

Ionone (beta-)

Botanical Source

Synonyms TRIMETHYLCYCLOHEX-1-ENYL)-BUT-3-EN-2-ONE(4-(2,6,6-;
NOVOVIOL (beta-)

IUPAC Name

CAS Reference 14901-07-6
79-77-6
8013-90-9

E Number

Food Legislation

Council of Europe (CoE)	
Number	Comment
142	Listed by the Council of Europe as acceptable for use in food.

US Food and Drug Administration	
Number	Comment
172.515	Approved by the US FDA. FDA 21 CFR 172.515

Joint FAO/WHO Expert Committee on Food Additives (JECFA)		
Number	ADI	Comment
389	150	Group ADI 0-0.1 mg/kg bw (1984)
		Comments: No safety concern at current levels of intake when used as a flavouring agent. The 1984 group ADI of 0-0.1 mg/kg bw for alpha-ionone and beta-ionone, singly or in combination, was maintained at the fifty-first meeting (1998).

FEMA	
FEMA No.	Comment
2595	Generally recognised as safe as a flavour ingredient:GRAS List Number 3

Natural Occurrence and Use in Food
Found in carrot, almonds, apricot, beer, blackberry, brandy, broccoli, capers, cherry; used in candy, baked goods, ice cream.

Estimated Intake from Food and Drink	
Daily Intake mg/kg/day	FEMA Possible Average Daily Intake mg
0.001709	0.962

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Tobacco Product Related Chemical and Biological Studies for Ingredients Added in a Mixture

Smoke Chemistry		
Published Source	Level Tested %	Comment
BAT	0.00100	At maximum application level this ingredient is not associated with significant increases in levels of Hoffmann analytes in smoke.

Ames Activity		
Published Source	Level Tested %	Comment
BAT	0.00100	Within the sensitivity and specificity of the system the Ames activity of the cigarette smoke condensate was not increased by the addition of the ingredient.

Micronucleus		
Published Source	Level Tested %	Comment
BAT	0.00100	Within the sensitivity of the in vitro micronucleus assay the activity of the cigarette smoke condensate was not increased by the addition of the ingredient.

Neutral Red		
Published Source	Level Tested %	Comment
BAT	0.00100	Within the sensitivity of the test system the in vitro cytotoxicity of the cigarette smoke condensate was not increased by the addition of the ingredient.

Inhalation		
Published Source	Level Tested %	Comment
BAT	0.00100	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.

Mouse Skin Painting		
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Published Source	Level Tested %	Comment

References

Baker RR, Pereira da Silva JR, Smith G. The effect of tobacco ingredients on smoke chemistry. Part I: Flavourings and additives. Food Chem Toxicol. 2004; 42 Suppl:S3-37.

Baker RR, Pereira da Silva JR, Smith G. The effect of tobacco ingredients on smoke chemistry. Part II: casing ingredients. Food Chem Toxicol. 2004; 42 Suppl:S39-52.

Baker RR, Massey ED, Smith G. An overview of the effects of tobacco ingredients on smoke chemistry and toxicity. Food Chem Toxicol. 2004; 42 Suppl:S53-83.

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Tobacco Product Related Chemical and Biological Studies for Ingredients Tested Singly

References
Baker RR, Bishop LJ. The pyrolysis of tobacco ingredients. J. Anal. Appl. Pyrolysis 2004, 71, 223-311.

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Toxicological Data on the Unburnt Ingredient

[+ve, positive; -ve, negative; ?, equivocal; with, with metabolic activation; without, without metabolic activation]

In vitro

Test system	Test conditions	Endpoint	Activation	Result	References
<i>Salmonella typhimurium</i> , strains TA98, TA100, TA1535 and TA1537	beta-Ionone tested at up to 180 µg/plate (a toxic concentration)	Mutation	with and without S9	-ve (a high quality study)	Mortelmans <i>et al.</i> 1986
<i>Salmonella typhimurium</i> , strains TA98, TA100, TA1535 and TA1537	beta-Ionone tested at up 0.6 mg/plate in a spot test	Mutation	with and without S9	-ve (a spot test is only a limited assay)	Florin <i>et al.</i> 1980
<i>Salmonella typhimurium</i> , strain TA1535/pSK1002 ('umu' test)	"Ionone" tested at 0.5 mg/ml	DNA damage	with and without S9	+ve (only without S9)	Ono <i>et al.</i> 1991
<i>Escherichia coli</i> WP2 uvrA	"Ionone" tested at up to 20 mg/plate (no toxicity at this high dose)	Mutation	without?	-ve	Yoo, 1986
<i>Bacillus subtilis</i> strains M45 and H17 ('Rec' assay)	"Ionone" tested at up to 20 mg/disc	DNA damage	without?	weak +ve	Yoo, 1986

References

Florin I *et al* (1980). Screening of tobacco smoke constituents for mutagenicity using the

- Ames' test. *Toxicology*, 15, 219-232.
- Mortelmans K *et al* (1986). Salmonella mutagenicity tests II. Results from the testing of 270 chemicals. *Environmental Mutagenesis*, 8 (Suppl. 7), 1-119.
- Ono Y *et al*. (1991). The evaluation of genotoxicity using DNA repairing test for chemicals produced in chlorination and ozonation processes. *Water Science and Technology*, 23, 329-338.
- Yoo Y S (1986). Mutagenic and antimutagenic activities of flavoring agents used in foodstuffs. *Journal of Osaka City Medical Center*, 34, 267-288.