

# GRAS Flavoring Substances 26

## FEMA EXPERT PANEL

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**26. GRAS Flavoring Substances.** This list of substances will appear in the 26<sup>th</sup> publication authored by the Expert Panel of the Flavor and Extract Manufacturers Association on recent progress in the consideration of flavoring ingredients “generally recognized as safe” (GRAS) under conditions of their intended use in food flavorings in accordance with the 1958 Food Additives Amendment to the Federal Food, Drug and Cosmetic Act.

The Expert Panel of the Flavor and Extract Manufacturers Association of the United States (FEMA) has evaluated substances for GRAS status under their conditions of intended use as flavoring substances since the early 1960s. The regulations of the U.S. Food and Drug Administration (FDA), and U.S. law, require that determinations that flavor substances and other food ingredients are “generally recognized as safe” (GRAS) be done in such a way that all information related to GRAS determinations is publicly available. The FEMA Expert Panel has met this requirement by publishing the identity of all flavoring substances determined to be GRAS by the Panel, and has submitted all information related to its GRAS reviews on these substances to the FDA for inclusion in the FDA databases. Information that was reviewed by the Expert Panel in the course of their evaluation is typically submitted to FDA within six months of the publication of the identity of newly GRASed substances. The Expert Panel also publishes separate extensive reviews of scientific information on all FEMA GRAS™ flavoring substances in the peer-reviewed scientific literature in the form of reports on the safety of structurally-related groups of flavoring substances. These important actions assure that there is “general recognition” of the safety of these substances when used as flavors.

**DISCLAIMER:** The user of this list agrees that its use of this document and the information contained therein is at the user’s sole risk and that FEMA shall have no liability to any person for any loss or damage arising out of the use of this document.

