

Vanillin

Botanical Source

Synonyms HYDROXY-3-METHOXY BENZALDEHYDE(4-);
VANILLALDEHYDE;
VANILLIC ALDEHYDE;
METHYLPROTOCATECHUIC ALDEHYDE

IUPAC Name

CAS Reference 121-33-5

E Number

Food Legislation

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

US Food and Drug Administration	
Number	Comment
182.60	Approved by the US FDA. FDA 21 CFR 182.60

Joint FAO/WHO Expert Committee on Food Additives (JECFA)		
Number	ADI	Comment
889	55000	ADI 0-10 mg/kg bw
		Comments: No safety concern at current levels of intake when used as a flavouring agent. The 1967 ADI of 0-10 mg/kg bw was maintained at the fifty-seventh meeting (2001).

FEMA	
FEMA No.	Comment
3107	Generally recognised as safe as a flavour ingredient:GRAS List Number 3

Natural Occurrence and Use in Food
Found in vanilla bean, asparagus, barley, beer, brandy, blackberry, blueberry, coffee, cranberry; used in confection frosting, baked goods, candy.

Estimated Intake from Food and Drink	
Daily Intake mg/kg/day	FEMA Possible Average Daily Intake mg
1.935	38.834

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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	0.09000	At maximum application level this ingredient is not associated with significant increases in levels of Hoffmann analytes in smoke.
Philip Morris	0.08290	An overall assessment of the data suggests that this ingredient did not add to the toxicity of smoke.

Ames Activity		
Published Source	Level Tested %	Comment
BAT	0.09000	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.
Philip Morris	0.08290	Within the sensitivity and specificity of the system the Ames activity of the cigarette smoke was not increased by the addition of the ingredient.

Micronucleus		
Published Source	Level Tested %	Comment
BAT	0.09000	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	0.09000	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.
Philip Morris	0.08290	Within the sensitivity of the test system the in vitro cytotoxicity of the cigarette smoke was not increased by the addition of the ingredient.

Inhalation		
Published Source	Level Tested %	Comment
BAT	0.09000	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Lorillard	0.08640	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Philip Morris	0.08290	The data indicate that the addition of the ingredient, when added with one of three groups, did not increase the inhalation toxicity of the smoke.

Mouse Skin Painting		
Published Source	Level Tested %	Comment
Lorillard	0.08640	None of the changes appeared to be substantial enough to conclude that the tumour promotion capacity of the condensate was discernibly different between condensate produced from cigarettes with the ingredient in comparison with condensate from cigarettes without the ingredient.

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Tobacco Product Related Chemical and Biological Studies for Ingredients Tested Singly

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Toxicological Data on the Unburnt Ingredient

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

In vivo

Species	Test conditions	Endpoint	Result	Reference
Mice (numbers not specified in brief report)	Not specified in brief report, bone marrow assessed for micronuclei	Chromosome damage	-ve	NTIS, 1996
Mice (3 males)	500 mg/kg bw given by stomach tube, bone marrow cells assessed for micronuclei induction	Chromosome damage	-ve	Inouye <i>et al.</i> 1988
Groups of pregnant mice (numbers not given)	Recessive spot test in which animals were given three oral doses (125-500 mg/kg bw), 0, 4 and 24 hr after an ip injection of a mutagen on day 10 of pregnancy, offspring assessed for colour spots	Mutation	Demonstrated anti-mutagenic activity	Imanishi <i>et al.</i> 1990

In vitro

Test system	Test conditions	Endpoint	Activation	Result	References
Human lymphocytes	Concentrations up to 2 mM or 4 mM	Chromosome damage and effects	without	+ve	Jansson & Zech, 1987; Jansson <i>et al.</i> 1986

Hamster cells	No details given in expert review	Chromosome damage	Not disclosed in expert review	-ve	TNO BIBRA, 1990 (citing Ishidate <i>et al.</i> 1984; Kasamaki <i>et al.</i> 1982; Sasaki <i>et al.</i> 1987a,b)
Hamster cells	Up to 40 nM	Chromosome damage	without	-ve	Kasamaki & Urasawa, 1985
Hamster cells	No details given in expert review	Mutation	Not disclosed	-ve	TNO BIBRA, 1990 (citing Imanishi <i>et al.</i> 1990)
Mammalian cells	Study of ability of vanillin to influence effects of known genotoxins, no further details given in expert review	Chromosomal effects	Not disclosed	some increases, some decreases in activity	TNO BIBRA (citing Imanishi <i>et al.</i> 1990; Sasaki <i>et al.</i> 1987a,b & 1990)
<i>Salmonella typhimurium</i> strains TA92, TA94, TA98, TA100, TA1535, TA1537	Various Ames tests, conditions not given in expert review	Mutation	with and without S9	-ve	TNO BIBRA (citing Bonin & Baker, 1980; Florin <i>et al.</i> 1980; Ishidate <i>et al.</i> 1984; Kasamaki <i>et al.</i> 1982; Mortelmans <i>et al.</i> 1986; Nagabhushan & Bhide, 1985; Pool & Lin, 1982; Rapson <i>et al.</i> 1980).
<i>Escherichia coli</i>	A limited assay ("paper disc" test)	Mutation	without	-ve	Szybalski, 1958

<i>Escherichia coli</i>	Study of ability of vanillin to influence effects of known mutagens, no further details given in expert review	Mutation	Not disclosed	Some increases, some decreases	TNO BIBRA (citing Watanabe <i>et al.</i> 1988 & 1989)
<i>Bacillus subtilis</i> H17 and M45	DNA repair (rec) assay using 21µg/disk	DNA damage	Not clear from Japanese paper	-ve	Oda <i>et al.</i> 1978
<i>Saccharomyces cerevisiae</i>	Assay for mitotic gene conversion	Gene conversion	Not disclosed	-ve	Rosin, 1984
Mammalian and bacterial cells	Various tests suggest that vanillin has antimutagenic activity	Various			De Flora <i>et al.</i> 1994; Shaughnessy <i>et al.</i> 2001; Schwab <i>et al.</i> 1999; Kumar <i>et al.</i> 2000; Gustafson <i>et al.</i> 2000; Keshava <i>et al.</i> 1998; Sanyal <i>et al.</i> 1997; Kuroda <i>et al.</i> 1992

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