Substance Information Document

Benzaldehyde

1. Substance identity

Name	Benzaldehyde
Synonyms	Benzoic aldehyde Phenylmethanal Benzenecarboxaldehyde Almond artificial essential oil Artificial almond oil
IUPAC Name	benzaldehyde
CAS	100-52-7

2. Toxicological information

Benzaldehyde is an organic compound consisting of a benzene ring with a formyl substituent. It is the simplest aromatic aldehyde, with an almond-like odor.

Read-across results with benzoic acid (metabolite of benzaldehyde, CAS# 65-85-0) showed minimal and reversible skin irritation to rabbits after 4 h treatment. A skin sensitization study performed with guinea pigs (similar to OECD 406) showed no skin sensitization; benzaldehyde is considered a weak skin sensitizer (based on RIFM assessment). A non-GLP study (similar to OECD 405) showed that ocular application of benzaldehyde was slightly irritating to rabbits. A non-GLP/non-OECD study in guinea pigs showed that 500 ppb benzaldehyde exposure for 4 weeks did not lead to respiratory allergic reactions, and only slight nose irritation was observed.

Several studies on the acute toxicity of the benzaldehyde are available: For oral acute-toxicity, an LD_{50} of 1430 mg/kg/bw was determined in a key study, similar to OECD 401; For acute inhalation toxicity, an OECD 436 study determined an LD_{50} within the range of 1-5 mg/L (i.e., all females and 1 male mice died at 5 mg/L and none at 1 mg/L); For acute dermal toxicity, a study similar to OECD 402 determined an LD_{50} > 2000 mg/kg bw (not considered toxic by dermal route).

Several studies on the repeated-dose toxicity of the benzaldehyde are available: For repeated oral toxicity, the reference study is a rat/mouse 2-year non-OECD study that defined a NOAEL of 200 mg/kg bw/d based on mice squamous cell papillomas and hyperplasia of the forestomach; those data were thoroughly reviewed by the Flavor and Fragrance High Production Volume Consortia (FFHPVC: Benzyl Derivatives) and determined to be not relevant to human health. An inhalation study, similar to OECD 412, established a LOAEC of 500 ppm (or 2.2 mg/L), according to clinical observations (indicative of neurotoxicity), hypothermia, and goblet cell metaplasia.

Benzaldehyde was tested in OECD 487 and 490 compliant studies showing no genotoxicity. Multiple Ames studies (OECD 471) showed non-mutagenicity. An in vivo micronucleus study (OECD 474) showed no clastogenic effects.

There are no developmental toxicity data on benzaldehyde. A gavage postnatal screening study conducted in mice with benzyl alcohol determined the developmental NOAEL to be 550 mg/kg/d, the

only dosage tested. The are no reproductive toxicity data on benzaldehyde. Benzoic acid has a dietary chronic toxicity and 4-generation reproductive toxicity study conducted in rats, which determined the NOAEL for reproductive toxicity to be 1% or 500 mg/kg/d, the highest dose tested.

JECFA	BENZYL DERIVATIVES (JECFA Food Additives Series 48) (inchem.org)
FEMA	BENZALDEHYDE | FEMA (femaflavor.org)
EFSA	Flavouring Group Evaluation 54, Revision 1 (FGE.54Rev1): Consideration of benzyl derivatives evaluated by JECFA (57th meeting) structurally related to benzyl alcohols, benzaldehydes, a related acetal, benzoic acids and related esters evaluated by EFSA in FGE.20Rev1 (2009) (wiley.com)
ECHA – REACH dossier	Registration Dossier - ECHA (europa.eu)
PUBCHEM	Benzaldehyde | C6H5CHO - PubChem (nih.gov)
CIR	-
OSHA	-

3. Addictiveness and attractiveness

In a publication by van de Nobelen et al., benzaldehyde effect on inhibition of the metabolic enzyme mouse CYP2A5 (human CYP2A6), tested *in vitro*, was linked to potential effects on higher nicotine exposure. The authors clarified also that the inhibition of CYP2A6 activity doesn't necessarily mean higher exposure to nicotine, as other processes like nicotine clearance should be monitored.

SCENIHR	-
EMA	-
PUBMED	An Inventory of Methods for the Assessment of Additive Increased Addictiveness of Tobacco Products - PubMed (nih.gov)