**Table 1 – Primary Names (in boldface capital letters) and Synonyms**

FEMA No.	Substance Primary Name and Synonyms	FEMA No.	Substance Primary Name and Synonyms	FEMA No.	Substance Primary Name and Synonyms	FEMA No.	Substance Primary Name and Synonyms
4728	<b>GLUCOSYL STEVIOL GLYCOSIDES</b>	4739	<b>GLUTAMYL-NORVALYL-GLYCINE</b> <i>L</i> -Glutamyl- <i>L</i> -norvalyl-glycine <i>N</i> -( <i>N</i> - <i>L</i> - <i>gamma</i> -Glutamyl- <i>L</i> -norvalyl)-glycine	4750	<b>CIS-3-HEXENYL SALICYLATE</b> ( <i>Z</i> )-3-Hexenyl salicylate 3 <i>Z</i> -Hexenyl 2-hydroxybenzoate 2-Hydroxybenzoic acid 3 <i>Z</i> -hexenyl ester	4761	<b>PRENYL THIOISOVALERATE</b> S-3-Methylbut-2-enyl 3-methylbutanethioate Butanethioic acid, 3-methyl-, S-(3-methyl-2-buten-1-yl) ester
4729	<b>DL-ISOMENTHOL</b> Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1- <i>alpha</i> ,2- <i>beta</i> ,5- <i>beta</i> )-Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1 <i>R</i> ,2 <i>S</i> ,5 <i>S</i> )-rel-(±)-Isomenthol	4740	<b>GLUTAMYL-NORVALINE</b> <i>N</i> -( <i>N</i> - <i>L</i> - <i>gamma</i> -Glutamyl)- <i>L</i> -norvaline <i>L</i> - <i>gamma</i> -Glutamyl- <i>L</i> -norvaline	4751	<b>(R)-N-(1-METHOXY-4-METHYLPENTAN-2-YL)-3,4-DIMETHYLBENZAMIDE</b> Benzamide, <i>N</i> -[[(1 <i>R</i> )-1-(methoxymethyl)-3-methylbutyl]-3,4-dimethyl-	4762	<b>(-)-MATAIRESINOL</b> 2(3 <i>H</i> )-Furanone, dihydro-3,4-bis[(4-hydroxy-3-methoxyphenyl)methyl]-, (3 <i>R</i> ,4 <i>R</i> )-(8 <i>R</i> ,8' <i>R</i> )-(-)-Matairesinol
4730	<b>O-ETHYL S-1-METHOXYHEXAN-3-YL CARBONATHIOATE</b> Carbonothioic acid, S-[1-(2-methoxyethyl)butyl] O-ethyl ester	4741	<b>M1-(2,3-DIMETHOXYBENZYL)-N2-(2-(PYRIDIN-2-YL)ETHYL) OXALAMIDE</b> Ethanediamide, <i>N</i> 1-[[2,3-dimethoxyphenyl)methyl]- <i>N</i> 2-[2-(2-pyridinyl)ethyl]-	4752	<b>N-ACETYL GLUTAMATE</b> <i>N</i> -Acetyl- <i>L</i> -glutamic acid <i>alpha</i> -( <i>N</i> -Acetyl)- <i>L</i> -glutamic acid	4763	<b>STEVIOSIDE</b> Steviosin (4, <i>alpha</i> )-13-[(2- <i>O</i> - <i>beta</i> - <i>D</i> -Glucopyranosyl- <i>alpha</i> - <i>D</i> -glucopyranosyl)oxy]kaur-16-en-18-oic acid <i>beta</i> - <i>D</i> -glucopyranosyl ester
4731	<b>CASSYRANE</b> 2-tert-Butyl-5-methyl-2-propyl-2,5-dihydrofuran (±)- <i>cis</i> and <i>trans</i> -2-(1,1-Dimethylethyl)-2,5-dihydro-5-methyl-2-propylfuran	4742	<b>1-(2-HYDROXY-4-METHYLCYCLOHEXYL)ETHANONE</b>	4753	<b>1,3-PROPANEDIOL</b>	4764	<b>1-(2,4-DIHYDROXYPHENYL)-3-(3-HYDROXY-4-METHOXYPHENYL)PROPAN-1-ONE</b>
4732	<b>1,5-OCTADIEN-3-OL</b> Octa-1,5-dien-3-ol	4743	<b>MEXICAN LIME OIL, EXPRESSED</b> Key lime oil, expressed <i>Citrus medica</i> var. <i>acida</i> oil, expressed <i>Citrus aurantifolia</i> oil, expressed	4754	<b>SZECHUAN PEPPER EXTRACT</b> Sichuan pepper extract Japan Pepper extract <i>Zanthoxylum bungeanum</i> extract <i>Zanthoxylum schinifolium</i> extract <i>Zanthoxylum piperitum</i> extract <i>Zanthoxylum simulans</i> extract	4765	<b>ETHYL 5-FORMYLOXYDECANOATE</b> Decanoic acid, 5-(formyloxy)-, ethyl ester
4733	<b>(±)-2-MERCAPTOHEPTAN-4-OL</b> 2-Thioheptan-4-ol 2-Mercapto-4-heptanol 2-Sulfanylheptan-4-ol	4744	<b>PERSIAN LIME OIL, EXPRESSED</b> Tahitian lime oil, expressed <i>Citrus latifolia</i> oil, expressed	4755	<b>Tasmannia lanceolata EXTRACT</b> <i>Drimys lanceolata</i> extract <i>Drimys aromatica</i> extract	4766	<b>3-[3-(2-ISOPROPYL-5-METHYL-CYCLOHEXYL)UREIDO]-BUTYRIC ACID ETHYL ESTER</b> 3-[[[5-Methyl-2-(1-methylethyl)cyclohexyl]amino]carbonyl]amino]butanoic acid ethyl ester
4734	<b>3-(METHYLTHIO)-DECANAL</b> 3-(Methylsulfanyl)decanal	4745	<b>(±)-6-METHOXY-2,6-DIMETHYLHEPTANAL</b> 6-Methoxy-2,6-dimethylheptanal	4756	<b>Mentha longifolia OIL</b> Horsemint oil	4767	<b>2-ISOPROPYL-4-METHYL-3-THIAZOLINE</b> 2-Isopropyl-4-methyl-2,5-dihydrothiazole
4735	<b>(4Z,7Z)-TRIDECA-4,7-DIENAL</b> <i>cis,cis</i> -4,7-Tridecadienal ( <i>Z,Z</i> )-4,7-Tridecadienal (4 <i>Z</i> ,7 <i>Z</i> )-Tridecadienal	4746	<b>3,5-UNDECADIEN-2-ONE</b> Undeca-3,5-dien-2-one	4757	<b>MANGOSTEEN DISTILLATE</b> <i>Garcinia mangostana</i> distillate	4768	<b>2,6,10-TRIMETHYL-9-UNDECENAL</b> 2,6,10-Trimethylundec-9-enal
4736	<b>Persicaria odorata OIL</b> Vietnamese cilantro oil <i>Polygonum odoratum</i> oil	4747	<b>(±)-2,5-UNDECADIEN-1-OL</b> Undeca-2,5-dien-1-ol 2,5-Undecadien-1-ol	4758	<b>ETHYL 3-(2-HYDROXYPHENYL)PROPANOATE</b> Hydrocinnamic acid, <i>o</i> -hydroxy-, ethyl ester Ethyl mellilotate Benzenepropanoic acid, 2-hydroxy-, ethyl ester	4769	<b>5-MERCAPTO-5-METHYL-3-HEXANONE</b>
4737	<b>AMACHA LEAVES EXTRACT</b> Buddha tea <i>Hydrangea macrophylla</i> var. <i>thunbergii</i> extract	4748	<b>TRIETHYLTHIALDINE</b> 2,4,6-Triethyl-1,3,5-dithiazinane 4 <i>H</i> -1,3,5-Dithiazine, 2,4,6-triethylidihydro-	4759	<b>1-CYCLOPROPANEMETHYL-4-METHOXYBENZENE</b> 1-(Cyclopropylmethyl)-4-methoxybenzene Benzene, 1-(cyclopropylmethyl)-4-methoxy- Anisole, <i>p</i> -(cyclopropylmethyl)-	4770	<b>MEYER LEMON OIL, COLD PRESSED, Citrus x meyeri</b>
4738	<b>GLUTAMYL-2-AMINOBUTYRIC ACID</b> <i>N</i> -[(1 <i>S</i> )-1-carboxypropyl]- <i>L</i> -Glutamine <i>L</i> - <i>gamma</i> -Glutamyl- <i>L</i> -2-aminobutyric acid <i>L</i> -2-Aminobutyric acid, <i>N</i> -( <i>N</i> - <i>L</i> - <i>gamma</i> -glutamyl)-	4749	<b>4-METHYLPENTYL 4-METHYLVALERATE</b> 4-Methylpentanoic acid, 4-methylpentyl ester 4-Methylpentyl 4-methylpentanoate Pentanoic acid, 4-methyl-, 4-methylpentyl ester	4760	<b>PRENYL THIOISOBUTYRATE</b> S-3-Methylbut-2-enyl 2-methylpropanethioate Propanethioic acid, 2-methyl-, S-(3-methyl-2-buten-1-yl) ester	4771	<b>STEVIL GLYCOSIDE EXTRACT, Stevia rebaudiana, REBAUDIOSIDE A 60%</b>
						4772	<b>STEVIL GLYCOSIDE EXTRACT, Stevia rebaudiana, REBAUDIOSIDE A 80%</b>

