Substance Information Document

Benzyl carbinol

1. Substance identity

Name	Benzyl carbinol
Synonyms	2-Phenethyl alcohol; Phenylethyl alcohol;2-Phenylethanol;2-Phenylethyl alcohol; 2-Phenylethan-1-ol; β-Phenylethanol;
IUPAC Name	2-phenylethanol
CAS	60-12-8

2. Toxicological information

Genotoxicological tests with 2-phenethyl alcohol were all negative. Intraperitoneal injections of 2-phenethyl alcohol at 100 mg/kg bw revealed an increase in cellular proliferation in the lung alveoli, however, this could not be confirmed in a later experiment. Generally, 2-phenethyl alcohol is considered as non-skin irritating by experts' groups. However, skin irritation was detected in a few volunteers after patch tests. Low levels of erythema and desquamation were observed in rats after undiluted 2-phenethyl alcohol at 70 mg/kg bw/day and above was topically applied, doses at 140 mg/kg bw/day caused reduction in foetal body weight and delay in ossification, hence, the developmental NOAEL was reported as 70 mg/kg bw/day. After 2-phenethyl alcohol oral gavage administration to rabbits, a developmental NOAEL of 50 mg/kg bw/day was determined based on foetal body weight decrease in males and females and skeletal variations and malformations. In a rat reproductive toxicological study, the NOAEL for 2-phenethyl alcohol applied by oral gavage was 4.3 mg/kg bw/day, based on foetal malformations and reduced live litter size at the higher doses.

0.5% to 0.75% solutions of 2-phenethyl alcohol were reported to irritate the human eye. Eye irritation was also detected in rabbits using solutions of 1% to 15%.

2-phenethyl alcohol has low toxicity based on results from an acute rat inhalation study receiving a nominal concentration of 4.63 mg/L. Reported LD_{50} values indicate a low-moderate order of acute oral toxicity (rats: 1500 mg/kg bw to 1609 mg/kg bw, mice: 800-1500 mg/kg bw, guinea pigs: 400-2540 mg/kg bw).

Based on limited data, 2-phenyethyl alcohol has low toxicity following repeated oral exposure. No adverse effects were reported when rats were fed diets containing 2-phenethyl alcohol providing 62.5-2000 mg/kg bw/day for 14 days. Oral gavage administration in rabbits at 300 mg/kg bw/day caused, however, severe toxic effects, including no food consumption and marked body weight loss. In this study a maternal NOAEL of 43 mg/kg bw/day was established.

Based on the results from a 90-day study in rats, 2-phenethyl alcohol has low toxicity following repeated dermal exposure (NOAEL= 510 mg/kg bw/day).

JECFA and EFSA concluded that the use of 2-phenethyl alcohol as a food flavouring is of "no safety concern" at then-current estimated intakes of 1200-1400 and 330 µg/person/day in Europe and the US, respectively.

JECFA	Phenylethyl Alcohol, Aldehyde, Acid and Related Acetals and Esters and Related Substances (JECFA Food Additives Series 50) (inchem.org)
FEMA	0320 FEMA GRAS 29 (femaflavor.org)
EFSA	http://onlinelibrary.wiley.com/doi/10.2903/j.efsa.2009.1024/epd https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6338
ECHA – REACH dossier	Registration Dossier - ECHA (europa.eu)
PUBCHEM	2-Phenylethanol | C8H10O - PubChem (nih.gov)
CIR	4 Final Report on the Safety Assessment of Phenethyl Alcohol (sagepub.com)
OSHA	-

3. Addictiveness and attractiveness

Inhalation of 2-phenethyl alcohol prolonged the pentobarbital-induced sleep time in mice. 20 minutes after a 15-minute inhalation of an unspecified concentration of 2-phenethyl alcohol, anxiety-like behaviour in mice was reported to be increased and depression-like behaviour was decreased. While another study in mice exposed to 2-phenethyl alcohol "odours" (filter paper soaked in the material) for 5 minutes showed anxiolytic effects, as confirmed by low blood corticosterone levels.

Solutions of 2-Phenethyl alcohol that were allowed to vaporize and pervade the cage via natural diffusion for 1 hour, demonstrated sedative effects in mice (reduction in spontaneous motor activity). Narcosis occurred within 1-5 minutes after mice were given single oral gavage dose of 1-2 g/kg bw, and performances of mice on a tilting plane were highly reduced 15 minutes after the administration of a single oral dose of 300, 600 or 900 mg phenethyl alcohol/kg bw.

2-Phenethyl alcohol local anaesthetic properties in mice were shown to be related to "a reduction in dipole potential and microviscosity of hippocampal membranes, with a concomitant increase in lateral diffusion". The effects appear to be mediated via the hippocampal serotonin 1A receptor.

SCENIHR	-
EMA	-
PUBMED	https://pubmed.ncbi.nlm.nih.gov/2049606/; https://pubmed.ncbi.nlm.nih.gov/30415864/; https://pubmed.ncbi.nlm.nih.gov/22248569/; https://pubmed.ncbi.nlm.nih.gov/33389551/ PHYSIOLOGICAL EFFECT OF PHENETHYL ALCOHOL (wiley.com) https://pubmed.ncbi.nlm.nih.gov/27825964/ https://pubmed.ncbi.nlm.nih.gov/30586308/