CONTAMINANTS, a new Challenge to a Critically Important Food Source

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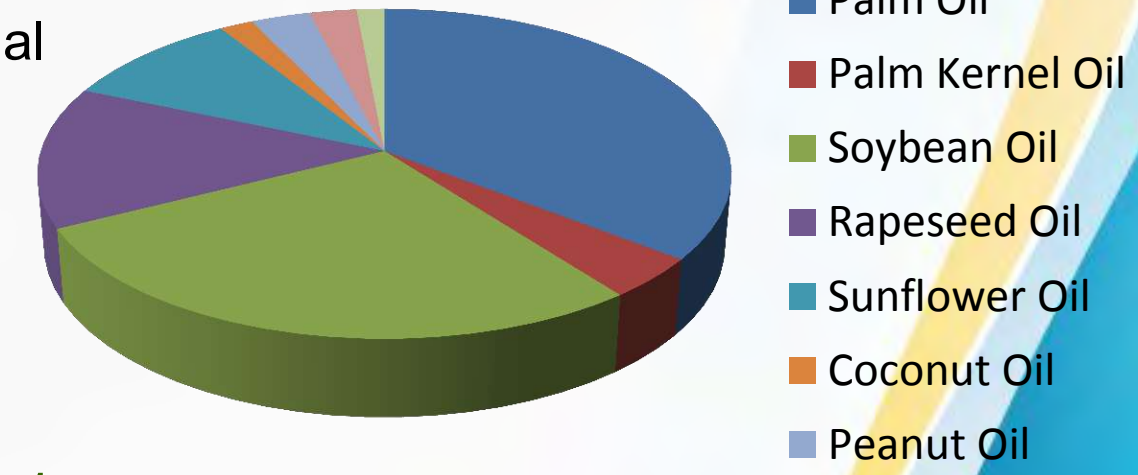
Edible oils – as food source

- Important food source (nutritional value)
- Widely consumed foods (202 million tonnes, 2019)
- Sources: plants and animals
- Prone to many contaminants
- Food safety aspect due to presence of contaminants
- Great concern for consumers, risk managers, official authorities and scientists

Nutritional value and the authenticity may not seriously affect consumer health,
BUT certain contaminants are known hazard if consumed above certain limits
Consumers have the right of safe food without or at least not more than the unavoidable contamination level.

Global Oils & Fats Consumed
(2019, 202 million tonnes)



Contaminants in edible oils

Contaminants

- Compounds unintentionally added to food
- Present as a result of farming, processing, production, preparation, transportation, packaging or storage
- Can be found at all stages: from production to finished products
- Sources: Endogenous or exogenous

  Endogenous - due to the conditions of the oil or food processing as products of the degradation of fatty acids or other constituents

  Exogenous - coming from outside the oil processing such as environmental chemicals
- Examples: water, phosphorus, non-visible insoluble compounds, free fatty acids, residual hexane, benzopyrene, pesticides, dioxins, mycotoxins, mineral oils, cargo residues, minerals such as iron, copper, or even products from primary and secondary oxidation processes

These contaminants may interfere in the functionality of the edible oils or simply contribute to certain level of toxicity once consumed

Concerns on contaminants in edible oils

- Food safety - great concern in many countries
- Regulation (EEC) No.315/93 – prohibit the placement of food containing contaminants in an unacceptable amounts in the market
- Minimizing principle is applied where only foods containing contaminants limited to values **a**s **l**ow **a**s **r**easonably **a**chievable (ALARA) by good manufacturing practice from the processing until are allowed to be placed in the market
- Based on ALARA, limits were defined for exogenous contaminants such as mycotoxins, metals, dioxins, and polycyclic aromatic hydrocarbons in Regulation (EC) No. 1881/2006
- Also applicable to oils and fats

Concerns on contaminants in edible oils/...

- BUT for **mineral oils** from exogenous sources NO regulations has been defined yet
- For **contaminants formed during oil or food processing** such as fatty acid esters of 3-MCPD or glycidyl, regulations have only been recently defined
- Main reason - Difficulty to conduct risk assessment on the toxicity of the compounds on basis of the real exposure and its effect on health.
- Except for some contaminants, the ALARA principle is often applicable for such compounds.

Limits on contaminants in food

Linked to

- ❑ Toxicity of contaminants once consumed
- ❑ Development of new and more sensitive analytical methods

Thus compounds NOT detectable some years ago are today registered with more and more sophisticated methods that are reliable, validated and robust.

This led to controversial debate about **contaminants**, **limits** for contaminants and procedures for their **mitigation**.

This pose a new challenge on the acceptability of edible oils

Mitigating contaminants in edible oils

Requires information on…

- ❑ The pathway of the contamination
- ❑ The fate of the contaminants during oil or food processing

A good example is the announcement on the finding of 3-MCPD and glycidyl esters in refined edible oils in 2007.

Since then, extensive efforts were undertaken to develop validated analytical methods and mitigation strategies for both 3-MCPD and glycidyl esters as reported by EFSA in 2103.

Other contaminants such as **mineral oils** or **epoxy fatty acids** have also generated interest with new findings and developments .

Balancing act to mitigate contaminants

- Exogenous contaminants can be removed or reduced during refining
- BUT contaminants such as long-chain mineral oils, NO technology available
- If more variation in product specifications allowed, contaminants could be reduced depending on the function of the oil or fat in the food
- Needs a balance between removal of harmful contaminants and the formation of new contaminants and costs
- The technical challenge is to introduce **flexibility** to refineries **without increasing costs**

Conclusions

- Edible oils contain contaminants of various origins
- Contaminants are either endogenous or exogenous and very varied
- Contaminants can pose danger to consumer
- **Refining technologies have made it possible to reduce, avoid or eliminate undesirable compounds in edible oils**
- **Need a balance between removing contaminants with cost**

BUT the main problem is NO one is willing to pay premium for higher-quality oils

THANK YOU

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