FEMA No.	Substance Primary Name and Synonyms	FEMA No.	Substance Primary Name and Synonyms
4773	<b>(E)-N-[2-(1,3-BENZODIOXOL-5-YL)ETHYL]-3-(3,4-DIMETHOXYPHENYL)PROP-2-ENAMIDE</b> Rubescenamine		
4774	<b>4-AMINO-5-(3-(ISOPROPYLAMINO)-2,2-DIMETHYL-3-OXOPROPOXY)-2-METHYLQUINOLINE-3-CARBOXYLIC ACID</b> 3-Quinolinecarboxylic acid, 4-amino-5-[2,2-dimethyl-3-[(1-methylethyl)amino]-3-oxopropoxy]-2-methyl-		
4775	<b>3-METHYL-5-(2,2,3-TRIMETHYLCYCLOPENT-3-EN-1-YL)PENT-4-EN-2-OL</b> Ebanol 4-Penten-2-ol, 3-methyl-5-(2,2,3-trimethyl-3-cyclopenten-1-yl)-		
4776	<b>(1-METHYL-2-(1,2,2-TRIMETHYLBICYCLO[3.1.0]HEX-3-YLMETHYL)CYCLOPROPYL)METHANOL</b> Cyclopropanemethanol, 1-methyl-2-[(1,2,2-trimethylbicyclo[3.1.0]hex-3-yl)methyl]-		
4777	<b>EROSPICATA OIL, <i>Mentha spicata</i> 'Erospicata'</b> <i>Mentha spicata</i> 'Erospicata' oil		
4778	<b>CURLY MINT OIL, <i>Mentha spicata</i> var. <i>crispa</i></b> <i>Mentha spicata</i> var. <i>crispa</i> oil		

**Table 2 – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances on which the FEMA Expert Panel based its judgments that the substances are generally recognized as safe (GRAS).**

	Glucosyl steviol glycosides	DL-Isomenthol	O-Ethyl S-1-methoxy hexan-3-yl carbonothioate	Cassyrane	1,5-Octadien-3-ol	(±)-2-Mercaptoheptan-4-ol	3-(Methylthio)decanal	(4Z,7Z)-Trideca-4,7-dienal	Persicaria odorata oil	Amacha leaves extract
Category	FEMA No. 4728	4729	4730	4731	4732	4733	4734	4735	4736	4737
Baked goods	150/400	30/130				0.08/0.6	0.05/0.2		1.0/10.0	
Beverages (Non-alcoholic)	125/250	10/35	0.25/0.5		0.05/0.2				0.5/1.0	150/350
Beverages (Alcoholic)	125/250	10/35							1.0/20.0	
Breakfast cereal	200/500								0.5/1.0	
Cheese	100/200								1.0/5.0	
Chewing gum	500/1000	500/1100		50/500		0.1/1.0			0.5/1.0	
Condiments/Relishes	125/250						0.05/0.1		1.0/10.0	
Confectionery frostings	50/100		0.4/0.8	10/50					0.5/1.0	250/350
Egg products							0.05/0.1	0.001/0.05	1.0/2.0	
Fats/Oils	125/250					0.06/0.5	0.05/0.2	0.001/0.05	1.0/10.0	
Fish products							0.05/0.1	0.001/0.05	1.0/20.0	
Frozen dairy	125/250	20/68	0.25/1						1.0/10.0	
Fruit ices	125/250	20/68			0.1/1				1.0/20.0	
Gelatins/Puddings	125/250								1.0/20.0	
Granulated Sugar										
Gravies	125/250					0.06/0.5	0.05/0.1	0.001/0.05	1.0/20.0	
Hard candy	100/300	100/400	0.5/1	10/50		0.06/0.5			0.5/1.0	
Imitation dairy	125/250								0.5/1.0	
Instant coffee/tea	125/250		0.25/5		0.1/0.5	0.06/0.5			0.5/1.0	
Jams/Jellies	150/300			10/20		0.05/0.5			0.5/1.0	
Meat products						0.06/0.5	0.05/0.1	0.001/0.05	1.0/20.0	
Milk products	150/300		0.4/0.8		0.1/1		0.05/0.1	0.001/0.05	0.5/1.0	200/350
Nut products	200/400						0.05/0.1	0.001/0.05	0.2/1.0	
Other grains	100/200								0.1/5.0	
Poultry							0.05/0.1		1.0/20.0	
Processed fruits	150/400					0.06/0.5			0.5/1.0	
Processed vegetables	100/200					0.06/0.5	0.05/0.1			
Reconstituted vegetables	150/300					0.06/0.5				
Seasonings/Flavors	200/400		2/25		0.01/0.1	0.06/0.5	0.05/0.1	0.001/0.05	1.0/100.0	
Snack foods	150/300				0.01/0.1	0.06/0.5	0.05/0.1	0.001/0.05	1.0/20.0	
Soft candy	100/300		0.5/1						0.1/3.0	
Soups	150/300					0.06/0.5	0.05/0.1	0.001/0.05	1.0/20.0	
Sugar substitutes	300/800									
Sweet sauces	200/400		0.25/0.5			0.05/0.5				

