Acetoin

Botanical Source	
Synonyms	BUTANOLONE(2,3-); HYDROXY-2-BUTANONE(3-); ACETYL METHYL CARBINOL; DIMETHYLKETOL;HYDROXY-3-BUTANONE(2-);HYDROXY BUTANONE (3-)
IUPAC Name	ACETOIN
CAS Reference	513-86-0
E Number	

Food Legislation

Council of Europe (CoE)	
Number	Comment
749	Listed by the Council of Europe as acceptable for use in food at up to 50 ppm

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
405	2800	No safety concern at current levels of intake when used as a flavouring agent.

FEMA	
FEMA No.	Comment
2008	Generally recognised as safe as a flavour ingredient:GRAS List Number 3

Natural Occurrence and Use in Food
Found in apples, butter, yoghurt, asparagus, blackcurrants, blackberry, wheat, broccoli, brussel sprouts, cantaloupe; used in baked goods.

Estimated Intake from Food and Drink

Daily Intake mg/kg/day	FEMA Possible Average Daily Intake mg
0.029	62.69

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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	0.01400	At maximum application level this ingredient is not associated with significant increases in levels of Hoffmann analytes in smoke.
Philip Morris	0.00110	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	0.01400	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	0.00110	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	0.01400	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	0.01400	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	0.00110	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	0.01400	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Lorillard	0.00500	The results indicate that the addition of the ingredient had no discernible effect on the inhalation toxicity of mainstream smoke.
Philip Morris	0.00110	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	0.00500	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.

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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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

Gaworski CL, Heck JD, Bennett MB, Wenk ML. Toxicologic evaluation of flavor ingredients added to cigarette tobacco: skin painting bioassay of cigarette smoke condensate in SENCAR mice. Toxicology. 1999; 139(1-2):1-17.

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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 TA100	"≤4500 mg/plate" according to JECFA, the source of the information [probably the units should be ug/plate]. [No further details given in the review citing this study.]	Mutation	with and without S9	+ve (with S9 only)	Garst *et al.* 1983
Salmonella typhimurium TA98, TA100, TA102	≤0.5 mmol/plate [44 mg/plate]	Mutation	with and without S9	-ve	Aeschbacher *et al.* 1989
Salmonella typhimurium TA98, TA100, TA1535, TA1537, TA1538	≤5 mg/plate. [No further details given in a brief citation.]	Mutation	without	-ve	Iwata *et al.* 1984
Salmonella typhimurium TA100	≤4.4 µmoles/plate [391 µg/plate]	Mutation	without	-ve	Kim *et al.* 1987
Escherichia coli WP2 UVRA	≤5 mg/plate. [No further details given in a brief citation.]	Mutation	without	-ve	Iwata *et al.* 1984

References

Aeschbacher H U *et al.* (1989). Fd Chem. Toxic. 27, 227.

Garst J *et al.* (1983). In: Oxy radicals and their scavenger systems. 2, 125.

Amsterdam (cited in JECFA, 1999).

Iwata T *et al.* (1984). Chemotherapy 32 (suppl. 8), 153 (cited in CCRIS).

Kim S B *et al.* (1987). Mutation Res. 177, 9.