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GRAS 29 FLAVORING SUBSTANCES

The 29th publication by the Expert Panel of the Flavor and Extract Manufacturers Association provides an update on recent progress in the consideration of flavoring ingredients generally recognized as safe under the Food Additives Amendment.

In 1960, the Flavor and Extract Manufacturers Association (FEMA) Expert Panel began a program to assess the safety of flavor ingredients for their intended use in human food. The primary objectives of the FEMA GRAS program are to evaluate whether materials nominated by the flavor industry are “generally recognized as safe” (GRAS) for their intended use as flavor ingredients and to reevaluate existing FEMA GRAS flavoring ingredients’ GRAS status. The GRAS provision of the Federal Food, Drug, and Cosmetic Act defines a food additive as: “... any substance ... which ... may ... [become] a component or ... [affect] the characteristics of any food ... if such substance is not generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown through scientific procedures ... to be safe under the conditions of its intended use,”

and thus requires that GRAS determinations are made by qualified experts in training and experience using scientific procedures.

This publication includes the results of the Expert Panel’s review of 64 new flavorings under their conditions of intended use (Tables 1 and 2). In addition, the Expert Panel determined that new use levels and/or use in new food categories for 76 flavorings are consistent with their current FEMA GRAS status (Table 3) and removed the FEMA GRAS status on the uses of one substance.

Update on Recent Panel Activities

The Expert Panel has a long history of publishing the criteria used in their safety assessments of flavoring substances for food (Smith et al. 2005a; Smith et al. 2005b; Cohen et al. 2018a). The Expert Panel has recently published several articles

FEMA GRAS Publications (3–28)

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describing their approach to certain aspects of flavor safety evaluation. These include an article (Smith et al. 2018) that summarizes the use and applicability of metabolic data on the disposition of flavoring substances, and an article that summarizes the use and interpretation of genotoxicity information within the Expert Panel's safety assessments (Gooderham et al. 2020).

Progress in the Reevaluation of Natural Flavor Complexes

In 2018, the FEMA Expert Panel published an update to its approach to the safety evaluation of natural flavor complexes (NFCs), or naturally occurring mixtures derived from plants or other natural sources used for the flavoring of food (Cohen et al. 2018a). The Expert Panel also started a comprehensive reassessment of the safety of natural flavor complexes with uses that are considered FEMA GRAS. These reassessments are based on complete and updated chemical analyses and comprehensive safety evaluations. The first results of this NFC reassessment program were published in 2018 and include the Expert Panel's conclusions on 54 NFCs derived from *Citrus* (Cohen et al. 2019). As a result of these reassessments, a number of NFCs were newly considered to have uses that are FEMA GRAS. The Expert Panel has also conducted and published safety reassessments of NFCs derived from Mint, Buchu, Dill, and Caraway (Cohen et al. 2020) and NFCs derived from *Cinnamomum* and *Myroxylon* species (Rietjens et al. 2020). An additional four publications summarizing the progress of the NFC reassessment program are anticipated in 2020.

FDA Final Rule

On October 5, 2018, the Food and Drug Administration of the United States (FDA) published a final rule partially granting a food additive petition (FAP 5A4810) that requested the amendment of FDA's food additive regulations to no longer authorize the use of benzophenone, ethyl acrylate, eugenyl methyl ether, myrcene, pulegone, pyridine, and styrene as synthetic flavoring substances and adjuvants for use in food (see 83 Fed. Reg. 50490, 9 October 2018). In doing so, FDA said: "We are taking this action [on the six flavoring substances¹] because, despite FDA's scientific analysis and determination that these substances do not pose a risk to public health under the conditions of their intended use, the

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petitioners provided data demonstrating that these additives induce cancer in laboratory animals, and, as a result of this finding in animals, FDA cannot as a matter of law maintain the listing of these synthetic flavoring substances in the food additive regulations.”

FDA explained that it had based its decision “as a matter of law” on the “extraordinarily rigid” Delaney Clause of the Federal Food, Drug, and Cosmetic Act. The Delaney Clause prohibits the agency from approving a “food additive if it is found . . . to induce cancer in man or animal.” FDA further explained: “We have evaluated the data and information submitted by the

petitioners, as well as other relevant carcinogenicity data and information, and have determined the remaining six synthetic flavoring substances (i.e., other than styrene) that are the subject of FAP 5A4810 are unlikely to pose a potential or significant carcinogenic risk for humans at the levels that these synthetic flavoring substances are used in foods, and that the use of these food additives is safe for human consumption. In other words, FDA has a reasonable certainty that the substances do no harm under the intended conditions of use (the standard for approving food additives)” (see 83 Fed. Reg. 50490, 9 October 2018). The Expert Panel reviewed

the FDA’s final rule and determined that no change is necessary in the FEMA GRAS status of benzophenone, ethyl acrylate, beta-myrcene, pulegone, and pyridine. Previous to FDA’s action on the petition, the Expert Panel concluded that two of the seven (eugenyl methyl ether and styrene) were no longer GRAS—eugenyl methyl ether because the available scientific information was not adequate to maintain GRAS status and styrene because it was no longer in use as a flavoring substance (Cohen et al. 2015; Cohen et al. 2018b). The FDA decision is applicable to the synthetic versions of the five flavoring substances. Thus, the synthetic versions of these five flavoring substances are no longer permitted for addition to food with a compliance date of October 9, 2020 (see 83 Fed. Reg. 50490, 9 October 2018).

FEMA GRAS Applications

The Expert Panel reviews both chemically defined substances and complex mixtures and considers safety under conditions of their intended use as flavoring substances (Smith et al. 2005a; Smith et al. 2005b; Cohen et al. 2018a). »»

Change in GRAS Status of Ethyl Nitrite

The FEMA GRAS status of ethyl nitrite (FEMA 2446) under the conditions of intended use as a flavor ingredient was reviewed by the FEMA Expert Panel as part of the continual reevaluation of FEMA GRAS status. The Expert Panel concluded that additional data, including further examination of the vascular effects observed in available toxicity studies as well as OECD- and GLP-compliant *in vitro* and *in vivo* genotoxicity testing, were required for the continuation of its GRAS status. Until such studies become available and further evaluated, the flavor ingredient ethyl nitrite has been removed from the FEMA GRAS list.

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Recently, the Panel has seen an increase in complex mixtures or natural flavoring complex applications and has reviewed its criteria regarding botanical species verification. Due to the potential for the inaccurate identification of botanical sources of complex mixtures or natural flavor complexes, the Expert Panel requires species verification to ensure the name of the botanical is reflective of the species in commerce. This can be most easily achieved by DNA genetic testing/DNA species identification approaches. Such verification services are available from a number of contract research facilities.

Use of *In Silico* Data

The Expert Panel notes the increasing use and availability of a wide array of *in silico* tools available to provide insights into toxicological potential and to predict metabolic outcomes for small molecules. Such tools may be useful to FEMA GRAS applicant companies in their internal assessments of the potential need for toxicity or genotoxicity

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studies to support their application for FEMA GRAS status. While the Expert Panel considers these data possibly supportive, the Panel has concluded that the information produced from currently available *in silico* tools cannot be used as a substitute for *in vitro* and *in vivo* metabolic and toxicological information within the context of FEMA GRAS applications.

Benchmark Dose Modeling

In the course of conducting safety evaluations on flavoring ingredients under their conditions of intended use, the FEMA Expert Panel reviews toxicity studies on the candidate flavoring and related substances (Cohen et al. 2018a; Smith et al. 2005a; Smith et al. 2005b). In the Panel's evaluation of a study, the study observations, their relevance of the observed effects on human health are evaluated and the dose at which no-adverse-effects (NOAEL) are observed is determined. NOAEL values are often used as reference points in the calculation of margins of safety (MoS) by taking the ratio of the NOAEL to the estimated intake for the flavoring ingredient being considered. NOAEL values have commonly been used as a point of reference for the calculation of MoS, acceptable daily intake (ADI), and similar values by regulatory bodies (Haber et al. 2018; Kroes et al. 2000).