**Table 2 (continued) – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances**

	Glutamyl-2-aminobutyric acid	Glutamyl-norvalyl-glycine	Glutamyl-norvaline	M1-(2,3-Dimethoxybenzyl)-N2-(2-(pyridin-2-yl)ethyl)oxalamide	1-(2-Hydroxy-4-methylcyclohexyl)ethanone	Mexican lime oil, expressed	Persian lime oil, expressed	(±)-6-Methoxy-2,6-dimethylheptanal	3,5-Undecadien-2-one	(±)-2,5-Undecadien-1-ol
Category	4738	4739	4740	4741	4742	4743	4744	4745	4746	4747
Baked goods	20/50	4/12	5/15	5/10	50/150	360/560	360/560	15/18		
Beverages (Non-alcoholic)	30/60	6/18	7/21		50/150	50/80	50/80	3/6	1/10	1/10
Beverages (Alcoholic)					50/150	400/460	400/460			
Breakfast cereal	100/200	20/40	25/50	25/50	20/50	125/200	125/200			
Cheese	40/80	6/18	10/20	5/15	50/75					
Chewing gum					1000/1500	1900/2325	1900/2325	200/200	10/30	5/20
Condiments/Relishes	40/80	8/24	10/20	10/20	50/150	90/100	90/100			
Confectionery frostings					500/1500				1/10	1/10
Egg products	20/50	4/12	5/15	5/10						
Fats/Oils	40/80	8/24	10/20	10/20	10/75				1/10	1/20
Fish products	20/50	4/12	5/15	5/15	1/10					
Frozen dairy	30/60	6/18	7/21		50/150	375/475	375/475	15/19		
Fruit ices	30/60	6/18	7/21		50/150				1/10	1/10
Gelatins/Puddings					10/75	350/500	350/500	9/12	1/10	
Granulated Sugar										
Gravies	40/80	8/24	10/20	10/20	10/75	1/10	1/10		1/10	1/20
Hard candy					50/100	350/950	350/950	6/6	5/20	1/10
Imitation dairy	30/60	6/18	7/21		5/10					
Instant coffee/tea	15/45	2/6	3/9		5/25					
Jams/Jellies					50/150			5/5	1/10	1/10
Meat products	20/50	4/12	5/15	5/15		75/85	75/85			
Milk products	20/50	4/12	5/15							
Nut products				5/10						
Other grains				5/10	5/10					
Poultry	20/50	4/12	5/15	5/15						
Processed fruits										
Processed vegetables	20/50	4/12	5/15	5/15						
Reconstituted vegetables	20/50	4/12	5/15	5/10						
Seasonings/Flavors	120/240	20/40	27/54	25/50	10000/100000			5/5	1/10	1/30
Snack foods	120/240	20/40	27/54	25/50	50/150				5/25	1/25
Soft candy					50/150	575/800	575/800	6/6	1/10	1/10
Soups	30/60	6/18	7/21	10/20	50/150				1/10	
Sugar substitutes	150/300	20/40	35/70		1/25					
Sweet sauces	40/80	8/24	10/20		100/1000				1/10	1/10

**Table 2 (continued) – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances**

	Triethyl thialdine	4-Methylpentyl 4-methylvalerate	cis-3-Hexenyl salicylate	(R)-N-(1-Methoxy-4-methylpentan-2-yl)-3,4-dimethyl benzamide	N-Acetyl glutamate	1,3-Propanediol	Szechuan pepper extract	Tasmania lanceolata extract	Mentha longifolia oil	Mangosteen distillate
Category	4748	4749	4750	4751	4752	4753	4754	4755	4756	4757
Baked goods	0.5/1.0	4/30	0.3/5	2/6		1300/1300	100/500			
Beverages (Non-alcoholic)		4/30	0.15/5		50/150	690/690	200/400	1/2		20/100
Beverages (Alcoholic)		4/30	0.15/5			690/690	200/400	1/4		20/100
Breakfast cereal	0.5/1.0	4/30	0.3/5	2/6						20/100
Cheese	0.5/1.0	4/30		2/6	50/150		300/500			
Chewing gum		10/80	0.5/5			1800/1800	500/2000	30/40	500/10000	
Condiments/Relishes	0.5/1.0	4/30		4/10	20/100	20/20	200/400			
Confectionery frostings		4/30	0.5/5				200/400			10/60
Egg products				2/6			100/200			
Fats/Oils	1.0/2.0			2/8	25/100		50/300			
Fish products				4/10	50/150		100/300			
Frozen dairy		4/30	0.5/5			810/810	200/300			40/200
Fruit ices		4/30	0.5/5			810/810				20/100
Gelatins/Puddings		4/30	0.5/5	4/10		250/290	100/300			40/200
Granulated Sugar		4/30								
Gravies	0.5/1.0			4/10	50/150		300/400			
Hard candy		4/30	0.5/5			1300/1300	100/200	4/7	100/2000	20/100
Imitation dairy	0.5/1.0		0.5/5		50/150		100/200			
Instant coffee/tea		4/30			50/150					
Jams/Jellies		4/30	0.5/5				200/400			
Meat products	1.0/2.0			4/10	50/150		50/150			
Milk products	0.5/1.0		0.5/5	2/6	50/200		100/200			
Nut products		4/30	0.5/5	2/6			200/300			
Other grains			0.5/5	2/6			100/500			
Poultry	0.5/1.0			2/6	50/150		300/500			
Processed fruits		4/30	0.5/5			300/300	100/300			
Processed vegetables	0.5/1.0			2/6	25/100		200/400			
Reconstituted vegetables				2/6	25/100					
Seasonings/Flavors	1.0/10.0	4/30	0.5/5	4/10	50/500		100/250	100/200		500/4000
Snack foods	1.0/2.0	4/30	0.5/5	4/10	50/200		200/400	10/20		20/100
Soft candy		4/30	0.5/5			1300/1300	100/200	4/7	200/5000	20/100
Soups	0.5/1.0			4/8	50/150	20/20	100/500			
Sugar substitutes										
Sweet sauces		4/30	0.5/5		50/150	7000/7000	100/250			20/100

