

Grapefruit oil, expressed

Botanical Source Citrus x paradisi Macf.
 Citrus maxima (Burm.)
 Citrus decumana L.

Synonyms

IUPAC Name

CAS Reference 8016-20-4

E Number

Food Legislation

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

US Food and Drug Administration	
Number	Comment
182.20	Approved by the US FDA. FDA 21 CFR 182.20

Joint FAO/WHO Expert Committee on Food Additives (JECFA)		
Number	ADI	Comment
-	-	-

FEMA	
FEMA No.	Comment
2530	Generally recognised as safe as a flavour ingredient:GRAS List Number 3

Natural Occurrence and Use in Food
Found in grapefruit; used in baked goods, candy, puddings ,dairy produce.

Estimated Intake From Food and Drink	
Daily Intake mg/kg/day	FEMA Possible Average Daily
0.02048	

Tobacco Legislation

Tobacco				
Country	Cigarettes	RYO	Cigars	Pipe
Afghanistan				
Algeria				
Argentina				
Australia				
Bahrain				
Brazil				
Burundi				
Canada				
Comoros				
Djibouti				
EEC				
Egypt				
Eritrea				
EU TPD2				
Fiji				
France	Y	Y	Y	Y
GCC (Bahrain,				
Germany	Y	Y	Y	Y
Hong Kong				
Hungary	Y	Y	Y	Y
Iceland				
Iran				
Iraq				
Jordan				
Kazakhstan				
Kuwait				
Libya				
Macedonia				
Madagascar				
Malaysia				

Grapefruit oil, expressed

Maldives				
Mexico				
Moldova				
Montenegro				
New Zealand				
Nigeria				
Norway				
Pakistan				
Palestine				
Papua New Guinea				
Rwanda				
Samoa				
Saudi Arabia				
Serbia				
Solomon Island				
Somalia				
Somaliland				
South Sudan				
Sri Lanka				
Sweden				
Switzerland	Y	Y	Y	Y
Syria				
Tunisia				
Turkey				
UK				
United Arab				
Vietnam				

Y=Permitted for use in tobacco products. If use is limited, the maximum permitted level is given.

Tobacco Product related Chemical and Biological Studies

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

Mouse Skin Painting		
Published Source	Level Tested %	Comment

Species	Test Conditions	End Point	Results	Reference
Human.	Grapefruit oil was applied, in a patch test, to the skin of 26 subjects for 24 hours. Dose 100%	Skin irritation.	No irritation.	Opdyke, 1974.
Mouse.	Grapefruit oil was applied to the skin of hairless mice. 100% Dose	Skin irritation.	No irritation.	Opdyke, 1974.
Rabbit.	Grapefruit oil expressed was applied to intact or abraded skin for 24 hours under occlusion. Dose 100%	Skin irritation.	Slight irritation.	Opdyke, 1974
Human.	A maximization test with grapefruit oil expressed (in petrolatum) on 24 volunteers. [No further details in citing source; the test procedure typically involves an initial induction phase of five 48-hour covered patch tests, followed 10-14 days later by a 48-hour covered challenge patch.]	<u>Sensitization and Intolerance</u> Skin sensitization <u>Local Effects</u> Skin irritation	<u>Sensitization and Intolerance</u> -ve. <u>Local Effects</u> No irritation.	Opdyke, 1974.
Human.	A repeated-insult patch test with grapefruit oil expressed (in petrolatum) on 40 subjects. Dose 4 %	Skin sensitization.	-ve.	Opdyke, 1974.
Mouse.	Grapefruit oil (20 µl) was applied to the skin of groups of 6 hairless mice. 30 minutes later the groups were exposed to either simulated sunlight with UVB removed (for 1 hour, UVB irradiation (for 2 minutes), or simulated sunlight (xenon lamp, for 40 minutes). Positive and negative controls were used. Test sites were examined 4, 24, 48, 72 and 96 hours after exposure, Dose 0 or 100%	Photosensitivity.	-ve	CIR, 2014.
Miniature swine.	Grapefruit oil (20 µl) was applied to the skin of groups of 2 miniature swine. 30 minutes later the groups were exposed to either simulated sunlight with UVB removed (for 1 hour), UVB irradiation (for 2 minutes), or simulated sunlight (xenon lamp, for 40 minutes). Positive and negative controls were used. Test sites were examined 4, 24, 48, 72 and 96 hours after exposure. Dose 0 or 100%.	Photosensitivity.	-ve.	CIR, 2014.

Species	Test Conditions	End Point	Results	Reference
Human.	Groups of around 10 or 5 healthy females inhaled grapefruit oil vapours for 3 or 7 minutes respectively. (Cotton wool onto which a 2% solution of grapefruit oil in triethyl citrate was absorbed was placed under the nose for the duration of exposure.) Blood pressure was monitored over 3 minutes of exposure. Catecholamine (adrenaline, noradrenaline and dopamine) levels were monitored after 7 minutes of exposure.	Blood pressure, catecholamine levels.	A statistically significant increase in systolic blood pressure relative to the control substance (vehicle only) was observed. There was no statistically significant effect on catecholamine levels.	Haze et al, 2002.
Rat.	Animals were given an oral dose of grapefruit oil expressed. LD ₅₀ >5000 mg/kg bw.	Mortality.	LD ₅₀ >5000 mg/kg bw.	Opdyke, 1974.
Rabbit.	Animals were treated dermally with grapefruit oil expressed. Dose 5000 mg/kg bw.	Mortality.	LD ₅₀ >5000 mg/kg bw.	Opdyke, 1974.

In Vitro

Species	Test Conditions	End Point	Results	Reference
Chinese hamster fibroblasts.	Chromosome aberration test in the absence of metabolic activation. Cells were exposed to grape fruit oil (in dimethylsulfoxide) at three different concentrations for 48 hours. The incidences of polyploidy [changes in chromosome number] and structural aberrations were recorded after 48 and 24/48 hours respectively. The top concentration was limited by cytotoxicity. UP to 0.063 mg/ml	Chromosome damage, changes in chromosome number.	-ve. No increase in polyploidy or chromosomal aberrations was observed, relative to controls.	Ishidate et al, 1984.
<i>Salmonella typhimurium</i> , strains TA98, TA100, TA1537, TA1535 and TA1538.	Bacterial reverse mutagenicity (Ames) assay. Dose 0.0005-0.5 µl/plate [about 0.0005-5 mg/plate].	Mutation.	-ve.	Hachiya et al, 1985.
<i>Bacillus subtilis</i> [presumably].	A Rec-assay with grapefruit oil in the presence and absence of S9. Dose 20 mg/disc.	DNA damage.	+ve (without S9). “(-)” [equivocal?] (with S9).	Hachiya et al, 1985.

References

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<http://www.cir-safety.org/sites/default/files/cpeelo092014FR.pdf>
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2.(1981-1983). *Tokishikoroji Foramu [Toxicology Forum]*, 8, 91-105 [in Japanese with part-English tables].
3. Haze, S., Sakai, K., Gozu, Y., 2002
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