Substance Information Document

Glycerol

1. Substance identity

Name	Glycerol
Synonyms	Glycerin Glycerine 1,2,3-Propanetriol 1,2,3-Trihydroxypropane
IUPAC Name	propane-1,2,3-triol
CAS	56-81-5

2. Toxicological information

In laboratory animal, glycerol has a low acute and repeated-dose toxicity following inhalation, oral or dermal treatment. The most informative inhalation study established a systemic NOAEC of 662 mg/m^3 (the highest tested concentration) in rats exposed 6 hours/day, 5 days/week, for 13 weeks. It also appears to be of low systemic toxicity following acute and repeated oral exposure in humans. The EMA recently noted that a single oral dose of 10 g might cause mild effects such as headache, stomach upset and diarrhea. No overt toxicity occurred in volunteers ingesting about 1300-2200 mg/kg bw/day for 50 days.

Glycerol is not genotoxic, and the available (limited) data do not suggest that it is carcinogenic. Occupational and laboratory animal data indicate that it is not toxic to reproduction or development.

Regarding local effects, rats showed only nasal discharge (and no other signs of respiratory tract irritation) when exposed to glycerol vapour at 11,000 mg/m^3 for 4-7 hours. In a subchronic inhalation study in rats, a local NOAEC of 167 mg/m^3 has been reported. The adversity of the key effect (minimal-to-mild squamous metaplasia of the epiglottal epithelium) been debated, with some experts opting for a higher local NOAEC of 662 mg/m^3.

Data from humans and laboratory animals suggest that undiluted glycerol is, at worst, slightly irritating to the eye and skin, and there is some evidence of gastrointestinal irritation in laboratory animals.

Glycerol does not appear to be a skin sensitiser in humans or guinea pigs. The UK COT has recently established a HBGV of 11.8 mg/m^3 for the general population continuously exposed to glycerol. An oral ADI of “not specified” has been established by EFSA/JECFA/SCF indicating a lack of concern for repeated oral exposure.

Glycerol is of low toxicological concern. There is the potential for (slight) irritation to the tissues of the respiratory tract at high concentrations, likely as a result of its dehydrating action. As a humectant, it may also improve the palatability of ENDS products.

JECFA	ALIPHATIC ACYCLIC DIOLS, TRIOLS, AND RELATED SUBSTANCES (JECFA Food Additives Series 48) (inchem.org)
FEMA	0320 FEMA GRAS 29 (femaflavor.org)
EFSA	Reports on toxicokinetics, toxicity and allergenicity data on substances to be evaluated as acceptable previous cargoes for edible fats and oils (NP/EFSA/CONTAM/2011/01) – Batches n. 1, 2 and 3 (wiley.com) Re-evaluation of glycerol (E 422) as a food additive (wiley.com)
ECHA – REACH dossier	Registration Dossier - ECHA (europa.eu)
PUBCHEM	Glycerol | C3H8O3 - PubChem (nih.gov)
CIR	CIR Report Data Sheet (cir-safety.org)
OSHA	Permissible Exposure Limits – OSHA Annotated Table Z-1 | Occupational Safety and Health Administration

3. Addictiveness and attractiveness

Due to its humectant properties, and that humidification improves the palatability of cigarettes, glycerol is considered to positively influence the attractiveness of cigarette smoking [and presumably ENDS products] despite lacking a strong flavour. However, no data have been "reported to suggest that glycerol plays a role in smokers' addictiveness to cigarettes" (SCENIHR, 2016). It has been said that monoamine oxidase (MAO) inhibitors may reinforce the brain's response to nicotine by delaying the degradation of relevant neurotransmitters by MAOs. Glycerol (10% in 500 mM phosphate buffer) was inactive in a kynuramine assay for MAO inhibition using human recombinant enzymes.

SCENIHR	Final Opinion on Additives used in tobacco products (Opinion 1) (europa.eu)
EMA	-
PUBMED	Monoamine oxidase inhibitory activity of flavoured e-cigarette liquids - PubMed (nih.gov)