Because NOAEL values are limited to the dose levels tested in a study and

do not describe the dose-response relationship, mathematical modeling of the dose-response data of a study, where the estimate of the benchmark dose (BMD) corresponding to a specific change in response (BMR) compared to the background is calculated, is of increasing relevance in safety evaluations (Haber et al. 2018). The Expert Panel has begun to use BMD approaches when the available data is adequate for robust modeling. The application of the BMD approach is summarized in the recent publication on the FEMA GRAS assessment of *Cinnamomum* and *Myroxylon*-derived flavoring ingredients (Rietjens et al. 2020). **FT**

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Basis for Safety Evaluation Decisions for GRAS 29

Key findings of the FEMA Expert Panel GRAS determinations are available on femaflavor.org for each new substance listed in Table 1.

Expert Panel Member Change

In January 2018, Dr. Thomas Rosol of Ohio University, Athens, Ohio, joined the FEMA Expert Panel.

Molecular Toxicology and the Assistant Provost in the Dept. of Metabolism, Digestion and Reproduction, Imperial College London. **F. P. Guengerich**, PhD, is *Tadashi Inagami Chair in Biochemistry and Director of Guengerich Research Laboratory, Vanderbilt University School of Medicine.* **Stephen S. Hecht**, PhD, is the *Wallin Land Grant Professor of Cancer Prevention, Masonic Cancer Center, and Dept. of Laboratory Medicine and Pathology, University of Minnesota.* **Ivonne M. C. M. Rietjens**, PhD, is *Full Professor in Toxicology at the Division of Toxicology, Wageningen University, Wageningen, The Netherlands.* **Thomas J. Rosol**, DVM, PhD, MBA, is a *Professor of*

Veterinary and Toxicological Pathology and Chair of the Dept. of Biomedical Sciences, Heritage College of Osteopathic Medicine, Ohio University, Athens, Ohio. **Christie L. Harman**, is *Senior Science and Policy Advisor to the FEMA Expert Panel, Washington, D.C.* **Sean V. Taylor**, PhD, is the *Scientific Secretary to the FEMA Expert Panel, Washington, D.C.*

NOTE

¹FDA removed styrene from 21 CFR 172.515 to no longer provide for the use of styrene as a synthetic flavoring substance and adjuvant in food in response to a food additive petition (FAP 6A4817) as the use was permanently and completely abandoned. »»

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In Memoriam

The FEMA Expert Panel notes with sadness the passing of Dr. Richard Hall on Aug. 15, 2019. Dick Hall spent his long career as a chemist, executive vice president, and board member for McCormick & Co., and he served as the Flavor and Extract Manufacturers Association senior science advisor in his retirement. He helped to establish the FEMA GRAS program in 1960 and significantly advanced the science of flavor safety, including contributions on topics such as assessing the dietary intake of flavor ingredients and the risk assessment of complex mixtures. Dick's eloquence, knowledge, and generosity to others will continue to inspire the scientific community far beyond the date of his passing.

FEMA NO.	SUBSTANCE PRIMARY NAME AND SYNONYMS
4912	Hibiscus blossom extract <i>Hibiscus sabdariffa</i> L. extract Roselle extract
4913	3,7-Dimethyl-2-methyleneoct-6-en-1-ol
4914	bisHOEHOLOH <i>bis</i> -(3-Methyl-2-buten-1-yl)disulfide
4915	(5Z)-3,4-Dimethyl-5-propylidene-2(5H)-furanone
4916	2-Methyl-3-butene-2-thiol α,α -Dimethyl allyl mercaptan
4917	(Z)-9-Dodecenoic acid (9Z)-9-Dodecenoic acid 9-Dodecenoic acid, (Z) <i>cis</i> -9-Dodecenoic acid Lauroleic acid
4918	Tridec-5-enal
4919	5HHGREHDL0H[UDF
4920	1-Ethyl-2-(1-pyrrolidmethyl)pyrrole
4921	Rebaudioside D 95%
4922	Rebaudioside M 95% Rebaudioside X 95%
4923	Buchu leaves extract <i>Barosma betulina</i> Bartl. et Wendl. leaves extract <i>B. crenulata</i> (L.) Hook leaves extract <i>B. seratifolia</i> Willd. leaves extract
4924	Peppermint oil terpeneless <i>Mentha piperita</i> L. oil terpeneless
4925	Spearmint oil terpeneless <i>Mentha spicata</i> L. oil terpeneless
4926	(Z)-8-Pentadecenal
4927	4,7-Decadienal
4928	2-Methylthiophene
4929	4-Methylidene-2-(2-methylprop-1-enyl)oxane

FEMA NO.	SUBSTANCE PRIMARY NAMES AND SYNONYMS
4930	4-Isopropoxycinnamaldehyde
4931	Glucosylated steviol glycosides, 90%
4932	<i>Chaenomeles speciosa</i> leaf extract
4933	<i>Eriobotrya japonica</i> leaves extract
4934	Sodium gluconate <i>D</i> -Gluconic acid, monosodium salt Sodium <i>D</i> -gluconate
4935	3-Methylbutane-1,3-dithiol
4936	5HEDGLRLGH(
4937	Rebaudioside I 95%
4938	S-Methyl 5-(1-ethoxyethoxy)tetradecanethioate
4939	S-Methyl 5-(1-ethoxyethoxy)decanethioate
4940	betaLEOHH
4941	Nootkatone complex
4942	ORGLHGDLDFFRRGH[UDF <i>Guaiaacum</i> spp. wood extract

TABLE 2 - Average Usual Use Levels/Average Maximum Use Levels

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)

	1-(3,5,5,6,8-Hexamethyl-5,6,7,8-tetrahydronaphthalen-2-yl)ethanone	2-(4-Ethylphenoxy)-N-(1H-pyrazol-3-yl)-N-(thiohen-2-ylmethyl)acetamide	N-(3-Hydroxy-4-methoxyphenyl)-2-isopropyl-5-dimethylcyclohexanecarboxamide	N-(4-(Cyanomethyl)phenyl)-2-isopropyl-5,5-dimethylcyclohexanecarboxamide	5-Allyl-L-cysteine sulfoxide	6-Methyl-5-hepten-2-ol	trans-5-Dodecenal	cis-6-Dodecenal	cis-9-Dodecenal	Mixture of 5-hydroxy-4-(4'-hydroxy-3'-methoxyphenyl)-7-methylchroman-2-one and 7-hydroxy-4-(4'-hydroxy-3'-methoxyphenyl)-5-methylchroman-2-one
CATEGORY/FEMA NO.	4879	4880	4881	4882	4883	4884	4885	4886	4887	4888
BAKED GOODS	0/0	3/15	0/0	0/0	100/500	10/50	0/0	0/0	0/0	45/60
BEVERAGES, NON-ALCOHOLIC	3/7.5	1/3	0.1/10	0.1/10	0/0	5/25	0.03/0.3	0.02/0.5	0.01/0.4	30/45
BEVERAGES, ALCOHOLIC	0/0	2/6	0.1/10	0.1/10	0/0	10/50	0.15/0.6	0.1/1.5	0.06/1	45/60
BREAKFAST CEREALS	0/0	3/15	0/0	0/0	0/0	5/25	0/0	0/0	0/0	45/60
CHEESES	0/0	0/0	0/0	0/0	200/1000	7/35	0/0	0/0	0/0	0/0
CHEWING GUM	1/2	75/150	1/100	1/100	0/0	0/0	0.3/1	0.25/2.5	0.25/2.5	0/0
CONDIMENTS AND RELISHES	0/0	3/15	0.1/10	0.1/10	100/500	5/25	0/0	0/0	0/0	30/45
CONFECTIONS AND FROSTINGS	0/0	5/30	1/100	1/100	0/0	10/50	0.15/0.6	0.1/1	0.06/1	45/60
EGG PRODUCTS	0/0	3/15	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0/0	3/15	0.05/5	0.05/5	800/5000	5/25	0.15/0.6	0.1/1	0.05/1	0/0
FISH PRODUCTS	0/0	0/0	0/0	0/0	100/500	2/10	0/0	0/0	0/0	0/0
FROZEN DAIRY	0/0	1/3	0.1/10	0.1/10	0/0	0/0	0.03/0.3	0.02/0.5	0.01/0.5	45/60
FRUIT ICES	1/2	1/3	0.1/10	0.1/10	0/0	10/50	0.03/0.3	0.02/0.5	0.01/0.25	30/45
GELATINS AND PUDDINGS	0/0	1/3	0.05/5	0.05/5	0/0	0/0	0.03/0.3	0.02/0.5	0.01/0.25	45/60
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	45/60
GRAVIES	0/0	3/15	0.05/5	0.05/5	0/0	5/25	0/0	0/0	0/0	0/0
HARD CANDY	1/2	5/15	0.1/10	0.1/10	0/0	0/0	0.15/0.6	0.1/1	0.05/1	30/45
IMITATION DAIRY	0/0	1/3	0.05/5	0.05/5	0/0	7/35	0/0	0/0	0/0	30/45
INSTANT COFFEE AND TEA	0/0	1/3	0.01/1	0.01/1	0/0	5/25	0.01/0.5	0.02/0.5	0.01/0.5	0/0
JAMS AND JELLIES	0/0	1/3	0.1/10	0.1/10	0/0	20/100	0.15/0.6	0.02/0.5	0.01/0.5	45/60
MEAT PRODUCTS	0/0	3/15	0/0	0/0	200/500	2/10	0/0	0/0	0/0	0/0
MILK PRODUCTS	0/0	1/3	0.05/5	0.05/5	0/0	7/35	0/0	0/0	0/0	45/60
NUT PRODUCTS	0/0	1/3	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	0/0	0/0	0/0	100/500	5/25	0/0	0/0	0/0	0/0
POULTRY	0/0	3/15	0/0	0/0	200/500	2/10	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	1/3	0/0	0/0	0/0	7/35	0.03/0.3	0.02/0.5	0.01/0.5	45/60
PROCESSED VEGETABLES	0/0	3/15	0/0	0/0	100/500	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	3/15	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	0/0	3/15	3/900	3/900	200/1500	5/25	0.06/0.6	0.04/1	0.02/1	0/0
SNACK FOODS	0/0	3/15	0.1/10	0.1/10	100/500	10/50	0/0	0/0	0/0	0/0
SOFT CANDY	1/2	5/15	0.1/10	0.1/10	0/0	0/0	0.05/1	0.1/1	0.05/1	30/45
SOUPS	0/0	3/15	0.1/10	0.1/10	200/2500	5/25	0/0	0/0	0/0	0/0
SUGAR SUBSTITUTES	0/0	0/0	0.005/0.5	0.005/0.5	0/0	0/0	0/0	0/0	0/0	45/60
SWEET SAUCES	0/0	5/15	0.5/50	0.5/50	0/0	5/25	0/0	0/0	0/0	0/0

