# Isoamyl isovalerate

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|---|---|
| **Botanical Source** | |
| **Synonyms** | ISOPENTYL ISOVALERATE |
| **IUPAC Name** | ISOPENTYL ISOVALERATE |
| **CAS Reference** | 659-70-1 |
| **E Number** | |

## Food Legislation

| **Council of Europe (CoE)** | |
|---|---|
| Number | Comment |
| 458 | Listed by the Council of Europe as acceptable for use in food at up to 60 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 |
| 50 | 1400 | ADI acceptable. No safety concern at current levels of intake when used as a flavouring agent |

| **FEMA** | |
|---|---|
| FEMA No. | Comment |
| 2085 | Generally recognised as safe as a flavour ingredient:GRAS List Number 3 |

| **Natural Occurrence and Use in Food** |
|---|
| Found in banana, tomato, beer, spearmint; used in frozen dairy goods, candy. |

| **Estimated Intake from Food and Drink** | |
|---|---|
| Daily Intake mg/kg/day | FEMA Possible Average Daily Intake mg |
| 0.01292 | 20.798 |

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

| **Smoke Chemistry** | | |
|---|---|---|
| Published Source | Level Tested % | Comment |
| BAT | 0.00300 | 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 | 0.00300 | 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 | 0.00300 | 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 | 0.00300 | 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 | 0.00300 | 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 |
| | | |

**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.

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.

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## Tobacco Product Related Chemical and Biological Studies for Ingredients Tested Singly

| References |
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| 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 status | Results | Reference |
|---|---|---|---|---|---|
| Chinese hamster lung cells | Cells incubated for 48 hours with up to 0.25 mg/ml [not clear if tested at up to toxic concentrations] and examined for chromosome aberrations and polyploidy | Chromosome damage and changes in chromosome number | Without | -ve<br><br>[Limited study, not tested with activation] | Ishidate et al. 1984, 1988 |
| *Salmonella typhimurium* strains TA92, TA94, TA98, TA100, TA1535, TA1537, possibly TA2637 | Ames test with up to 10 mg/plate | Mutation | With and without | -ve<br><br>(Good quality test) | Ishidate et al. 1984 |
| *Salmonella typhimurium* strains TA97, TA102 | Ames test with up to 1 mg/plate | Mutation | With and without | -ve<br><br>(Limited test) | Fujita & Sasaki, 1987 |

| | | | | | |
|---|---|---|---|---|---|
| *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537, TA1538 | Ames test with a mixture of isoamyl acetate, n-amyl butyrate and isoamyl isovalerate. [English abstract only. Full paper is in Chinese and may contain additional information.] | Mutation | With and without | Mixture gave a +ve result but there was no indication of which component may have been responsible | Shao et al. 1979 |
| *Bacillus subtilis* strains M45, H17 | Rec assay (measuring differential killing) at up to 20 µl/disc (about 20 mg/disc) | DNA damage (indicative test). | Without | Inconclusive (no growth inhibition in either strain)<br><br>There is an inconsistency between this study and that of Oda *et al*. (below) in that they reported toxicity at only 17 µg/disc, which is about 1000x lower than the dose Yoo reported as non-toxic | Yoo, 1986 |
| *Bacillus subtilis* strains M45, H17 | Rec assay (measuring differential killing) at up to 17 µg/disc | DNA damage (indicative test). | Without | -ve | Oda et al. 1978 |

References

Fujita H & Sasaki M (1987). Mutagenicity test of food additives with Salmonella typhimurium TA 97 and TA102(II). Annual Report. Tokyo Toritsu Eisei Kenkyusho Nempo (Tokyo Metr. Res. Lab.) 38, 423.

Ishidate M et al. (1984). Primary mutagenicity screening of food additives currently used in Japan. Food and Chemical Toxicology 22, 623-636.

Ishidate M et al. (1988). A comparative analysis of data on the clastogenicity of 951 chemical substances tested in mammalian cell culture. Mutation Research 195, 151-213.

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

Shao S Y et al. (1979). Mutagenicity testing of 36 chemicals including pesticides, food additives and drugs in the Salmonella/microsome system. Shih Yen Sheng Wu Hsueh Pao (Acta Biologiae Experimentalis (Sinica)) 12, 41-49 [in Chinese with English abstract].

Yoo Y S (1986). Mutagenic and antimutagenic activities of flavoring agents used in foodstuffs. Journal of the Osaka City Medical Centre 34, 267-288 [in Japanese with English abstract and tables].