

3-MCPD and GE

1. What are 3-MCPD and GE?

- 3-MCPD stands for 3-monochloropropanediol, and GE for glycidyl fatty acid esters.
- 3-MCPD is the most commonly occurring group of contaminants known as chloropropanols. First identified as a contaminant of acid-hydrolysed vegetable proteins and soy sauce, it was later found in other foods¹.
- Glycidyl fatty acid esters (GEs) are processing induced contaminants primarily found in refined fats and oils, and foods containing fats and oils.
- Both substances are considered to be of concern to public health and it is recommended to minimise the amount consumed.

2. Why are 3-MCPD and GE considered contaminants?

- In 2016, the European Food Safety Authority² (EFSA)'s expert panel on contaminants first assessed the potential risks of 3-MCPD and GE.
- Consumption levels of 3-MCPD in food are considered safe for most consumers but there is a potential health concern among high consumers in younger age groups. In the worst case scenario, infants receiving formula only may slightly exceed the safe level.
- GEs are a concern for public health because they are genotoxic and carcinogenic, i.e. they can damage DNA and cause cancer.

3. Are these contaminants found in palm oil and other vegetable oils?

- All vegetable oils³, including rapeseed oil, soybean oil, coconut oil, sunflower seed oil, and palm oil, as well as margarines and processed foods may contain these contaminants as a by-product of food processing, particularly processing that involves high-temperature refining at above 200°C.
- These by-products can be minimised or eliminated entirely through changes to how food is produced.

4. How do 3-MCPD and GE enter during food production?

- 3-MCPD and GE are compounds formed during food production and preparation at high temperatures.
- High deodorisation temperature leads to the formation of 3-MCPD; deodorisation removes unwanted taste and odour to meet customer quality and safety specifications.
- GE is formed from diacylglyceride (DAG) compounds at temperatures of 230 °C or higher.

¹ <https://www.ifst.org/resources/information-statements/3-monochloropropane-diol-3-mcpd-3-mcpd-esters-and-glycidyl-esters>

² <http://www.efsa.europa.eu/>

³ <https://www.efsa.europa.eu/en/press/news/process-contaminants-vegetable-oils-and-foods>

5. What consumption levels do EU authorities consider safe today⁴?

- There are two proposed maximum levels of 3-MCPD for vegetable oils and fats and fish oils for the consumers, or for use as food ingredients:

| Category | Maximum level (µg/kg) |
|---|-----------------------|
| Unrefined oils, refined oils and fats from coconut, maize, rapeseed, olives (except olive pomace oil), sunflower, soya bean, palm kernel, and mixtures of oils and fats from this category only | 1,250µg/kg |
| Other refined vegetable oils, fish oils and oils of other marine organisms and mixtures of oils and fats from this category only | 2,500µg/kg |

*µg/kg = Micrograms per kilogram

*Maximum permitted level = the maximum amount of 3-MCPD which may be present in the food as set out in relation to that food

- For mixtures of oils and fats from the two different categories, if the quantitative composition of the mixture is not known, the maximum level set of 3-MCPD should not exceed 2,500µg/kg.
- Because of the potential health concern among high consumers in younger age groups, foods, for children, have different limits. The proposed maximum level of 3-MCPD for baby food, infant formula, follow-on formula and foods are as follows:

| Category | Maximum level (µg/kg) |
|--|-----------------------------|
| For vegetable oils and fats used for baby food, processed cereal-based food for infants and young children, and young child formulas | 750µg/kg (being considered) |
| Powder infant and young children formula, follow-on formula and foods for special medical purposes | 125µg/kg |
| Liquid infant and young children formula, follow-on formula and foods for special medical purposes | 15µg/kg |

- The EU's current maximum level of GE and products containing them are:

| Category | Maximum level (µg/kg) |
|--|-----------------------|
| Vegetable oils and fats | 1,000µg/kg |
| Vegetable oils and fats for the production of baby food and processed cereal-based food for infants and young children | 500µg/kg |
| Powder infant formula, follow-on formula and foods for special medical purposes | 50µg/kg |
| Liquid infant formula, follow-on formula and foods for special medical purposes | 6µg/kg |

⁴ <https://www.ofimagazine.com/news/eu-considers-maximum-limits-for-3-mcpd-and-3-mpdes-in-oils-and-fats>

6. What is GAR doing to reduce 3-MCPD and GE?

GAR is implementing several mitigation strategies to reduce 3-MCPD and GE. Together with food manufacturers, we are using new internationally approved identification methods to test for these substances.

At the same time, we have been actively working on installing and testing new mitigation technologies. Our trial tests show that using chemical refining to produce non-bleached and deodorised palm oil could meet specifications by food manufacturers, including the stringent specifications set by international brands and by producers of infant formula.

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