	Methyl propyl sulfide	3-p-Menthen-7-ol	(E)-3-Methyl-4-dodecenoic acid	cis-2-Hexacyclopropaneacetic acid	2-Ethoxy-4-(hydroxymethyl) phenol	2-Mercapto-3-methyl-1-butanol	Rebaudioside M	N-(2-Hydroxy-2-phenylethyl)-2-isopropyl-5,5-dimethylcyclohexane-1-carboxamide	Allulose	trans-5-Octenal	N-(1-((4-Amino-2,2-dioxido-1H-benzotriazol-2-yl)oxy)-2-methylpropan-2-yl)-2,6-dimethylisonicotinamide (sulfate salt)
CATEGORY/FEMA NO.	4889	4890	4891	4892	4893	4894	4895	4896	4897	4898	4899
BAKED GOODS	0.1/1	0.001/0.01	0.1/1	0.001/0.01	50/200	0.001/1	0/0	0/0	0/0	5/50	0/0
BEVERAGES, NON-ALCOHOLIC	0.002/0.1	0.0003/0.005	0.001/0.1	0.0002/0.005	25/100	0.0001/0.1	15/20	1/100	15000/20000	2.5/25	18/27
BEVERAGES, ALCOHOLIC	0.006/0.3	0.0003/0.005	0.001/0.1	0.0002/0.005	20/50	0.0001/0.1	0/0	1/100	15000/15000	2.5/25	18/27
BREAKFAST CEREALS	0.01/1	0/0	0/0	0/0	30/50	0/0	0/0	0/0	0/0	10/100	20/27
CHEESES	0.01/2	0.001/0.01	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
CHEWING GUM	0/0	0.001/0.01	0.001/0.1	0.001/0.01	1000/2500	0/0	0/0	10/1000	0/0	50/250	27/27
CONDIMENTS AND RELISHES	0.01/2	0.01/0.1	0/0	0.001/0.01	10/30	0/0	0/0	1/100	0/0	0/0	20/27
CONFECTIONS AND FROSTINGS	0/0	0.001/0.01	0.001/0.3	0.0005/0.005	30/50	0/0	0/0	10/1000	0/0	5/50	27/27
EGG PRODUCTS	0.01/1	0/0	0.001/0.3	0.0005/0.005	5/10	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0.01/0.1	0.01/0.1	0.01/1	0.01/0.1	30/50	0/0	0/0	0.5/50	0/0	3/30	0/0
FISH PRODUCTS	0.01/2	0/0	0.001/0.3	0.001/0.01	5/10	0/0	0/0	0/0	0/0	3/30	0/0
FROZEN DAIRY	0/0	0.001/0.01	0.001/0.2	0.001/0.01	20/50	0.0001/0.1	15/20	1/100	0/0	5/50	18/27
FRUIT ICES	0/0	0.0005/0.01	0.001/0.2	0.0005/0.005	5/10	0/0	15/20	1/100	0/0	5/50	18/27
GELATINS AND PUDDINGS	0/0	0.0005/0.01	0.01/0.1	0.0005/0.005	40/80	0.0001/0.1	0/0	0.5/50	0/0	10/100	18/27
GRANULATED SUGAR	0/0	0/0	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0/0	0/0	0.001/0.05	0/0	5/10	0/0	0/0	0.5/50	0/0	0.5/5	0/0
HARD CANDY	0/0	0.001/0.01	0.001/0.3	0.001/0.01	200/500	0/0	0/0	1/100	0/0	10/50	27/27
IMITATION DAIRY	0/0	0/0	0.0001/0.05	0.001/0.01	20/50	0/0	15/20	0.5/50	0/0	3/30	10/27
INSTANT COFFEE AND TEA	0.01/0.1	0/0	0.0001/0.1	0.0002/0.005	15/30	0.0001/0.1	15/20	0.1/10	0/0	5/50	10/27
JAMS AND JELLIES	0/0	0.0005/0.01	0/0	0.0005/0.005	20/50	0/0	0/0	1/100	0/0	5/50	18/27
MEAT PRODUCTS	0.01/2	0.001/0.01	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
MILK PRODUCTS	0.01/0.5	0/0	0.001/0.05	0.001/0.01	20/50	0.0001/0.01	15/20	0.5/50	15000/15000	3/30	18/27
NUT PRODUCTS	0.01/2	0/0	0.001/0.05	0.001/0.01	60/200	0/0	0/0	0/0	0/0	3/30	0/0
OTHER GRAINS	0.01/0.2	0/0	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
POULTRY	0.01/2	0/0	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	0/0	20/50	0/0	15/20	0/0	0/0	0/0	0/0
PROCESSED VEGETABLES	0.01/0.5	0/0	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0.01/0.5	0/0	0/0	0/0	5/10	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	0.001/2	0.05/0.3	0.01/2	0.01/0.2	100/200	0/0	0/0	30/9000	0/0	0/0	0/0
SNACK FOODS	0.2/2	0.003/0.1	0.001/0.3	0.001/0.01	20/50	0/0	0/0	1/100	0/0	15/150	0/0
SOFT CANDY	0/0	0.001/0.01	0.001/0.3	0.001/0.01	100/300	0/0	0/0	1/100	0/0	10/100	20/27
SOUPS	0.02/2	0.0005/0.01	0.0001/0.3	0.0002/0.005	5/10	0/0	0/0	1/100	0/0	0.5/5	0/0
SUGAR SUBSTITUTES	0/0	0/0	0.001/0.05	0/0	10/30	0/0	0/0	0.05/5	0/0	0/0	0/0
SWEET SAUCES	0/0	0.001/0.01	0/0	0.001/0.01	10/30	0/0	0/0	5/500	0/0	10/100	18/27

TABLE 2 CONTINUED - Average Usual Use Levels/Average Maximum Use Levels

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)

