

Substance Information Document

Ethyl maltol

1. Substance identity

Name	Ethyl maltol
Synonyms	2-Ethyl-3-hydroxy-4-pyrone 2-Ethyl-3-hydroxy-4H-pyran-4-one 2-Ethylpyromeconic acid 3-Hydroxy-2-ethyl-4-pyrone 3-Hydroxy-2-ethyl-4H-pyran-4-one
IUPAC Name	2-ethyl-3-hydroxypyran-4-one
CAS	4940-11-8

2. Toxicological information

Ethyl maltol was determined not to be a dermal irritant in vitro, when tested undiluted in rabbits, or at 10% in human subjects, but did cause transient slight irritation to the eyes of rabbits when tested undiluted. It was not a skin sensitizer. No in vivo data on its local effects on the respiratory tract were identified, but it did show cytotoxicity to various human lung cell types in vitro.

Ethyl maltol meets the criteria for classification for acute oral toxicity, with rodent LD50 values of 780-1220 mg/kg bw, but has a very low acute dermal toxicity in rabbits. A 2-year dietary study in rats established a NOAEL of 200 mg/kg bw/day (the highest dose tested) and was the key study used by JECFA (1975, 2006) in setting an ADI of 2 mg/kg bw/day. EFSA (2015) had “no safety concern” from the use of ethyl maltol as a food flavouring agent. No acute or repeated-exposure inhalation studies were identified.

Although mutagenicity was detected in one bacterial reverse mutation (Ames) assay, EFSA (2015) considered that the lack of carcinogenicity seen in the chronic rat study “could overrule” this result. Another Ames assay and two in vivo micronucleus tests in mice did not show any evidence of genotoxicity, but markers of in vitro clastogenic activity have been reported in a non-standard assay in human cells. Dietary administration of ethyl maltol at up to 200 mg/kg bw/day to rats, (presumably) prior to and during mating, and during gestation and lactation, was not associated with any adverse effects on reproduction or development.

JECFA	356. Ethylmaltol (WHO Food Additives Series 6) (inchem.org) v56je07.pdf (inchem.org)
FEMA	10.GRAS Substances (3477-3525).pdf (femaflavor.org)

EFSA	Scientific Opinion on Flavouring Group Evaluation 83, Revision 1 (FGE.83Rev1): Consideration of ethyl maltol and two 6-keto-1, 4-dioxane derivatives substances evaluated by JECFA (65th meeting) (wiley.com) https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2017.4720
ECHA – REACH dossier	Registration Dossier - ECHA (europa.eu)
PUBCHEM	Ethyl maltol C7H8O3 - PubChem (nih.gov)
CIR	-
OSHA	-

3. Addictiveness and attractiveness

Scientists from the Dutch National Institute for Public Health and the Environment (RIVM) identified ethyl maltol as an ingredient added to at least 100 e-liquids of the EU-CEG dataset and it was reported to be present in 32.01% of all e-liquids and within several flavour categories. The flavour type of ethyl maltol has been described as sweet, fruity-caramellic and cotton candy. The Dutch investigators noted that such flavourings increase e-cigarette attractiveness and use and thereby exposure to potentially toxic ingredients.

SCENIHR	-
EMA	-
PUBMED	Fragrance compounds and essential oils with sedative effects upon inhalation - PubMed (nih.gov) Blood levels of 1,8-cineole and locomotor activity of mice after inhalation and oral administration of rosemary oil - PubMed (nih.gov) Comprehensive overview of common e-liquid ingredients and how they can be used to predict an e-liquid's flavour category - PubMed (nih.gov)