



## Parte 2:

¿Cómo pueden prepararse el sector alimentario para los niveles máximos de MOH?



# Agenda:

1. ¿Quién soy?
2. ¿Qué implicaciones tienen los niveles máximos (NM) de MOAH para los socios comerciales?
3. Vías de entrada en los alimentos: herramientas
4. Estrategias prácticas de mitigación: ¿qué podemos hacer?
5. Cómo encontrar un laboratorio fiable: la complejidad de los análisis
6. Preguntas / Debate

# 01.

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¿Quién soy?

¿Puedo presentarme?



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Experto sénior en calidad alimentaria

Más de 30 años de experiencia en la industria alimentaria a nivel mundial

**Consultor independiente – autónomo**

«La seguridad alimentaria es lo primero»

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



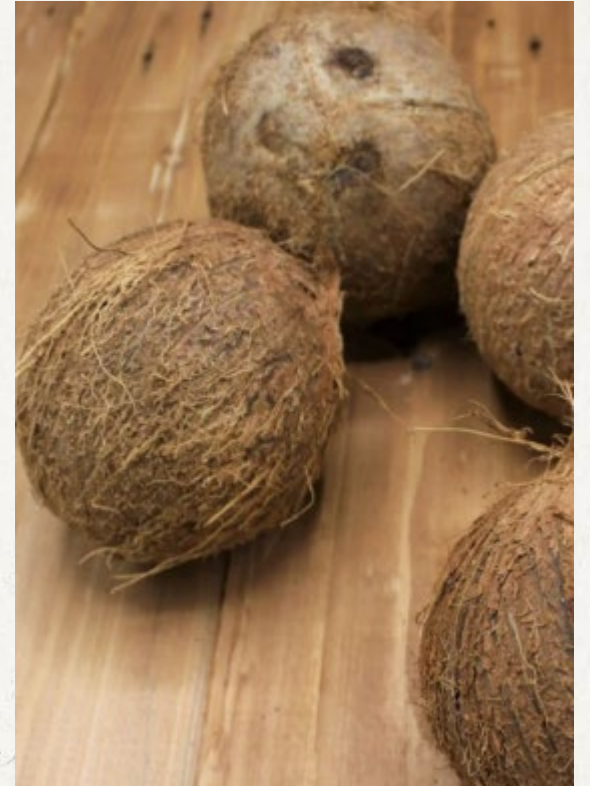
# 02.

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¿Qué implicaciones tienen los Niveles Máximos (NM) de la UE para los socios comerciales?

## 02. ¿Qué repercusiones tendrá esto en los socios comerciales?

- Los operadores deben estar preparados para enero de 2027 a fin de cumplir con los nuevos niveles máximos. Esto requerirá la intervención de los socios comerciales para garantizar que no se produzcan repercusiones negativas en el comercio.
- Los hidrocarburos de aceites minerales **deben reducirse en origen**; no pueden eliminarse de forma significativa en etapas posteriores del proceso.  
*Una excepción:* el refinado de los aceites vegetales puede eliminar parcialmente los hidrocarburos de aceites minerales (MOH).\*
- Existen múltiples vías de migración de los hidrocarburos de aceites minerales a los alimentos y diferentes soluciones para cada una de ellas.



\*Bieber (2024)



## 02. ¿Qué repercusiones tendrá esto en los socios comerciales?

### Algunas ventajas de los niveles máximos en la legislación y algunos retos

- ❑ Reglas más claras con niveles máximos específicos para productos concretos
- ❑ Para determinados alimentos **se aplicarán límites de control más elevados** de forma temporal en comparación con los antiguos límites de LOQ de la declaración del SCoPAFF
- ❑ Probable aumento de los controles de MOAH en toda la UE
- ❑ Enfoque más coherente en la aplicación de la normativa respecto a los alimentos que contengan  $\text{MOAH} > \text{NM}$
- ❑ Mayor exigencia por parte de las empresas europeas a los proveedores para que aporten pruebas del cumplimiento de los niveles máximos de MOAH

# 03.

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Vías de entrada en los  
alimentos

Caja de herramientas



# 03. Fuentes de contaminación

## Caja de herramientas\*



\*Food Drink Europe (2018)