	Hexyl propyl disulfide	0-Ethyl-5-(3-methylbut-2-en-1-yl)thiocarbonate	3-Methyl-2(5H)-furanone	Ethyl 3-methyl-2-oxopentanoate	trans-Tetradec-4-enal	2,6-Dimethylheptenyl formate	L-Carnitine tartrate	<i>Corynebacterium glutamicum</i> corn syrup fermentation product	<i>Corynebacterium stationis</i> corn syrup fermentation product	Glucosylated steviol glycosides, 70-80%	Glucosylated steviol glycosides, 40%
CATEGORY/FEMA NO.	4900	4901	4902	4903	4904	4905	4906	4907	4908	4909	4910
BAKED GOODS	0.4/20	0/0	0.01/20	10/100	0.5/35	0.5/30	750/1250	0/0	0/0	0/0	30/135
BEVERAGES, NON-ALCOHOLIC	0.1/10	0.0001/0.003	0.001/10	5/50	0.1/10	0.1/5	750/1250	0/0	0/0	55/65	30/135
BEVERAGES, ALCOHOLIC	0.3/30	0.0002/0.006	0.001/10	2.5/25	0.3/20	0.3/15	750/1250	0/0	0/0	0/0	30/135
BREAKFAST CEREALS	0.2/20	0.005/0.015	0/0	5/50	0.3/25	0.3/20	0/0	0/0	0/0	0/0	30/135
CHEESES	0.3/30	0/0	0/0	0/0	0.1/10	0.1/5	0/0	0/0	0/0	0/0	30/135
CHWING GUM	1/30	0/0	0.01/20	10/100	2.5/55	2.5/50	0/0	0/0	0/0	0/0	30/135
CONDIMENTS AND RELISHES	0.5/30	0/0	0/0	0/0	0.3/20	0.3/15	750/1250	3400/5100	1120/1680	0/0	30/135
CONFECTIONS AND FROSTINGS	0.1/10	0.005/0.015	0/0	5/50	0.2/15	0.2/10	0/0	0/0	0/0	0/0	30/135
EGG PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0.1/30	0/0	0/0	5/50	0.3/20	0.3/15	750/1250	3400/5100	1120/1680	0/0	30/135
FISH PRODUCTS	0.1/30	0/0	0/0	0/0	0.3/20	0.3/15	750/1250	1800/2700	600/900	0/0	0/0
FROZEN DAIRY	0.1/10	0.005/0.015	0.001/10	5/50	0.5/25	0.5/20	0/0	0/0	0/0	55/65	30/135
FRUIT ICES	0.1/10	0/0	0/0	5/50	0.4/25	0.4/20	0/0	0/0	0/0	0/0	30/135
GELATINS AND PUDDINGS	0.1/10	0.005/0.015	0/0	5/50	0.4/25	0.4/20	0/0	0/0	0/0	0/0	30/135
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0.2/40	0/0	0/0	0/0	0.2/25	0.2/20	750/1250	1667/2500	847/1270	0/0	30/135
HARD CANDY	0.1/15	0.005/0.15	0.01/20	10/100	0.3/25	0.3/20	0/0	0/0	0/0	0/0	30/135
IMITATION DAIRY	0/0	0.0001/0.003	0/0	2.5/25	0/0	0/0	0/0	0/0	0/0	55/65	30/135
INSTANT COFFEE AND TEA	0.1/10	0.0001/0.003	0.001/10	5/50	0.3/25	0.3/20	0/0	0/0	0/0	55/65	30/135
JAMS AND JELLIES	0.1/15	0.005/0.015	0/0	2.5/25	0.5/35	0.5/30	0/0	0/0	0/0	0/0	30/135
MEAT PRODUCTS	0.2/35	0/0	0/0	0/0	0.2/15	0.2/10	750/1250	1800/2700	600/900	0/0	0/0
MILK PRODUCTS	0.1/10	0.0001/0.003	0.001/10	2.5/25	0.3/15	0.3/10	0/0	0/0	0/0	55/65	30/135
NUT PRODUCTS	0.1/20	0.005/0.015	0/0	5/50	0.2/10	0.2/5	0/0	0/0	0/0	0/0	30/135
OTHER GRAINS	0/0	0/0	0/0	5/50	0/0	0/0	750/1250	0/0	0/0	0/0	30/135
POULTRY	0.2/40	0/0	0/0	0/0	0.3/15	0.3/10	750/1250	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0.1/40	0/0	0/0	0/0	0.4/20	0.4/15	0/0	0/0	0/0	0/0	30/135
PROCESSED VEGETABLES	0.1/40	0/0	0/0	0/0	0/0	0/0	750/1250	0/0	0/0	0/0	30/135
RECONSTITUTED VEGETABLE PROTEIN	0.1/40	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	50/500	0/0	0/0	10/100	20/100	20/100	0/0	2667/4000	893/1340	0/0	30/135
SNACK FOODS	0.1/50	0.005/0.015	0/0	2.5/25	0.3/20	0.3/15	750/1250	0/0	0/0	0/0	30/135
SOFT CANDY	0.1/15	0.005/0.015	0.01/20	5/50	0.3/20	0.3/20	0/0	0/0	0/0	0/0	30/135
SOUPS	0.1/40	0/0	0/0	2.5/25	0.2/25	0.2/20	750/1250	1667/2500	847/1270	0/0	30/135
SUGAR SUBSTITUTES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0.1/20	0.005/0.015	0/0	2.5/25	0.3/25	0.3/20	0/0	0/0	0/0	0/0	30/135

	Stevia extract stevioside, 70%	Hibiscus blossom extract	3,7-Dimethyl-2-methyloct-6-en-1-ol	bis-(3-Methyl-2-butenyl) disulfide	(5Z)-3,4-Dimethyl-5-propylidene-2(5H)-furanone	2-Methyl-3-butene-2-thiol	(Z)-9-Dodecenoic acid	Tridec-5-enal	Refined soybean oil extract	1-Ethyl-2-(1-pyrrolylmethyl) pyrrole
CATEGORY/FEMA NO.	4911	4912	4913	4914	4915	4916	4917	4918	4919	4920
BAKED GOODS	100/200	600/5000	5/50	0.1/1	0/0	0.001/0.05	1/10	0.5/35	1/5	0.00001/0.002
BEVERAGES, NON-ALCOHOLIC	50/50	300/10000	1/10	0.005/0.05	0.01/0.1	0.0001/0.002	0.02/0.2	0.1/10	0.2/2	0.00001/0.002
BEVERAGES, ALCOHOLIC	50/50	0/0	1/10	0.005/0.05	0.01/0.1	0.0001/0.002	0.02/0.2	0.3/20	0.2/2	0.00001/0.002
BREAKFAST CEREALS	100/250	600/5000	0/0	0.1/1	0/0	0/0	0.05/5	0.3/25	1/5	0/0
CHEESES	50/50	0/0	2/20	0.1/1	0/0	0.0005/0.005	0.2/2	0.1/10	0/0	0/0
CHEWING GUM	50/50	1200/10000	50/500	0.1/1	0/0	0.001/0.02	0.1/1	2.5/55	1/5	0/0
CONDIMENTS AND RELISHES	50/50	0/0	0/0	0.1/1	0.1/1	0.001/0.01	0.1/1	0.3/20	0.5/2	0.00001/0.002
CONFECTIONS AND FROSTINGS	50/50	1200/5000	10/100	0.1/1	0/0	0.0005/0.005	0.1/1	0.2/15	0.5/2	0/0
EGG PRODUCTS	50/50	0/0	0/0	0.1/1	0/0	0.0002/0.002	0.05/0.5	0/0	0/0	0/0
FATS AND OILS	50/50	0/0	10/100	0.1/1	0/0	0/0	0.5/5	0.3/20	0/0	0.00001/0.002
FISH PRODUCTS	50/50	0/0	0/0	0.1/1	0/0	0/0	0.05/0.5	0.3/20	0/0	0/0
FROZEN DAIRY	50/50	600/5000	2/20	0.1/1	0/0	0.0002/0.003	0.05/0.5	0.5/25	0.2/2	0/0
FRUIT ICES	50/50	600/5000	2/20	0.1/1	0.001/0.01	0.0002/0.003	0.05/0.5	0.4/25	0.2/2	0/0
GELATINS AND PUDDINGS	50/50	600/5000	2/20	0.1/1	0.001/0.01	0.0002/0.003	0.05/0.5	0.4/25	0/0	0/0
GRANULATED SUGAR	0/0	0/0	0/0	0.1/1	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	50/50	0/0	0/0	0.1/1	0/0	0.001/0.01	0.05/0.5	0.2/25	1/5	0/0
HARD CANDY	50/50	1200/5000	10/100	0.1/1	0.1/5	0.001/0.01	0.05/0.5	0.3/25	1/5	0/0
IMITATION DAIRY	50/50	1200/5000	0/0	0.1/1	0/0	0/0	0.5/5	0/0	0/0	0/0
INSTANT COFFEE AND TEA	50/50	600/1000	0/0	0.1/1	0.01/0.1	0.0003/0.005	0.02/0.2	0.3/25	0.2/2	0.00001/0.002
JAMS AND JELLIES	50/50	0/0	5/100	0.1/1	0/0	0/0	0.05/0.5	0.5/35	0/0	0/0
MEAT PRODUCTS	0/0	0/0	0/0	0.1/1	0/0	0.001/0.01	0.05/0.5	0.2/15	1/5	0/0
MILK PRODUCTS	50/50	900/5000	2/20	0.1/1	0.01/0.1	0.0001/0.002	0.5/5	0.3/15	1/5	0/0
NUT PRODUCTS	50/50	0/0	0/0	0.1/1	0/0	0/0	0.05/0.5	0.2/10	1/5	0.00001/0.002
OTHER GRAINS	50/50	0/0	0/0	0.1/1	0/0	0/0	0.05/0.5	0/0	0/0	0/0
POULTRY	0/0	0/0	0/0	0.1/1	0/0	0/0	0.05/0.5	0.3/15	1/5	0/0
PROCESSED FRUITS	50/50	0/0	2/20	0.1/1	0/0	0/0	0/0	0.4/20	0/0	0/0
PROCESSED VEGETABLES	50/50	0/0	0/0	0.1/1	0/0	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	50/50	0/0	0/0	0.1/1	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	50/50	0/0	0/0	0.1/1	0.01/0.1	0.1/1	0.05/0.5	20/50	1/5	0/0
SNACK FOODS	50/50	0/0	0/0	0.1/1	0.01/0.1	0.005/0.1	0.05/0.5	0.3/20	1/5	0/0
SOFT CANDY	50/50	900/5000	10/100	0.1/1	0/0	0.001/0.01	0.10/1	0.3/20	1/5	0/0
SOUPS	50/50	0/0	0/0	0.1/1	0/0	0.003/0.005	0.02/0.2	0.2/25	1/5	0.00001/0.002
SUGAR SUBSTITUTES	50/50	0/0	0/0	0.1/1	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	50/50	600/5000	0/0	0.1/1	0.1/5	0.001/0.01	0.05/2	0.3/25	0/0	0/0