**Table 2 (continued) – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances**

	Ethyl 3-(2-hydroxyphenyl)propanoate	1-Cyclopropane methyl-4-methoxy benzene	Prenyl thioisobutyrate	Prenyl thioisovalerate	(-)-Matairesinol	Steviosides	1-(2,4-Dihydroxyphenyl)-3-(3-hydroxy-4-methoxyphenyl)propan-1-one	Ethyl 5-formyl oxydecanoate	3-[3-(2-Isopropyl-5-methyl-cyclohexyl)ureido]-butyric acid ethyl ester	2-Isopropyl-4-methyl-3-thiazoline
<b>Category</b>	<b>4758</b>	<b>4759</b>	<b>4760</b>	<b>4761</b>	<b>4762</b>	<b>4763</b>	<b>4764</b>	<b>4765</b>	<b>4766</b>	<b>4767</b>
Baked goods	0.05/0.2	1.2/6	0.01/0.5	0.01/0.5		40/65		120/300		0.25/0.5
Beverages (Non-alcoholic)	0.02/0.2	0.4/2	0.01/0.5	0.01/0.5	25/150	25/35	20/75	5/50	0.2/1.7	0.25/0.5
Beverages (Alcoholic)	0.1/0.4	4/20	0.01/0.5	0.01/0.5		25/35	25/150	5/50		0.25/0.5
Breakfast cereal	0.05/0.2	1.2/8				40/65	25/150			0.25/0.5
Cheese	0.2/0.3							10/100	2/6	
Chewing gum	2/5	4/100	0.03/1	0.03/1	50/300	200/200	25/150			0.5/1
Condiments/Relishes	0.1/0.3		0.01/0.5	0.01/0.5		15/30			4/10	0.25/0.5
Confectionery frostings	0.1/0.3	1.8/10	0.01/0.5	0.01/0.5	25/150		25/150	5/50		0.25/0.5
Egg products	0.05/0.2							5/50	4/10	
Fats/Oils	0.5/1							100/200	2/8	
Fish products	0.05/0.2								2/8	
Frozen dairy	0.1/0.4	1.2/8				40/55	25/150	120/300		0.25/0.5
Fruit ices	0.1/0.4	1.2/8				25/35	25/150			0.25/0.5
Gelatins/Puddings	0.1/0.3	1.8/10				40/65	25/150	120/300		
Granulated Sugar							25/150			
Gravies	0.05/0.3		0.01/0.5	0.01/0.5		15/30	25/150	40/80	4/10	
Hard candy	0.2/0.5	1.2/8	0.01/0.5	0.01/0.5		40/65	25/150			0.25/0.5
Imitation dairy	0.2/0.5					40/55	25/150	10/100		
Instant coffee/tea					25/150	25/35	25/150	5/50	0.2/1.7	
Jams/Jellies	0.05/0.2		0.01/0.5	0.01/0.5			25/150			0.25/0.5
Meat products						10/20			2/8	
Milk products	0.5/0.8				25/150	40/55	25/150	10/100		0.25/0.5
Nut products								5/50		
Other grains										
Poultry									2/8	
Processed fruits			0.001/0.5	0.001/0.5		25/35				0.25/0.5
Processed vegetables			0.001/0.5	0.001/0.5		25/35			2/8	
Reconstituted vegetables									2/8	
Seasonings/Flavors	5/100		0.01/0.05	0.01/0.05		25/35		5/50	10/20	0.25/0.5
Snack foods			0.01/0.05	0.01/0.05		20/30	25/150		8/20	
Soft candy	0.2/0.5	1.2/8	0.01/0.05	0.01/0.05		40/65	25/150	100/200		0.25/0.5
Soups	0.05/0.3		0.01/0.05	0.01/0.05		10/20		5/50	4/10	
Sugar substitutes										
Sweet sauces	0.05/0.3					25/35	25/150	1/2		0.25/0.5

**Table 2 (continued) – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances**

	2,6,10-Trimethyl-9-undecenal	5-Mercapto-5-methyl-3-hexanone	Meyer lemon oil, cold pressed, <i>Citrus x meyeri</i>	Steviol glycoside extract, <i>Stevia rebaudiana</i> , Rebaudioside A 60%	Steviol glycoside extract, <i>Stevia rebaudiana</i> , Rebaudioside A 80%	(E)-N-[2-(1,3-Benzodioxol-5-yl)ethyl]-3-(3,4-dimethoxyphenyl)prop-2-enamide	4-Amino-5-(3-(isopropyl amino)-2,2-dimethyl-3-oxopropoxy)-2-methylquinoline-3-carboxylic acid	3-Methyl-5-(2,2,3-trimethyl cyclopent-3-en-1-yl)pent-4-en-2-ol	(1-Methyl-2-(1,2,2-trimethyl bicyclo[3.1.0]hex-3-ylmethyl) cyclopropyl) methanol
Category	4768	4769	4770	4771	4772	4773	4774	4775	4776
Baked goods	0.2/1	2.5/5.0	213/413	30/30	30/35				
Beverages (Non-alcoholic)	0.2/1	0.1/0.5	50.7/108.7	30/30	30/35	0.2/2.5	8/30	0.1/1	0.1/1
Beverages (Alcoholic)	0.2/1	0.3/2.5	123/174	30/30	30/35		10/30		
Breakfast cereal	0.2/1	0.1/0.3	200/400	30/30	30/35		12/30		
Cheese	0.2/1	0.3/0.5	126/254			2/9		0.1/1	0.1/1
Chewing gum	0.4/1.5	5.0/10.0	376/1692	200/200	234/234		30/300	1/10	1/10
Condiments/Relishes	0.2/1	0.3/0.5	151/307	30/30	30/35	2/15	8/30		
Confectionery frostings	0.2/1	0.3/2.5	50/500	30/30	30/35		30/300	0.1/5	0.1/5
Egg products	0.2/1	0.3/0.5	20/200			4/15			
Fats/Oils	0.2/1		20/20			2/12	8/30		
Fish products	0.2/1	0.3/0.5	19/200			2/12			
Frozen dairy	0.2/1	1/10	126/254	30/30	30/35				
Fruit ices	0.2/1	0.5/5	50/500	30/30	30/35		10/30		
Gelatins/Puddings	0.2/1	0.3/2.5	109/265	30/30	30/35		8/30		
Granulated Sugar	0.2/1		20/100	30/30	30/35				
Gravies	0.2/1	0.3/0.5	41/107	30/30	30/35	2/15	8/30		
Hard candy	0.2/1	2.5/12.5	431/2017	30/30	30/35		10/30	0.1/5	1/10
Imitation dairy	0.2/1		126/254	30/30	30/35		8/30		
Instant coffee/tea	0.2/1	0.1/1	20/400	30/30	30/35	0.2/2.5	8/30	0.1/1	0.1/1
Jams/Jellies	0.2/1	0.5/2.5	125/200	30/30	30/35		10/30	0.1/1	0.1/1
Meat products	0.2/1	0.3/0.5	19/20			2/12			
Milk products	0.2/1	0.1/0.5	126/254	30/30	30/35		8/30	0.1/1	0.1/1
Nut products	0.2/1		20/200						
Other grains	0.2/1		20/200						
Poultry	0.2/1	0.3/0.5	19/200			2/12			
Processed fruits	0.2/1		125/200	30/30	30/35				
Processed vegetables	0.2/1	0.3/0.5	125/200	30/30	30/35	2/12			
Reconstituted vegetables	0.2/1		125/200	30/30	30/35				
Seasonings/Flavors	0.2/1	0.3/0.5	50/500	30/30	30/35	10/30		10/100	1/10
Snack foods	0.2/1	0.3/0.5	50/300	30/30	30/35	5/30	12/30		
Soft candy	0.2/1	0.5/2.5	232.1/456.7	30/30	30/35		10/30	0.1/5	0.1/1
Soups	0.2/1	0.3/0.5	5.5/100	30/30	30/35	2/15	8/30		
Sugar substitutes	0.2/1		20/100	30/30	30/35				
Sweet sauces	0.2/1	0.3/0.5	50/200	30/30	30/35		15/30		