# 03. Fuentes de contaminación: Caja de herramientas



## 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.

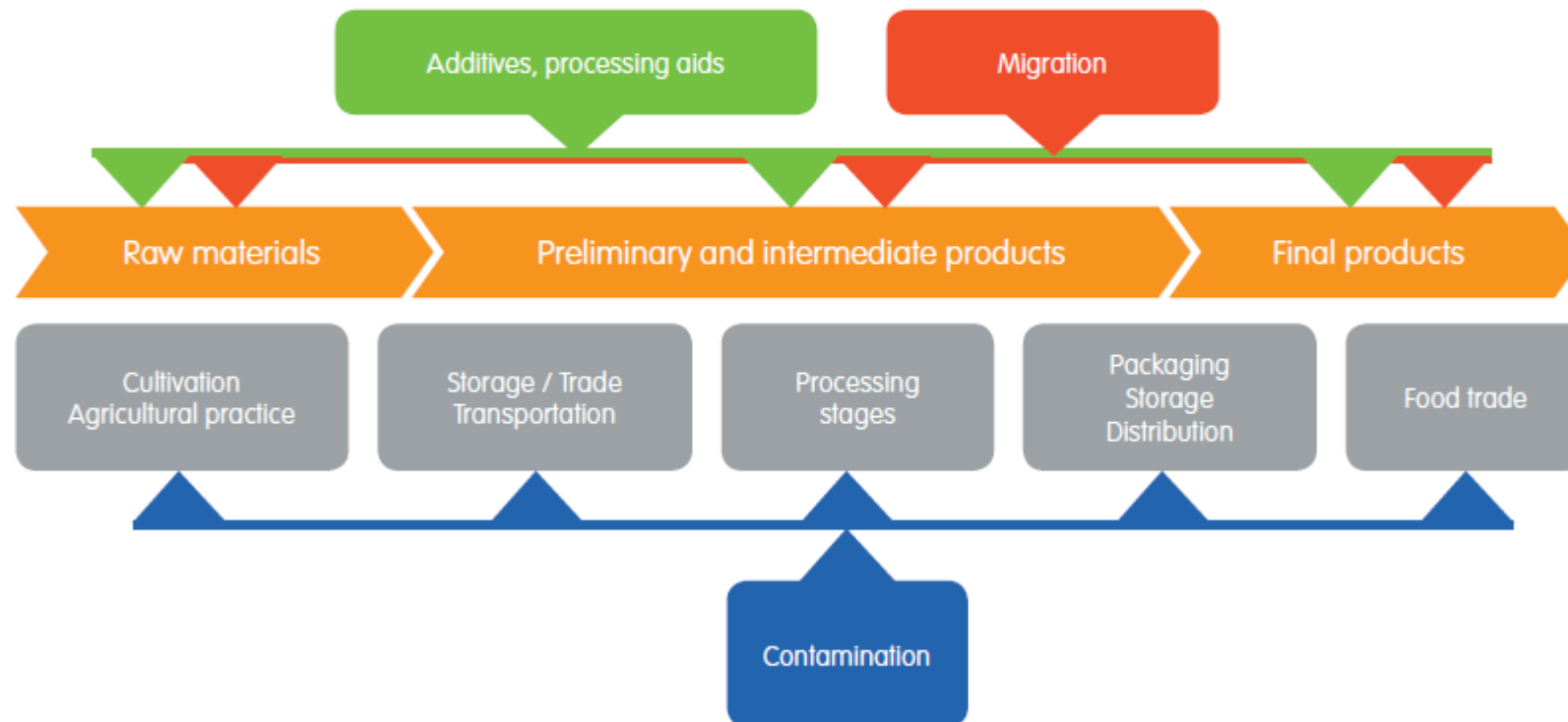


Figure 1: Systematic illustration of the routes of entry of MOSH/MOSH analogues and MOAH into food (according to [4])

# 03. Fuentes de contaminación

## Caja de herramientas: Migración – principalmente envases



| 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 <b>fresh fibre products</b> :<br><br>Bags, folding boxes and corrugated board made from fresh fibres<br><br>                                                                                   | <ul style="list-style-type: none"><li>● 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.</li><li>● 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.</li><li>● Ex: Specified primary fibre cartons according to DIN, such as GC1, GC2, GN4 and others.</li></ul> |
| Paper/ carton/board | Primary packaging     | MOSH/MOAH                                                 | Where necessary, use <b>functional barriers</b> for final product packaging: coatings, bag-in-box systems or liners (Kraft bags), corrugated boards<br><br>Applies also to packaging of upstream products<br><br> | <ul style="list-style-type: none"><li>● Use barrier materials suitable for raw materials/ upstream and intermediate products:</li><li>● coatings: co-extruded plastics or surface finish of cartons, e.g. in cartons or paper bags</li><li>● Ex: Barrier optimised products, e.g. for folding boxes or corrugated paper cartons.</li><li>● EVOH, PVDC, PA, PET, BOPP for bag-in-box</li></ul>                                                                                                                                                                                       |

Papel y cartón reciclados:

Los MOSH/MOAH quedan retenidos gracias a las tintas de impresión (¡MOH puro!)