TABLE 2 CONTINUED - Average Usual Use Levels/Average Maximum Use Levels

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)

	Rebaudioside D 95%	Rebaudioside M 95%	Buchu leaves extract	Peppermint oil terpeneless	Spearmint oil terpeneless	(Z)- β -Pentadecenal	4,7-Decadienal	2-Methylthiophene	4-Methylidene-2-(2-methylprop-1-enyl)oxane	4-Isopropoxycinnamaldehyde	Glucosylated steviol glycosides, 90%
CATEGORY/FEMA NO.	4921	4922	4923	4924	4925	4926	4927	4928	4929	4930	4931
BAKED GOODS	15/32.5	10/24	1/3	140/300	1055/1320	0.001/0.1	0.1/1	0.3/10	0/0	0/0	100/100
BEVERAGES, NON-ALCOHOLIC	15/32.5	10/24	0.8/0.8	39/99	110/140	0.00002/0.002	0.1/0.5	0.1/5	0.01/0.5	0.5/25	100/100
BEVERAGES, ALCOHOLIC	15/32.5	10/24	0.2/0.4	150/240	120/155	0.00002/0.002	0.1/0.5	0.1/5	0.01/0.5	0.5/25	100/100
BREAKFAST CEREALS	15/32.5	10/24	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.3/10	0.1/5	0/0	100/100
CHEESES	0/0	0/0	0/0	0/0	0/0	0.0002/0.02	0.1/0.5	0.1/5	0/0	0/0	100/100
CHewing GUM	200/325	10/240	0/0	8300/8300	8000/24000	0.0001/0.01	1/5	0.1/5	0.03/1.5	2/25	100/100
CONDIMENTS AND RELISHES	15/32.5	10/24	2/10	0/0	50/250	0.0001/0.01	0.5/1	0.1/5	0/0	0/0	100/100
CONFECTIONS AND FROSTINGS	15/32.5	10/24	0/0	650/650	0/0	0.0001/0.01	0.5/1	0.3/10	0.03/1.5	0/0	100/100
EGG PRODUCTS	0/0	0/0	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	0/0
FATS AND OILS	0/0	0/0	0/0	0/0	0/0	0.001/0.1	0.5/1	0.1/5	0/0	0/0	100/100
FISH PRODUCTS	0/0	0/0	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	0/0
FROZEN DAIRY	15/32.5	10/24	1.8/1.8	95/110	50/131	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	100/100
FRUIT ICES	15/32.5	10/24	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.1/5	0.03/1.5	0/0	100/100
GELATINS AND PUDDINGS	15/32.5	10/24	1/13	75/200	90/96	0.0001/0.005	0.1/0.5	0.1/5	0.03/1.5	0/0	100/100
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0.5/1	0/0	0/0	0/0	0/0
GRAVIES	0/0	0/0	0/0	0/0	0/0	0.0001/0.005	0.1/1	0.1/5	0/0	0/0	100/100
HARD CANDY	15/32.5	10/24	0/0	1200/1200	5000/10000	0.0001/0.005	0.1/0.5	0.3/10	0.1/5	0/0	100/100
IMITATION DAIRY	15/32.5	10/24	0/0	0/0	0/0	0.0005/0.05	0.1/0.5	0.3/10	0/0	0/0	100/100
INSTANT COFFEE AND TEA	15/32.5	10/24	10/20	0/0	0/0	0.00002/0.002	0.1/0.5	0.1/5	0.01/0.5	0.1/15	100/100
JAMS AND JELLIES	15/32.5	10/24	0/0	0/0	97/1900	0.0001/0.005	0.1/0.5	0.1/5	0.03/1.5	0/0	100/100
MEAT PRODUCTS	0/0	0/0	0/0	6/8	0/0	0.0001/0.005	0.1/1	0.1/5	0/0	0/0	0/0
MILK PRODUCTS	15/32.5	10/24	0/0	0/0	0/0	0.0005/0.05	0.1/0.5	0.1/5	0/0	0.2/15	100/100
NUT PRODUCTS	15/32.5	10/24	0/0	0/0	0/0	0.0001/0.005	0.5/1	0.1/5	0/0	0/0	100/100
OTHER GRAINS	15/32.5	10/24	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	100/100
POULTRY	0/0	0/0	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	0/0
PROCESSED FRUITS	15/32.5	10/24	0/0	0/0	0/0	0/0	0.1/0.5	0/0	0/0	0/0	100/100
PROCESSED VEGETABLES	0/0	0/0	0/0	0/0	500/550	0/0	0.1/0.5	0/0	0/0	0/0	100/100
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0/0	0/0	0/0	0.1/0.5	0/0	0/0	0/0	100/100
SEASONINGS AND FLAVORS	15/32.5	10/24	0/0	0/0	66670/66670	0.0001/0.005	0.1/1	0.1/5	0/0	0/0	100/100
SNACK FOODS	15/32.5	10/24	0/0	0/0	0/0	0.0001/0.005	0.1/0.5	0.3/10	0/0	0.2/10	100/100
SOFT CANDY	15/32.5	10/24	1/3	320/1200	5000/10000	0.0001/0.01	0.1/0.5	0.3/10	0.03/1.5	0/0	100/100
SOUPS	15/32.5	10/24	0/0	0/0	0/0	0.00002/0.002	0.1/0.5	0.1/5	0/0	0/0	100/100
SUGAR SUBSTITUTES	0/0	0/0	0/0	0/0	0/0	0/0	0.5/1	0/0	0/0	1/25	0/0
SWEET SAUCES	15/32.5	10/24	0/0	0/0	40/90	0.0001/0.005	0.1/0.5	0.1/5	0/0	0/0	100/100

