Ethyl hexanoate

Botanical Source	
Synonyms	ETHYL CAPROATE; ETHYL CAPRONATE; ETHYL HEXYLATE
IUPAC Name	ETHYL HEXANOATE
CAS Reference	123-66-0
E Number	

Food Legislation

Council of Europe (CoE)	
Number	Comment
310	Listed by the Council of Europe as acceptable for use in food at up to 40 ppm.

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
31	2200	No safety concern at current levels of intake when used as a flavouring agent.

FEMA	
FEMA No.	Comment
2439	Generally recognised as safe as a flavour ingredient:GRAS List Number 3

Natural Occurrence and Use in Food
Found in banana, beer, cheese, blackcurrants, blackberry, brandies, broccoli; used in baked goods, ice cream, candy.

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

0.009943	2.56

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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	0.00550	At maximum application level this ingredient is not associated with significant increases in levels of Hoffmann analytes in smoke.
Philip Morris	0.00260	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	0.00550	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	0.00260	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	0.00550	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	0.00550	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	0.00260	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	0.00550	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Lorillard	0.00001	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Philip Morris	0.00260	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

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.

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Carmines EL. Evaluation of the potential effects of ingredients added to cigarettes. Part 1: cigarette design, testing approach, and review of results. Food Chem Toxicol. 2002; 40(1): 77-91.

Rustemeier K, Stabbert R, Haussmann HJ, Roemer E, Carmines EL. Evaluation of the potential effects of ingredients added to cigarettes. Part 2: chemical composition of mainstream smoke. Food Chem Toxicol. 2002; 40(1): 93-104.

Roemer E, Tewes FJ, Meisgen TJ, Veltel DJ, Carmines EL. Evaluation of the potential effects of ingredients added to cigarettes. Part 3: in vitro genotoxicity and cytotoxicity. Food Chem Toxicol. 2002; 40(1): 105-111.

Vanscheeuwijck PM, Teredesai A, Terpstra PM, Verbeeck J, Kuhl P, Gerstenberg B, Gebel S, Carmines EL. Evaluation of the potential effects of ingredients added to cigarettes. Part 4: subchronic inhalation toxicity. Food Chem Toxicol. 2002; 40(1): 113-131.

Gaworski CL, Dozier MM, Heck JD, Gerhart JM, Rajendran N, David RM. Brennecke LH, Morrissey R. Toxicologic evaluation of flavor ingredients added to cigarette tobacco: 13 week inhalation exposures in rats. Inhal. Toxicol. 1998; 10:357-381

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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
Salmonella typhimurium TA97, TA102	Ames, 0.001-0.1 mg/plate. [Current guidelines recommend the use of 5 strains with concentrations up to 5 mg/plate.]	Mutation	With and without S9	-ve a limited study, only two strains used, and low quantities tested	Fujita *et al.* 1992
Bacillus subtilis ('Rec' assay) in strains H17 (rec+) and M45 (rec-)	Ethyl caproate was tested in a rec assay at 17 µg/disk. [Results taken from table in Japanese paper, no inhibition zone reported for either strain.]	DNA damage (as indicated by differential toxicity)	Without	No test [Inadequate test, considered -ve by investigators]	Oda *et al.* 1978.
Bacillus subtilis ('Rec' assay) in strains H17 (rec+) and M45 (rec-)	Tested at up to 20 µL/disc in a rec assay. Toxicity was not achieved in either strain.	DNA damage (as indicated by differential toxicity)	Without?	No test (as toxicity was not seen in either strain)	Yoo, 1986

References

Fujita H. *et al.* (1992). Kenkyu Nenpo – Tokyo Toritsu Eisei Kenkyusho (Annual Report of the Tokyo Metropolitan Research Laboratory of Public Health, 43, 219-227.

Oda Y *et al* (1978). Mutagenicity of food flavours in bacteria. 1. Osaka-Furitsu Koshu Eisei Kenkyu Shokuhin Eisei Hen, 9, 177-181.

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