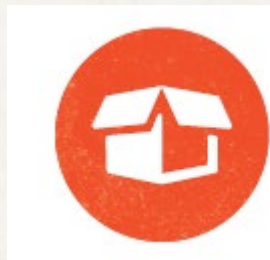


SEPTEMBER 2018



# 03. Fuentes de contaminación

## Caja de herramientas: Migración – principalmente envases



| Source              | Route of entry/ cause     | Saturated and unsaturated mineral oil hydrocarbons/groups | Tool                                                                                                                                                                           | Notes/examples                                                                                                                                                                                                                                                                                     |
|---------------------|---------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Paper/ carton/board | Container linings/ liners | <b>MOSH/MOAH</b>                                          | Use of low mineral oil linings (dressings), in particular for sea transport<br>               | <ul style="list-style-type: none"><li>● 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.</li><li>● Concretise FCC guidelines.</li></ul> |
| Paper/ carton/board | Container liners          | <b>MOSH/MOAH</b>                                          | Use alternative materials for the absorption of moisture/humidity in transport containers<br> | <ul style="list-style-type: none"><li>● Refrain from using carton dressings made from waste paper or based on recycling materials.</li></ul>                                                                                                                                                       |



# 03. Fuentes de contaminación

## Caja de herramientas: Migración – principalmente envases



| 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<br> | <ul style="list-style-type: none"><li>● 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".</li><li>● Comply with ILO Standards, no quality standards as regards MOSH/MOAH levels.</li></ul> |



Pero también el almacenamiento «a granel» sobre suelos de betón y asfalto: utilice suelos de hormigón o cúbralos con lonas.





# 03. Fuentes de contaminación

## Caja de herramientas: Contaminación



| 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 | <b>MOSH/MOAH</b><br><b>MOSH analogues (PAO, MORE)</b>     | 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<br> | <ul style="list-style-type: none"><li>● "Food grade" lubricants for machines and equipment, use in food production without intended food contact.</li><li>● 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.</li></ul> |

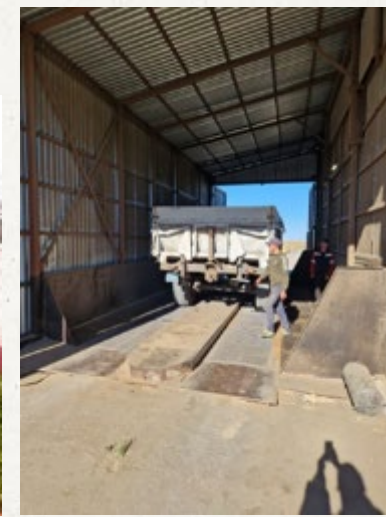
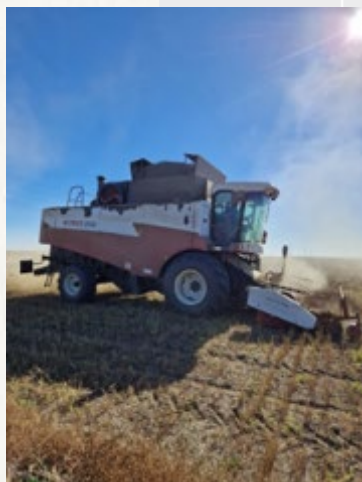




## Caja de herramientas: Contaminación



| Source               | Route of entry/cause                          | Saturated and unsaturated mineral oil hydrocarbons/groups | Tool                                                                                                                                                        | Note                                                                                                                                                                                                           |
|----------------------|-----------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technical lubricants | Continuous entry through harvesters or damage | <b>MOSH/MOAH</b><br><b>MOSH analogues (PAO)</b>           | Avoid/reduce leaks that may result in the entry of lubricants<br><br>Use suitable lubricants (NSG-H1/ NSF-H2) at all primary production levels, if possible | <ul style="list-style-type: none"> <li>Elaborate maintenance and damage action plans in case of leaks and accidents.</li> <li>Ex: Use of harvesters e.g. combines, and conveyors in harvesters.</li> </ul>     |
| Technical lubricants | Transport chain                               | <b>MOSH/MOAH</b><br><b>MOSH analogues (PAO)</b>           | Prevent/minimise entry of lubricants. All pneumatic and belt conveyors are concerned. Use H1 lubricants within the entire transport chain, if possible      | <ul style="list-style-type: none"> <li>Even when using H1 lubricants, MOSH and PAO may enter, e.g. conveyors, fork lifts, contaminated transport containers or carriers (e. g. returnable pallets).</li> </ul> |



