Substance Information Document

trans-beta-Damascone

1. Substance identity

Name	trans-beta-Damascone
Synonyms	(E)-1-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2-buten-1-one
IUPAC Name	(E)-1-(2,6,6-trimethylcyclohexen-1-yl)but-2-en-1-one
CAS	23726-91-2

2. Toxicological information

beta-Damascone (CAS 35044-68-9) is a racemic mixture of two isomers: *trans-beta*-damascone (CAS 23726-91-2) and *cis-beta*-damascone (CAS 23726-92-3).

Despite an absence of data, respiratory tract irritation has been noted as a potential concern for *beta*-damascone (CAS 35044-68-9). Based on laboratory animal data for *cis-beta*-damascone and several chemicals within the group, NICNAS (National Industrial Chemicals Notification and Assessment Scheme) concluded that the damascones (including *cis*- and *trans-beta*-damascone) are "not expected to cause skin irritation at the concentrations used in consumer products". NICNAS stated that several of the damascones tested (including *cis-beta*-damascone) have "shown no evidence of eye irritation at concentrations of 0.5-100%".

Human studies on *trans-beta*-damascone at 0.2-1% did not show skin sensitization. However for *cis-beta*-damascone reactions indicative of skin sensitization were reported at 0.5-5%, but not at 0.05%.

A maximization study in guinea pigs and a mouse LLNA have indicated that *trans-beta*-damascone is a mild-to-moderate skin sensitiser. Evidence of skin sensitisation induced by *cis-beta*-damascone has been reported in guinea pigs, at concentrations of 2% and higher, but not at up to 1.5%.

No acute or repeated-dose inhalation toxicity data were identified. Based on laboratory animal data for *trans-beta*-damascone and several related chemicals, NICNAS reported that the damascones are expected to have low to moderate acute oral systemic toxicity, low acute dermal systemic toxicity, and not to "pose serious damage to health from repeated oral exposure".

No evidence of bacterial mutagenicity was reported in reliable studies on *cis*- and *trans-beta*-damascone. An equivocal result was obtained in a guideline *in vitro* micronucleus assay with the *cis*-isomer, but in a good quality *in vivo* study, no DNA damage or chromosome damage were seen in the liver and duodenum or the bone marrow, respectively. No reproductive or developmental toxicity, or carcinogenicity studies were identified, although the EU SCENIHR have indicated a lack of concern for these endpoints with regards to *cis-beta*-damascone.

Existing expert-group reference values were not identified, but JECFA have raised no human health concerns with regard to *cis-beta*-damascone.

JECFA	945. Ionones and structurally related substances (WHO Food Additives Series 42) (inchem.org)
FEMA	0320 FEMA GRAS 29 (femaflavor.org)
EFSA	Scientific Opinion on Flavouring Group Evaluation 213, Revision 1 (FGE.213Rev1): Consideration of genotoxic potential for α,β-Unsaturated Alicyclic ketones and precursors from chemical subgroup 2.7 of FGE.19 - - 2014 - EFSA Journal - Wiley Online Library Scientific Opinion on Flavouring Group Evaluation 213, Revision 2 (FGE.213Rev2): Consideration of genotoxic potential for α,β-unsaturated alicyclic ketones and precursors from chemical subgroup 2.7 of FGE.19 - - 2015 - EFSA Journal - Wiley Online Library
ECHA – REACH dossier	Registration Dossier - ECHA (europa.eu)
PUBCHEM	(E)-beta-Damascone | C13H20O - PubChem (nih.gov)
CIR	-
OSHA	-

3. Addictiveness and attractiveness

No substance-specific addictiveness data were identified. Although SCENIHR (2016) did not cite any studies or provide an opinion on the addictiveness of *beta*-damascone, they did note that it is a flavour and is used as such in food and tobacco.

Scientists from the Dutch National Institute for Public Health and the Environment (RIVM) identified *beta*-damascone as an ingredient added to at least 100 e-liquids of the EU-CEG38 dataset and it was reported to be present in 5.53% of all e-liquids and within the flavour category tobacco, it was present at an average concentration of 1.10 mg/10 mL. The investigators noted that such flavourings increase e-cigarette attractiveness and use and thereby exposure to potentially toxic ingredients.

SCENIHR	Final Opinion on Additives used in tobacco products (Opinion 1) (europa.eu)
EMA	-
PUBMED	Comprehensive overview of common e-liquid ingredients and how they can be used to predict an e-liquid's flavour category - PMC (nih.gov)