**Table 2 (continued) – Average usual use levels (ppm)/average maximum use levels (ppm) for new FEMA GRAS™ Flavoring Substances**

	Erospicata oil, <i>Mentha spicata</i> 'Erospicata'	Curly mint oil, <i>Mentha spicata</i> var. <i>crispa</i>
Category	4777	4778
Baked goods	140/300	140/300
Beverages (Non-alcoholic)	39/99	39/99
Beverages (Alcoholic)	150/240	150/240
Breakfast cereal		
Cheese		
Chewing gum	8300/8300	8300/8300
Condiments/Relishes		
Confectionery frostings	650/650	650/650
Egg products		
Fats/Oils		
Fish products		
Frozen dairy	95/110	95/110
Fruit ices		
Gelatins/Puddings	50/200	50/200
Granulated Sugar		
Gravies		
Hard candy	320/1200	320/1200
Imitation dairy		
Instant coffee/tea		
Jams/Jellies		
Meat products	6/8	6/8
Milk products		
Nut products		
Other grains		
Poultry		
Processed fruits		
Processed vegetables		
Reconstituted vegetables		
Seasonings/Flavors		
Snack foods		
Soft candy	320/1200	320/1200
Soups		
Sugar substitutes		
Sweet sauces		

**Table 3 – Updated average usual use levels (ppm)/average maximum use levels (ppm) for flavoring substances previously recognized as FEMA GRAS™.**

