

3-Monochloropropane-1,2-diol (3-MCPD) Fact Sheet

What is 3-MCPD?

3-Monochloropropane-1,2-diol (3-MCPD) is a type of process contaminants found in a wide range of foods and food ingredients, existing in either its free form or esterified form (3-MCPD fatty acid esters)¹.

List of local foods containing 3-MCPD/3-MCPD fatty acid esters¹

Food items	Min - Max levels (µg/kg)	Food items	Min - Max levels (µg/kg)
Fats and oils	ND [#] - 2500	Dairy products	ND - 230
Chinese pastry	ND - 1200	Noodles	ND - 210
Biscuits	50 - 860	Infant milk substitute	13 - 120 ³
Condiments and sauces	ND - 490	Soup and non-alcoholic beverages (e.g. coffee)	ND - 61
Meat, fish and their products (e.g. sausages or canned fish)	ND - 280	Breakfast cereals	ND - 43

#ND = Non-detectable

How is 3-MCPD formed?

3-MCPD is formed as a result of high temperature chlorination of lipids (~200°C) during manufacturing process of certain foods such as acid hydrolysis, baking, deep frying and roasting^{1,2}.

Are there any safety concerns for 3-MCPD?

3-MCPD fatty acid esters can potentially be hydrolyzed and released *in vivo* in the gastrointestinal tract. While 3-MCPD has been classified as Group 2B agent (possibly carcinogenic to humans) given the evidenced impacts on the kidney and the male reproductive system of rats⁴ but no evidence is available to demonstrate carcinogenicity of

Are there any international authority risk assessments in relation to 3-MCPD?

- The Codex Alimentarius Committee (Codex) has set the maximum level of 3-MCPDs in liquid condiments containing acid-HVP at 0.4 mg/kg¹
- In 2016, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) has established a provisional maximum tolerable daily intake (PMTDI) for 3-MCPD and 3-MCPD esters at 4 µg/kg body weight/day (alone or in combination)⁵
- In 2017, the European Food Safety Authority has revised its established Tolerable Daily Intake (TDI) of 3-MCPD to 2.0 µg/kg of body weight (previously at 0.8 µg/kg of body weight in 2016)⁶.
- In 2018, the European Union has set maximum levels for 3-MCPDs at up to 20 µg/kg specifically in hydrolysed vegetable protein and soy sauce⁷

Any advice on how to reduce 3-MCPD levels from dietary exposure?

According to Centre for Food Safety, current findings do not sufficiently justify for any changes in fundamental dietary recommendations on health eating, however, a reduced consumption of fats and oils may further minimize the exposure to 3-MCPD given refined oil is one of its major sources.

References: 1. Centre for Food Safety. Fatty acid esters of 3-monochloropropane-1,2-diol (3-MCPD) in food. 2012. 2. Food and Agriculture Organization (FAO). Position paper on chloropropanols. 2001. 3. Hong Kong Customer Council. Choice. 2020;(8):526. 4. Oey S et al. Compr Rev Food Sci Food Saf. 2019;18:349-361. 5. World Health Organization (WHO). Evaluation of the Joint FAO/WHO Expert Committee on Food Additives (JECFA): 3-Chloro-1,2-propanediol esters. 2016. Available at: <https://apps.who.int/food-additives-contaminants-jecfa-database/chemical.aspx?chemID=6456>. Accessed on 18Aug2020. 6. European Food Safety Authority (EFSA). Revised safe intake for 3-MCPD in vegetable oils and food. 2018. Available at: <https://www.efsa.europa.eu/en/press/news/180110>. Accessed on 18Aug2020. 7. European Commission. Commission Regulation (EU) 2018/290. 2018.