	<i>Chaenomeles speciosa</i> leaf extract	<i>Eriobotrya japonica</i> leaves extract	Sodium gluconate	3-Methylbutane-1,3-dithiol	Rebaudioside E ≥85%	Rebaudioside I 95%	5-Methyl 5-(1-ethoxyethoxy) tetradecanethioate	5-Methyl 5-(1-ethoxyethoxy) decanethioate	beta-Bisabolene ≥86%	Nootkatone complex	Modified guar: wood extract
CATEGORY/FEMA NO.	4932	4933	4934	4935	4936	4937	4938	4939	4940	4941	4942
BAKED GOODS	200/400	20/100	2500/2500	0.1/1	30/45	20/30	0.2/1	0.2/2	10/50	0/0	0.1/2
BEVERAGES, NON-ALCOHOLIC	50/200	5/50	1500/2500	0.001/0.01	30/45	20/30	0.1/0.5	0.1/0.5	5/25	10/50	0.05/0.2
BEVERAGES, ALCOHOLIC	50/200	5/50	1500/2500	0.001/0.01	30/45	20/30	0/0	0/0	10/50	10/50	0.1/2
BREAKFAST CEREALS	200/400	20/100	2500/2500	0.1/1	30/45	20/30	0.05/0.5	0.05/0.5	5/25	0/0	0.1/2
CHEESES	100/200	5/50	2500/2500	0.01/0.1	0/0	0/0	0.05/0.5	0.05/0.5	0/0	0/0	0/0
CHEWING GUM	200/800	20/200	0/0	0.05/0.5	35/45	25/30	0/0	0.1/1	10/50	10/50	1/5
CONDIMENTS AND RELISHES	50/200	5/50	1500/2500	0.002/0.02	30/45	20/30	0/0	0/0	0/0	0/0	0/0
CONFECTIONS AND FROSTINGS	200/400	20/200	1500/2500	0.05/0.5	30/45	20/30	0.1/0.5	0.1/0.5	10/50	10/50	0/0
EGG PRODUCTS	100/400	5/50	1500/2500	0.005/0.05	0/0	0/0	0.1/0.5	0.1/0.5	0/0	0/0	0/0
FATS AND OILS	100/400	10/100	0/0	0.01/0.1	0/0	0/0	0.1/0.5	0.1/2	5/25	0/0	0.1/1.5
FISH PRODUCTS	100/400	10/100	1500/2500	0.001/0.1	0/0	0/0	0/0	0/0	0/0	0/0	0.1/0.5
FROZEN DAIRY	100/400	10/100	1500/2500	0.005/0.05	30/45	20/30	0.01/0.1	0.1/1	7/35	0/0	0.1/1.5
FRUIT ICES	50/200	5/50	1500/2500	0.001/0.01	30/45	20/30	0/0	0/0	10/50	0/0	0.1/1
GELATINS AND PUDDINGS	100/400	10/100	0/0	0.005/0.05	30/45	20/30	0.01/0.05	0.01/0.1	5/25	0/0	0.1/0.5
GRANULATED SUGAR	0/0	5/50	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	100/400	20/100	2500/2500	0.01/0.1	0/0	0/0	0.1/1	0.1/1	0/0	0/0	0.1/1.5
HARD CANDY	200/400	20/200	0/0	0.1/1	30/45	20/30	0.01/0.05	0.01/0.05	10/50	0/0	0.2/1
IMITATION DAIRY	100/400	10/100	1500/2500	0.01/0.1	30/45	20/30	0.1/1	0.1/1	0/0	0/0	0.1/0.8
INSTANT COFFEE AND TEA	50/200	5/50	1500/2500	0.01/0.1	30/45	20/30	0.2/2	0.2/2	0/0	0/0	0.05/0.5
JAMS AND JELLIES	100/400	5/50	1000/2500	0.002/0.02	30/45	20/30	0/0	0.05/0.2	5/25	0/0	0.1/1
MEAT PRODUCTS	100/400	20/100	2500/2500	0.01/0.1	0/0	0/0	0.1/1	0.1/1	0/0	0/0	0.1/0.5
MILK PRODUCTS	50/200	5/50	0/0	0.005/0.05	30/45	20/30	0.1/1	0.1/1	0/0	0/0	0.1/1
NUT PRODUCTS	200/400	10/100	2500/2500	0.002/0.02	30/45	20/30	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	100/400	10/100	0/0	0.01/0.1	30/45	20/30	0.01/0.1	0.01/0.1	0/0	0/0	0/0
POULTRY	100/400	20/100	2500/2500	0.02/0.02	0/0	0/0	0.1/1	0.1/1	0/0	0/0	0.1/0.5
PROCESSED FRUITS	50/200	5/50	1500/2500	0.001/0.01	30/45	20/30	0/0	0/0	7/35	0/0	0.05/0.5
PROCESSED VEGETABLES	50/200	5/50	2500/2500	0.002/0.02	0/0	0/0	0/0	0/0	0/0	0/0	0.05/0.2
RECONSTITUTED VEGETABLE PROTEIN	50/200	5/50	0/0	0.002/0.02	0/0	0/0	0.03/0.1	0.03/0.1	0/0	0/0	0.02/0.1
SEASONINGS AND FLAVORS	100/400	10/200	2500/2500	0/0	30/45	20/30	0/0	0/0	0/0	0/0	0.5/2
SNACK FOODS	100/500	10/200	2500/2500	0.05/0.5	30/45	20/30	0.2/2	0.2/2	0/0	0/0	0.2/1
SOFT CANDY	200/400	20/200	0/0	0.002/0.02	30/45	20/30	0.01/0.05	0.01/0.05	10/50	0/0	0.1/0.8
SOUPS	100/400	5/100	2500/2500	0.05/0.5	30/45	20/30	0.1/1	0.1/1	0/0	0/0	0.1/0.5
SUGAR SUBSTITUTES	0/0	5/50	1500/2500	0.001/0.01	0/0	20/30	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	50/200	5/100	1500/2500	0.005/0.05	30/45	20/30	0/0	0.01/0.1	5/25	0/0	0.1/0.5

TABLE 3 - Updated Average Usual Use Levels/Average Maximum Use Levels

Average Usual Use Levels (ppm)/Average Maximum Use Levels (ppm) for flavoring substances previously recognized as FEMA GRAS

^a represents a change from previous FEMA GRAS publications

	Acetal	Acetic acid	Isoamyl alcohol	Anisyl propionate	Isobutyl alcohol	Butyric acid	Isobutyric acid	Caffeine	Citric acid	dl-Citronellol
FEMA NO.	2002	2006	2057	2102	2179	2221	2222	2224	2306	2309
GRAS PUBLICATION	3	25	3	3	25	25	25	3	25	3
CATEGORY										
BAKED GOODS	65/120	0.1/38	17/27	17/30	20/31	44/106	20/41	0/0	2/3	6/20
BEVERAGES, NON-ALCOHOLIC	5/11	0.06/39	4/17	5/7	8/17	9/16	2/4	120/150 ^a	2/3	1/4
BEVERAGES, ALCOHOLIC	109 ^a /154 ^a	500 ^a /2000 ^a	500 ^a /4500 ^a	3/5	518 ^a /6500 ^a	3.5 ^a /30 ^a	2 ^a /10 ^a	0/0	800 ^a /20000 ^a	1/4
BREAKFAST CEREALS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.1/0.1	0/0
CHEESES	0/0	0/0	0/0	0/0	1/1	0/0	0/0	0/0	0.4/0.9	0/0
CHEWING GUM	155/155	400/5000	594/594	0/0	50/500	60/270	25/110	0/0	10000/25400	8/9
CONDIMENTS AND RELISHES	0/0	136/5900	0/0	0.45 ^a /0.68 ^a	0/0	125/200	0/0	0/0	0.4/0.8	0.3 ^a /0.45 ^a
CONFECTIONS AND FROSTINGS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.3/1	0/0
EGG PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.6/0.6	0/0
FATS AND OILS	2/3	15/31	0/0	0.45 ^a /0.68 ^a	0/0	9/26	2/30	0/0	0.5/0.8	0.3 ^a /0.45 ^a
FISH PRODUCTS	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	0.3/0.4	0.3 ^a /0.45 ^a
FROZEN DAIRY	36/73	0.03/32	5/10	6/11	19/19	9/14	6/12	0/0	1/3	1/40
FRUIT ICES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/2	0/0
GELATINS AND PUDDINGS	36/67	0.04/15	12/46	5/9	24/35	13/45	11/20	0/0	174/210	2/6
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0/0	2/12	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	1/2	0.3 ^a /0.45 ^a
HARD CANDY	4/39	0.2/52	158/168	0.6/16	30/30	39/103	8/41	0/0	950/1000	2/2
IMITATION DAIRY	0/0	0.1/0.1	0/0	0/0	0/0	101/183	0/0	0/0	2/2	0/0
INSTANT COFFEE AND TEA	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	5/5	0/0
JAMS AND JELLIES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2/6	0/0
MEAT PRODUCTS	0/0	8/16	0/0	0.45 ^a /0.68 ^a	0/0	7/7	0/0	0/0	0.8/0.9	0.3 ^a /0.45 ^a
MILK PRODUCTS	0/0	0.8/1	0/0	0/0	0/0	15/15	100/200	0/0	0.8/1	0/0
NUT PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.3 ^a /0.45 ^a
OTHER GRAINS	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	0.4/0.4	0.3 ^a /0.45 ^a
POULTRY	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	1/1	0.3 ^a /0.45 ^a
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	13/16	0/0
PROCESSED VEGETABLES	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	0.5/1	0.3 ^a /0.45 ^a
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	33/33	0.3 ^a /0.45 ^a
SEASONINGS AND FLAVORS	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	0/0	0.3 ^a /0.45 ^a
SNACK FOODS	0/0	2/2	0/0	0.45 ^a /0.68 ^a	0/0	24/48	0/0	0/0	0.4/1	0.3 ^a /0.45 ^a
SOFT CANDY	33/56	0.05/0.07	8/14	12/23	25/34	32/42	21/47	0/0	2/14	142/181
SOUPS	0/0	0/0	0/0	0.45 ^a /0.68 ^a	0/0	0/0	0/0	0/0	0.2/0.2	0.3 ^a /0.45 ^a
SUGAR SUBSTITUTES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0/0	0.1/0.1	0/0	0/0	0/0	9/9	62/124	0/0	3/3	0/0