	Carvone	Spearmint oil- <i>Mentha spicata</i> L.	1- <i>p</i> -Menthene-8- thiol	<i>L</i> -Monomenthyl glutarate	<i>Heliopsis</i> <i>longipes</i> extract	Scotch spearmint oil, <i>Mentha cardiaca</i> L.	<i>N</i> -[(Ethoxycarbonyl) methyl]- <i>p</i> -menthane- 3-carboxamide	<i>N</i> -[2-(3,4- Dimethoxyphenyl) ethyl]-3,4- dimethoxycinnamic acid amide
FEMA No.	2249	3032	3700	4006	4220	4221	4309	4310
GRAS Publication	3	3	13	20	22	22	23	23
Category								
Baked goods	94/116	1055/1320					20/200	10/50
Beverages (Non-alcoholic)	34/850	110/140	0.0003/0.001	50/125	30 <sup>a</sup> /100		10/50	3/20
Beverages (Alcoholic)	126/145	120/155	0.00015 <sup>a</sup> /0.00015 <sup>a</sup>	50/150	25/150		10/400	5/25
Breakfast cereal					15 <sup>a</sup> /15 <sup>a</sup>		10/50	
Cheese	0.2/0.2				15 <sup>a</sup> /30 <sup>a</sup>		20/100	10 <sup>a</sup> /50 <sup>a</sup>
Chewing gum	10000/20000	8000 <sup>a</sup> /24000 <sup>a</sup>	0.0003/0.004	1500/8000 <sup>a</sup>	350/800	8000 <sup>a</sup> /24000 <sup>a</sup>	1000 <sup>a</sup> /5000 <sup>a</sup>	50/100
Condiments/Relishes	50/60	50/250			25/120	50/250	20/300	
Confectionery frostings			0.0003/0.002	200/600	35/70		10/200	10/20
Egg products							10/150	10 <sup>a</sup> /50 <sup>a</sup>
Fats/Oils					15 <sup>a</sup> /50 <sup>a</sup>		10/200	10 <sup>a</sup> /50 <sup>a</sup>
Fish products					10 <sup>a</sup> /50 <sup>a</sup>		10/100	10 <sup>a</sup> /50 <sup>a</sup>
Frozen dairy	150/197	50/130			12 <sup>a</sup> /50 <sup>a</sup>	50/130	10/300	
Fruit ices			0.0003/0.001	40 <sup>a</sup> /100 <sup>a</sup>	12 <sup>a</sup> /50 <sup>a</sup>		10/150	5/10
Gelatins/Puddings	87/90	90/95	0.0003/0.001		12 <sup>a</sup> /50 <sup>a</sup>		5/100	
Granulated Sugar							15/100	
Gravies					25/150		10/100	10 <sup>a</sup> /50 <sup>a</sup>
Hard candy	5000 <sup>a</sup> /10000 <sup>a</sup>	5000 <sup>a</sup> /10000 <sup>a</sup>	0.0003/0.002	300/2000 <sup>a</sup>	200/600	5000 <sup>a</sup> /10000 <sup>a</sup>	50/350	10/30
Imitation dairy					17 <sup>a</sup> /50 <sup>a</sup>		10/100	
Instant coffee/tea							10/65	5/10
Jams/Jellies		72/1900	0.0003/0.001		12 <sup>a</sup> /50 <sup>a</sup>	100/200	10/65	
Meat products	0.1/0.1				20 <sup>a</sup> /50 <sup>a</sup>		10/100	10 <sup>a</sup> /75 <sup>a</sup>
Milk products					17 <sup>a</sup> /50 <sup>a</sup>		10/100	3/10
Nut products							10/200	
Other grains					8 <sup>a</sup> /20 <sup>a</sup>		10/300	
Poultry					20 <sup>a</sup> /50 <sup>a</sup>		10/100	10 <sup>a</sup> /75 <sup>a</sup>
Processed fruits			0.0003/0.001		3 <sup>a</sup> /10 <sup>a</sup>		10/200	
Processed vegetables					8 <sup>a</sup> /20 <sup>a</sup>		10/200	10 <sup>a</sup> /75 <sup>a</sup>
Reconstituted vegetables					8 <sup>a</sup> /20 <sup>a</sup>		10/100	
Seasonings/Flavors		66670/66670			100/500	1000/5000	20/200	10 <sup>a</sup> /75 <sup>a</sup>
Snack foods				40/80	25/150		20/300	10 <sup>a</sup> /75 <sup>a</sup>
Soft candy	5000 <sup>a</sup> /10000 <sup>a</sup>	5000 <sup>a</sup> /10000 <sup>a</sup>	0.0003/0.002	250/800 <sup>a</sup>	200/600	5000 <sup>a</sup> /10000 <sup>a</sup>	10/500 <sup>a</sup>	5/20
Soups					8 <sup>a</sup> /20 <sup>a</sup>		10/100	10 <sup>a</sup> /75 <sup>a</sup>
Sugar substitutes					20 <sup>a</sup> /50 <sup>a</sup>		5/100	
Sweet sauces		40/90				40/90	10/100	

<sup>a</sup> New use level/new food category

**Table 3 – Updated average usual use levels (ppm)/average maximum use levels (ppm) for flavoring substances previously recognized as FEMA GRAS™.**

	5,7-Dihydroxy-2-(3-hydroxy-4-methoxyphenyl)chroman-4-one	3-(4-Hydroxyphenyl)-1-(2,4,6-trihydroxyphenyl)propan-1-one	Naringin dihydrochalcone	Choline chloride	Cyclopropane carboxylic acid (2-isopropyl-5-methylcyclohexyl)-amide	Rebaudioside A	4-Amino-5,6-dimethylthieno[2,3-d]pyrimidin-2(1H)-one and 4-amino-5,6-dimethylthieno[2,3-d]pyrimidin-2(1H)-one hydrochloride	Arachidonic acid enriched oil
FEMA No.	4313	4390	4495	4500	4558	4601	4669	4679
GRAS Publication	23	23	24	24	24	24	25	25
Category								
Baked goods			5 <sup>a</sup> /20 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>		20 <sup>a</sup> /30 <sup>a</sup>	5/10	1/10
Beverages (Non-alcoholic)	10/50	15/50	50/60		0.2 <sup>a</sup> /1.7 <sup>a</sup>	20/30	7.5/15	1 <sup>a</sup> /2 <sup>a</sup>
Beverages (Alcoholic)	10/100	15/50	50/60			20/30	7.5/15	1 <sup>a</sup> /2 <sup>a</sup>
Breakfast cereal	30/60	20/50	150/200	4000 <sup>a</sup> /6000 <sup>a</sup>		20/30	10/20	1 <sup>a</sup> /2 <sup>a</sup>
Cheese	20/150	10/50			2/6			5/50
Chewing gum			200/200		10 <sup>a</sup> /50 <sup>a</sup>	200/200	10/50	
Condiments/Relishes	10 <sup>a</sup> /100 <sup>a</sup>	10 <sup>a</sup> /100 <sup>a</sup>	5 <sup>a</sup> /20 <sup>a</sup>		4/10	20 <sup>a</sup> /30 <sup>a</sup>		1/10
Confectionery frostings	50/100	20/100	5 <sup>a</sup> /20 <sup>a</sup>		1 <sup>a</sup> /20 <sup>a</sup>	20 <sup>a</sup> /30 <sup>a</sup>	10/25	
Egg products					4/10			
Fats/Oils					2/8			
Fish products				600/1200	2/8			1 <sup>a</sup> /2 <sup>a</sup>
Frozen dairy	20/150	10/50	50/60			20/30	7.5/15	1 <sup>a</sup> /2 <sup>a</sup>
Fruit ices	20 <sup>a</sup> /100 <sup>a</sup>	20/50	50/60			20/30	7.5/15	
Gelatins/Puddings	10/100	10/100	50/60			20/30	5/10	1 <sup>a</sup> /2 <sup>a</sup>
Granulated Sugar	100/250	20/100						
Gravies	10/100	10/100	5 <sup>a</sup> /20 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>	4/10	20 <sup>a</sup> /30 <sup>a</sup>		10/50
Hard candy	50/100	20/100	50/60			20/30	10/25	
Imitation dairy			50/60			20/30	7.5/15	1/10
Instant coffee/tea	10/50	15/50				20/30	7.5 <sup>a</sup> /15 <sup>a</sup>	
Jams/Jellies	20/50	20/50	50/60			20 <sup>a</sup> /30 <sup>a</sup>	10/25	
Meat products			50 <sup>a</sup> /350 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>	2/8	20 <sup>a</sup> /75 <sup>a</sup>		10/50
Milk products	20/150	10/50	50/60			20/30	7.5/15	1/10
Nut products	20 <sup>a</sup> /50 <sup>a</sup>	20/50						
Other grains	30 <sup>a</sup> /60 <sup>a</sup>	20 <sup>a</sup> /50 <sup>a</sup>						
Poultry			50 <sup>a</sup> /350 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>	2/8	20 <sup>a</sup> /75 <sup>a</sup>		10/100
Processed fruits	20 <sup>a</sup> /50 <sup>a</sup>	20 <sup>a</sup> /50 <sup>a</sup>	50/60			20/30		
Processed vegetables	20 <sup>a</sup> /50 <sup>a</sup>	20 <sup>a</sup> /50 <sup>a</sup>	50/60		2/8	20/30		
Reconstituted vegetables	20 <sup>a</sup> /50 <sup>a</sup>	20 <sup>a</sup> /50 <sup>a</sup>						
Seasonings/Flavors	10/100	10/100	20 <sup>a</sup> /30 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>	10/20	20 <sup>a</sup> /30 <sup>a</sup>	5/15	10/50
Snack foods	60/120		20 <sup>a</sup> /30 <sup>a</sup>	4000 <sup>a</sup> /6000 <sup>a</sup>	8/20	20 <sup>a</sup> /30 <sup>a</sup>	5/15	10/50
Soft candy	50 <sup>a</sup> /100 <sup>a</sup>	20/100	50/60			20/30	10/25	
Soups	10/100	10/100	20 <sup>a</sup> /30 <sup>a</sup>	2500 <sup>a</sup> /4000 <sup>a</sup>	4/10	20 <sup>a</sup> /30 <sup>a</sup>		10/50
Sugar substitutes	100/250	20/100					300/600	
Sweet sauces	10/100	10/100	50/60			20/30	10/25	1 <sup>a</sup> /2 <sup>a</sup>

