

Frequently Asked Questions about 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.

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.

1. 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.
- High consumption levels of GEs in food are a concern for public health because they are genotoxic and carcinogenic, i.e. they can damage DNA and cause cancer.

2. 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.

3. How are 3-MCPD and GE introduced during food production?

- 3-MCPD and GE are compounds formed during food production and preparation at high temperatures.
- The high temperature used in the deodorisation process 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>

4. What consumption levels do EU authorities consider safe today?

- In September 2020, the European Commission adopted its latest regulation on the maximum levels of 3-MCPD, 3-MCPD fatty acid esters and GE⁴.
- The maximum levels of 3-MCPD and its fatty acid esters, and the new maximum levels of GE in young-child formula, fish oil, and oils from other marine organisms, enter into force from 1 January 2021.
- The maximum levels of 3-MCPD for vegetable oils and fats and fish oils for the consumers, or for use as food ingredients, are:

Category	Maximum level (µg/kg)
Oils and fats from coconut, maize, rapeseed, sunflower, soybean, palm kernel and olive oils (composed of refined olive oil and virgin olive oil) and mixtures of oils and fats with oils and fats from this category only	1,250µg/kg
Other vegetable oils (including pomace olive oils), fish oils and oils from other marine organisms and mixtures of oils and fats with oils and fats only from this category	2,500µg/kg

*µg/kg = Micrograms per kilogram

- Because of the potential health concern among high consumers in younger age groups, foods for children have different limits. The adopted maximum level of 3-MCPD and its fatty acid esters 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
Powder infant and young-child formula, follow-on formula and foods for special medical purposes	125µg/kg
Liquid infant and young-child formula, follow-on formula and foods for special medical purposes	15µg/kg

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

Category	Maximum level (µg/kg)
Vegetable oils and fats for the final consumer or for use as an ingredient in food, except for the baby food and processed cereal-based food for infants and young children, and of virgin olive oils	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://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1322&from=EN>

5. Besides the EU, who is else concerned about MCPD and GE levels in food?

The Codex Alimentarius Commission⁵ (commonly referred to as Codex) is the body established to develop, harmonise and implement international food standards under the Joint FAO/WHO Food Standards Programme.

In July 2019, the Codex adopted a Code of Practice (COP) for the reduction of 3-MCPD and GE in refined oils and food products made with refined oils⁶. The COP provides guidance on how producers and users can reduce 3-MCPD and GE levels through good practices in agriculture, manufacturing and oil selection in food products.

Governments around the world refer to the Codex food standards to protect the health of their domestic consumers.

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 tests show that our palm oil can meet requirements of food manufacturers, including the stringent specifications set by international brands and producers of infant formula.

For more information, please contact:

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⁵ <http://www.fao.org/fao-who-codexalimentarius/news-and-events/news-details/en/c/1204499/>

⁶ http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252Fstandards%252FCXC%2B79-2019%252FCXC_079e.pdf