	<i>delta</i> -Decalactone	Decanoic acid	Dihydrocoumarin	Ethyl acetate	Ethyl palmitate	Eugenol	Glycerol	Guaiacol	Hexanoic acid
FEMA NO.	2361	2364	2381	2414	2451	2467	2525	2532	2559
GRAS PUBLICATION	25	3	25	3	25	3	3	3	25
CATEGORY									
BAKED GOODS	14/26	10/30 ^a	141/165	154/211	20/20	15/33	18/1300	2/3	19/65
BEVERAGES, NON-ALCOHOLIC	5/14	1/10	25/28	42/67	0/0	1/2	0.7/570	0.8/1	2/3
BEVERAGES, ALCOHOLIC	15 ^a /20 ^a	3 ^a /15 ^a	0.3 ^a /2 ^a	100 ^a /200 ^a	0.3 ^a /5 ^a	1.5 ^a /40 ^a	20000 ^a /20000 ^a	1/15 ^a	3 ^a /50 ^a
BREAKFAST CEREALS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
CHEESES	0/0	11/30 ^a	0/0	0/0	0/0	0/0	0/0	0.1/0.1	2/5
CHEWING GUM	15/100	5 ^a /30 ^a	20/250	1190/10000 ^a	0.1/0.1	400 ^a /2320 ^a	17/6000	0.01/0.01	100/1000
CONDIMENTS AND RELISHES	0/0	3 ^a /30 ^a	10/15	0/0	0/0	50/100	0/0	0/0	448/510
CONFECTIONS AND FROSTINGS	0.5/5	3 ^a /30 ^a	0/0	0/0	0/0	625/750	70/23000	0/0	0/0
EGG PRODUCTS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	9/20	4/140	0/0	0/0	0/0	0/0	0.2/0.2	0/0	36/36
FISH PRODUCTS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FROZEN DAIRY	19/37	3 ^a /30 ^a	95/104	66/110	20/20	2/4	0.3/500	0.7/2	10/24
FRUIT ICES	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GELATINS AND PUDDINGS	15/30	3 ^a /30 ^a	116/132	73/200	0/0	2/3	26/360	0.9/2	2/6
GRANULATED SUGAR	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	4/8	3 ^a /30 ^a	0/0	20/40	0/0	0/0	0.2/0.2	0/0	2/4
HARD CANDY	0.3/5	5/30 ^a	8/44	149/7500 ^a	40/40	700 ^a /700 ^a	22/980	1/1	3/28
IMITATION DAIRY	0/0	7/30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	5/10
INSTANT COFFEE AND TEA	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
JAMS AND JELLIES	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	42/54	0/0	0/0
MEAT PRODUCTS	0/0	3 ^a /30 ^a	0/0	0.1/0.1	0/0	51/2000	1/40	3/6	6/26
MILK PRODUCTS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	84/84	0/0	0/0
NUT PRODUCTS	0/0	0/0	0/0	0/0	3/5	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
POULTRY	0/0	5 ^a /50 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	8/15	0/0	0/0	0.02/0.07	0/0	0/0
PROCESSED VEGETABLES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	150/176
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	0/0	200 ^a /2000 ^a	0/0	0/0	0/0	0/0	400000/400000	0/0	0/0
SNACK FOODS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	22/24	0/0	10/20
SOFT CANDY	13/26	2/6	111/131	113/5000 ^a	0/0	10/15	2/4	0.8/2	5/9
SOUPS	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SUGAR SUBSTITUTES	0/0	3 ^a /30 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0.1/0.1	3 ^a /30 ^a	0/0	0/0	0/0	0/0	74/74	0/0	0/0

TABLE 3 CONTINUED - Updated Average Usual Use Levels/Average Maximum Use Levels
 Average Usual Use Levels (ppm)/Average Maximum Use Levels (ppm) for flavoring substances previously recognized as FEMA GRAS
^a represents a change from previous FEMA GRAS publications

	4-(p-Hydroxyphenyl)-2-butanone	Lactic acid	Lauric acid	Lauryl alcohol	Linalool	L-Malic acid	Maltol	4-Methyl-2-methoxyphenol	2-Methoxy-4-vinylphenol	3-Methylbutylaldehyde
FEMA NO.	2588	2611	2614	2617	2635	2655	2656	2671	2675	2692
GRAS PUBLICATION	3	25	25	3	3	25	3	25	25	25
CATEGORY										
BAKED GOODS	13/54	2/89	86/86	9/14	12/18	0.6/2	107/320	4/11	20/24	21/29
BEVERAGES, NON-ALCOHOLIC	3/16	0.02/34	11/15	2/3	4/7	90/380	78/182	10/21	2/3	2/4
BEVERAGES, ALCOHOLIC	250 ^a /300 ^a	3000 ^a /11000 ^a	0.6 ^a /2 ^a	1 ^a /10 ^a	10 ^a /50 ^a	1200 ^a /10000 ^a	70 ^a /350 ^a	0.6 ^a /10 ^a	20 ^a /40 ^a	0.4 ^a /10 ^a
BREAKFAST CEREALS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
CHEESES	0/0	19/37	53/53	0/0	0/0	0/0	0/0	0/0	0/0	0/0
CHEWING GUM	71/320	5000 ^a /5000 ^a	2/5	24/27	41/200 ^a	6000/25000	53/192	15/25	2/5	760/5000
CONDIMENTS AND RELISHES	0/0	1200/24000	0/0	0/0	5/40	0/0	0/0	0/0	0/0	0/0
CONFECTIONS AND FROSTINGS	0/0	0.3/300	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
EGG PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0/0	1/2	6/315	0/0	0/0	0/0	0.4/18	0/0	0/0	0/0
FISH PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
FROZEN DAIRY	9/34	0.03/66	18/21	4/7	6/10	25/390	121/287	1/2	4/11	8/12
FRUIT ICES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GELATINS AND PUDDINGS	14/50	14/25	18/25	4/7	7/10	0/0	112/244	7/18	4/6	8/11
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0/0	2/2	0/0	0/0	0/0	0/0	0/0	0/0	3/6	0/0
HARD CANDY	17/44	20000 ^a /20000 ^a	2/2	6/6	3/400 ^a	420/420	6/31	0.8/0.8	1/8	3/3
IMITATION DAIRY	0/0	0.8/1	7/14	0/0	0/0	0/0	0/0	0/0	0/0	0/0
INSTANT COFFEE AND TEA	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
JAMS AND JELLIES	0/0	0/0	0/0	0/0	0/0	0/0	15/15	0/0	0/0	0/0
MEAT PRODUCTS	0/0	4/4	0/0	0.03/0.03	19/46	0/0	0.1/0.1	12/35	3/7	0.1/0.5
MILK PRODUCTS	0/0	0.9/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
NUT PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
POULTRY	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED VEGETABLES	0/0	0.02/0.03	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SNACK FOODS	0/0	0.3/0.4	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SOFT CANDY	13/36	14000 ^a /14000 ^a	25/27	5/8	6/10	25/420	114/267	4/10	8/9	12/17
SOUPS	0/0	0.1/0.1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SUGAR SUBSTITUTES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0.9/1	0.5/0.5	0/0	7/7	0/0	0/0	0.3/0.4	0/0	0/0	0/0