<sup>a</sup> New use level/new food category

**Table 3 – Updated average usual use levels (ppm)/average maximum use levels (ppm) for flavoring substances previously recognized as FEMA GRAS™.**

	<b>Glutamyl-valyl-glycine</b>	<b>Luo Han Fruit concentrate</b>	<b>Rebaudioside C</b>
<b>FEMA No.</b>	<b>4709</b>	<b>4711</b>	<b>4720</b>
<b>GRAS Publication</b>	<b>25</b>	<b>25</b>	<b>25</b>
<b>Category</b>			
Baked goods	15 <sup>a</sup> /30 <sup>a</sup>	40/60	100 <sup>a</sup> /400 <sup>a</sup>
Beverages (Non-alcoholic)	20 <sup>a</sup> /50 <sup>a</sup>	40/60	100/400
Beverages (Alcoholic)		40/60	50 <sup>a</sup> /150 <sup>a</sup>
Breakfast cereal	80 <sup>a</sup> /160 <sup>a</sup>	40/80	200/400
Cheese	20 <sup>a</sup> /50 <sup>a</sup>		
Chewing gum			1000/1000
Condiments/Relishes	30 <sup>a</sup> /60 <sup>a</sup>	5/40	
Confectionery frostings		40/80	100 <sup>a</sup> /300 <sup>a</sup>
Egg products	15 <sup>a</sup> /45 <sup>a</sup>		
Fats/Oils	30 <sup>a</sup> /60 <sup>a</sup>		
Fish products	15 <sup>a</sup> /45 <sup>a</sup>		
Frozen dairy	20/50	5/80	100 <sup>a</sup> /300 <sup>a</sup>
Fruit ices	20 <sup>a</sup> /50 <sup>a</sup>	5/40	100 <sup>a</sup> /300 <sup>a</sup>
Gelatins/Puddings		40/80	50 <sup>a</sup> /300 <sup>a</sup>
Granulated Sugar			
Gravies	30 <sup>a</sup> /60 <sup>a</sup>	5 <sup>a</sup> /40 <sup>a</sup>	50 <sup>a</sup> /100 <sup>a</sup>
Hard candy		40/80	
Imitation dairy	20 <sup>a</sup> /50 <sup>a</sup>	5/40	80 <sup>a</sup> /200 <sup>a</sup>
Instant coffee/tea	10 <sup>a</sup> /30 <sup>a</sup>		
Jams/Jellies		10/40	50/300
Meat products	15 <sup>a</sup> /45 <sup>a</sup>		
Milk products	15/45	40/80	100 <sup>a</sup> /400 <sup>a</sup>
Nut products		5/40	
Other grains			
Poultry	15 <sup>a</sup> /45 <sup>a</sup>		
Processed fruits		5/40	
Processed vegetables	15 <sup>a</sup> /45 <sup>a</sup>		
Reconstituted vegetables	15 <sup>a</sup> /45 <sup>a</sup>		
Seasonings/Flavors	80 <sup>a</sup> /160 <sup>a</sup>	5/40	50 <sup>a</sup> /100 <sup>a</sup>
Snack foods	80 <sup>a</sup> /160 <sup>a</sup>	5/40	
Soft candy		40/80	
Soups	20/50		
Sugar substitutes	80 <sup>a</sup> /160 <sup>a</sup>		
Sweet sauces	30 <sup>a</sup> /60 <sup>a</sup>	5/40	

<sup>a</sup> New use level/new food category