# 03. Fuentes de contaminación

## Caja de herramientas: Contaminación



| Source                               | Route of entry/cause               | Saturated and unsaturated mineral oil hydrocarbons/groups | Tool                                                                                                                                              | Note                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------|------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lubricants - technical quality       | Compressed air<br>Pneumatic plants | <b>MOSH/MOAH</b><br><b>MOSH analogues (PAO, MORE)</b>     | Check compressed air for oil penetration on a regular basis<br>Use oil-free compressors, and if possible, draw in zero-emission environmental air | <ul style="list-style-type: none"><li>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.</li><li>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.</li></ul> |
| Smoke, gases from drying/ combustion | Drying methods                     | <b>MOSH/MOAH</b>                                          | Avoid direct drying of raw materials with combustion gases dependent on the energy source                                                         | <ul style="list-style-type: none"><li>Concerns mainly entry of volatile hydrocarbons and PAH during drying processes, e.g. spices, grain products.</li></ul>                                                                                                                                                                                                                                                                                                                        |

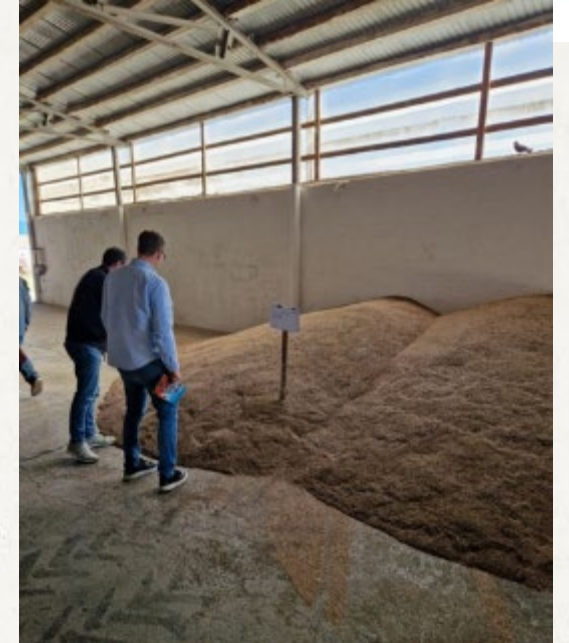




# 03. Fuentes de contaminación

## Caja de herramientas: Contaminación

| Source               | Route of entry/cause               | Saturated and unsaturated mineral oil hydrocarbons/groups | Tool                                                                                                                                                    | Note                                                                                                                                      |
|----------------------|------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Technical lubricants | Damage or systematic contamination | <b>MOSH/MOAH</b><br><b>MOSH analogues (PAO)</b>           | Prevent contact between raw materials and storage areas/floors contaminated with lubricants<br><br>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      | <b>MOSH/MOAH</b>                                          | Avoid contamination by exhaust gases. Check vehicle fleet, check external air inlets                                                                    | ● Prevent trucks from backing up to storage areas, turn off motors, etc.                                                                  |





# 03. Fuentes de contaminación

## Caja de herramientas: Aditivos – Coadyuvantes tecnológicos



| Source                 | Route of entry/ cause                   | Saturated and unsaturated mineral oil hydrocarbons/ groups | Notes/examples                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|-----------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dust control agents    | Spraying of mineral-oil based oils      | <b>MOSH/MOAH</b>                                           | <ul style="list-style-type: none"> <li>Used with dusting bulk goods that are food raw materials such as soya beans, grains, rape seeds and other oil seeds.</li> <li>Alternatively use mineral oil-free dust control agents based on vegetable oils.</li> <li>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.</li> </ul> |
| Pesticide formulations | Use of pesticides based on paraffin oil | <b>MOSH/MOAH</b><br><b>MOSH analogues (MORE)</b>           | <ul style="list-style-type: none"> <li>Use and presence as MOSH analogue within the area of vegetable raw materials possible.</li> </ul>                                                                                                                                                                                                                                                                                         |
| Release agent          | Hard paraffin or microcrystalline waxes | <b>MOSH analogues (PAO, MORE)</b>                          | <ul style="list-style-type: none"> <li>Used with e.g. confectionery, fruits.</li> <li>Is harmless when used as approved; however, relevant to analysis as MOSH analogues.</li> <li>Where necessary, use alternative waxes such as carnauba wax or beeswax, which are also relevant as MOSH analogues in analysis.</li> </ul>                                                                                                     |

— Animal drug components (by-products in vaccines)

# 03. Fuentes de contaminación

## Caja de herramientas: Aditivos – Coadyuvantes tecnológicos



|                                         |       |
|-----------------------------------------|-------|
| — 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 |