!)

Sources of contamination

Toolbox: Migration – mainly packagings



Source	Route of entry/ cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Notes/examples
Paper/ carton/board	Container linings/ liners	MOSH/MOAH	Use of low mineral oil linings (dressings), in particular for sea transport 	● Container dressings for the transport of bulk and bagged goods in containers or open bulk goods should be free from mineral oils and free from waste paper substances or equipped with functional barriers. ● Concretise FCC guidelines.
Paper/ carton/board	Container liners	MOSH/MOAH	Use alternative materials for the absorption of moisture/humidity in transport containers 	● Refrain from using carton dressings made from waste paper or based on recycling materials.



Sources of contamination

Toolbox: Migration – mainly packagings



Source	Route of entry/ cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Notes/examples
Jute and sisal fibres	Bags	MOSH/MOAH	Request use of suitable jute bags according to IUP (food grade) and use of vegetable batching oils 	● Refers to e.g. transport of bulk goods such as cocoa beans, grains, spices in jute bags from countries of origin; no sufficient definition of “food grade quality”. ● Comply with ILO Standards, no quality standards as regards MOSH/MOAH levels.



But also „bulk / hump“ storage on bitumen & asphalt floors: use concrete floors or cover with tarpaulins.



Sources of contamination

Toolbox: Contamination



Source	Route of entry/cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Note
Lubricants in food processing (food grade incidental food contact)	Damage, contamination, continuous entry	MOSH/MOAH MOSH analogues (PAO, MORE)	Use specified and internationally certified NSF lubricants (NSF-H1) or synthetic lubricants. Minimise technically inevitable entry (instructions, staff training). Adhere to hygienic design of equipment (lubrication cup, motors etc.) by maintenance 	• “Food grade” lubricants for machines and equipment, use in food production without intended food contact. • Lubricants on mineral oil basis may contain MOSH as well as MOAH. MOAH-free products are available; according to FDA: maximum residue of 10 mg “mineral oils”/ kg food for H1 lubricants. PAO will deliver false positive results after damage. Synthetic lubricants are more homogeneous, not free from MOSH and PAO, free from MOAH.



Sources of contamination

Toolbox: Contamination



Source	Route of entry/cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Note
Technical lubricants	Continuous entry through harvesters or damage	MOSH/MOAH MOSH analogues (PAO)	Avoid/reduce leaks that may result in the entry of lubricants Use suitable lubricants (NSG-H1/ NSF-H2) at all primary production levels, if possible	- Elaborate maintenance and damage action plans in case of leaks and accidents. - Ex: Use of harvesters e.g. combines, and conveyors in harvesters.
Technical lubricants	Transport chain	MOSH/MOAH MOSH analogues (PAO)	Prevent/minimise entry of lubricants. All pneumatic and belt conveyors are concerned. Use H1 lubricants within the entire transport chain, if possible	Even when using H1 lubricants, MOSH and PAO may enter, e.g. conveyors, fork lifts, contaminated transport containers or carriers (e. g. returnable pallets).



Sources of contamination

Toolbox: Contamination



Source	Route of entry/cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Note
Lubricants - technical quality	Compressed air Pneumatic plants	MOSH/MOAH MOSH analogues (PAO, MORE)	Check compressed air for oil penetration on a regular basis Use oil-free compressors, and if possible, draw in zero-emission environmental air	- The quality of compressed air is stipulated in the Standards DIN ISO 8573 ff. According to ISO 8573-1 a maximum residue oil level of 0.01 mg/sqm was defined for compressed air with food contact. - Ex: Use of compressed air for spray drying, pneumatic conveying plants for the transport of granulates or powders (e. g. filling and emptying of silos); contact of food with compressed air in filling/packaging lines.
Smoke, gases from drying/combustion	Drying methods	MOSH/MOAH	Avoid direct drying of raw materials with combustion gases dependent on the energy source	Concerns mainly entry of volatile hydrocarbons and PAH during drying processes, e.g. spices, grain products.



Sources of contamination

Toolbox: Contamination



Source	Route of entry/cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Tool	Note
Technical lubricants	Damage or systematic contamination	MOSH/MOAH MOSH analogues (PAO)	Prevent contact between raw materials and storage areas/floors contaminated with lubricants No raw materials from contaminated cultivation areas	● Occurs during handling of raw materials in the country of production (e. g. drying) or during transportation (e. g. loading platforms).
Exhaust gases	Environmental air ventilation	MOSH/MOAH	Avoid contamination by exhaust gases. Check vehicle fleet, check external air inlets	● Prevent trucks from backing up to storage areas, turn off motors, etc.



3. Sources of contamination

Toolbox: Additives – Processing aids



Source	Route of entry/cause	Saturated and unsaturated mineral oil hydrocarbons/groups	Notes/examples
Dust control agents	Spraying of mineral-oil based oils	MOSH/MOAH	- Used with dusting bulk goods that are food raw materials such as soya beans, grains, rape seeds and other oil seeds. - Alternatively use mineral oil-free dust control agents based on vegetable oils. - For dusting food with flours or powders, only use dust control agents on a vegetable oil basis or substances according to Regulation (EC) No 1333/2008.
Pesticide formulations	Use of pesticides based on paraffin oil	MOSH/MOAH MOSH analogues (MORE)	Use and presence as MOSH analogue within the area of vegetable raw materials possible.
Release agent	Hard paraffin or microcrystalline waxes	MOSH analogues (PAO, MORE)	- Used with e.g. confectionery, fruits. - Is harmless when used as approved; however, relevant to analysis as MOSH analogues. - Where necessary, use alternative waxes such as carnauba wax or beeswax, which are also relevant as MOSH analogues in analysis.



— Animal drug components (by-products in vaccines)

3. Sources of contamination

Toolbox: Additives – Processing aids



— Microcrystalline waxes/hard paraffins	E 905
— Carnauba wax	E 903
— Candelilla wax	E 902
— Beeswax	E 901
— Siloxane	E 900
— Oxidised polyethylene wax	E 914
— Hydrogenated poly-1-decene	E 907