	5-Methylfurfural	Myristic acid	Nerol	Octanoic acid	Palmitic acid	2,3-Pentanedione	Phenethyl alcohol	Phosphoric acid	alpha-Pinene
FEMA NO.	2702	2764	2770	2799	2832	2841	2858	2900	2902
GRAS PUBLICATION	25	25	3	3	25	3	3	3	25
CATEGORY									
BAKED GOODS	1/2	3/5	15/25	0.01/18	3/3	5/11	27/33	0.3/1500	35/160
BEVERAGES, NON-ALCOHOLIC	1/2	2/5	3/5	3/3	0/0	1/2	13/18	0.5/510	16/54
BEVERAGES, ALCOHOLIC	0.02 ¹ /2 ²	0.002 ² /4 ⁴	1 ¹ /2 ²	5 ¹ /10 ²	0.001 ¹ /3 ³	3 ¹ /10 ²	250 ² /250 ³	100 ² /2000 ³	10 ¹ /100 ²
BREAKFAST CEREALS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	12/12	0/0	0.08/0.08	0/0
CHEESES	0/0	2/2	0/0	1 ¹ /10 ²	0/0	0/0	0/0	3/5	0/0
CHEWING GUM	20/500	6/10	27/300 ²	15 ¹ /30 ²	1/1	0.04/0.04	25/80	0/0	175/1300
CONDIMENTS AND RELISHES	0/0	0/0	0/0	12/12	1/1	0/0	0/0	0/0	47/150
CONFECTIONS AND FROSTINGS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0.3/0.3	0/0	0.7/0.8	0/0
EGG PRODUCTS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0.05/0.1	0/0	0/0
FISH PRODUCTS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
FROZEN DAIRY	1/3	3/10	14/21	2/10 ²	0/0	4/10	19/23	0.3/660	13/64
FRUIT ICES	0/0	0/0	0/0	2 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
GELATINS AND PUDDINGS	1/2	1/2	5/8	1 ¹ /10 ²	0/0	4/8	6/10	0.4/0.5	6/12
GRANULATED SUGAR	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
GRAVIES	2/4	0.3/0.6	0/0	1 ¹ /10 ²	0/0	0.2/0.4	0/0	0/0	0/0
HARD CANDY	0.03/0.1	4/4	1/16	13/13	0/0	40/58	2/12	5000/5000	253/265
IMITATION DAIRY	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	1/2	0/0
INSTANT COFFEE AND TEA	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.3/0.4	0/0
JAMS AND JELLIES	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0.05/0.05	0/0
MEAT PRODUCTS	5/10	1/2	0/0	1 ¹ /10 ²	4/9	4/6	0/0	0.02/0.02	10/20
MILK PRODUCTS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
NUT PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0.04/0.04	0/0
POULTRY	0/0	0/0	0/0	2 ¹ /20 ²	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED VEGETABLES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.02/0.02	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.02/1	0/0
SEASONINGS AND FLAVORS	0/0	0/0	0/0	50 ¹ /500 ²	0/0	0/0	0/0	0/0	0/0
SNACK FOODS	0.05/0.1	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
SOFT CANDY	1/2	2/3	0/0	13 ¹ /13 ²	0/0	4/11	26/30	0.1/0.3	31/63
SOUPS	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
SUGAR SUBSTITUTES	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0/0	0/0	0/0	1 ¹ /10 ²	0/0	0.3/0.6	0/0	0.2/0.2	0/0

TABLE 3 CONTINUED - Updated Average Usual Use Levels/Average Maximum Use Levels

Average Usual Use Levels (ppm)/Average Maximum Use Levels (ppm) for flavoring substances previously recognized as FEMA GRAS

^a represents a change from previous FEMA GRAS publications

	<i>beta</i> -Pinene	Piperine	Potassium acetate	Propionic acid	Tartaric acid (<i>O</i> -, <i>L</i> -, <i>DL</i> -, <i>Meso</i> -)	<i>alpha</i> -Terpineol	Vanillin	2,6-Dimethoxyphenol	4-Hydroxy-2,5-dimethyl-3(2H)-furanone	2,4-Nonadienal
FEMA NO.	2903	2909	2920	2924	3044	3045	3107	3137	3174	3212
GRAS PUBLICATION	3	3	3	25	25	3	3	4	25	25
CATEGORY										
BAKED GOODS	48/600	1.37 ^a /2.1 ^a	0/0	200 ^a /500 ^a	0.9/1300	16/20	74/220	1.5/5	4/10	2/7
BEVERAGES, NON-ALCOHOLIC	11/21	0.6/0.7	0.3/2	50 ^a /500 ^a	1/960	3/5	40/97	2/5	5/80	0.9/4
BEVERAGES, ALCOHOLIC	10/50 ^a	0.9/1	350 ^a /3000 ^a	0.01/0.01	5000 ^a /10000 ^a	1.5 ^a /10 ^a	30/450 ^a	0.05 ^a /10 ^a	43 ^a /180 ^a	0.01 ^a /2 ^a
BREAKFAST CEREALS	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	353/353	0/0	0/0	0.2/0.2
CHEESES	0/0	0/0	0/0	100 ^a /600 ^a	0/0	0/0	0/0	0/0	0/0	0/0
CHEWING GUM	17/23	0/0	0/0	100/300	500/5000	13/1000 ^a	82/445	0/0	100/1000	5/10
CONDIMENTS AND RELISHES	20/40	1.5 ^a /2.25 ^a	0/0	100 ^a /500 ^a	2/10000	26/45	0/0	0/0	0/0	1/2
CONFECTIONS AND FROSTINGS	0/0	0/0	0/0	0/0	0/0	0/0	597/970	0/0	0/0	0/0
EGG PRODUCTS	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	96/100	0/0	0.1/0.5	0/0
FISH PRODUCTS	0/0	1.5 ^a /2.25 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	2/2	0/0	0/0
FROZEN DAIRY	20/64	1/1	0/0	50 ^a /500 ^a	2/570	9/16	27/95	2/5	5/10	2/7
FRUIT ICES	0/0	0/0	0/0	0/0	3/5	0/0	0/0	0/0	0/0	0/0
GELATINS AND PUDDINGS	10/15	1/1	0/0	0/0	3/60	12/16	48/120	2/5	10/80	1/5
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0/0	1.5 ^a /2.25 ^a	0/0	100 ^a /500 ^a	0.8/0.8	3/6	0/0	0/0	0/0	0.5/2
HARD CANDY	48/600	0/0	0/0	14/14	10/5400	11/17	26/200	0/0	10/10	0/0
IMITATION DAIRY	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
INSTANT COFFEE AND TEA	0/0	0/0	0/0	100 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
JAMS AND JELLIES	0/0	0/0	0/0	0/0	2/4	0/0	0/0	0/0	0.6/0.6	0/0
MEAT PRODUCTS	9/18	2/3	0/0	50 ^a /500 ^a	0.01/0.02	5/11	2/3	4/18	0/0	3/18
MILK PRODUCTS	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	221/314	0/0	0/0	0.2/0.2
NUT PRODUCTS	0/0	0.8 ^a /1.2 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	2.04 ^a /3.1 ^a	0/0	0/0	0.2/0.2	0/0	0/0	0/0	0/0	0/0
POULTRY	0/0	1.5 ^a /2.25 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	0/0	10/10	0/0	0/0	0/0	0/0	0/0
PROCESSED VEGETABLES	0/0	1.5 ^a /2.25 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	0.8 ^a /1.2 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	0/0	0/0
SEASONINGS AND FLAVORS	0/0	2.04 ^a /3.1 ^a	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0	1/10	0/0
SNACK FOODS	0/0	1.5 ^a /2.25 ^a	0/0	50 ^a /500 ^a	0/0	0/0	200/200	0/0	0/0	0/0
SOFT CANDY	20/74	1/1	0/0	0.01/0.01	10/10	13/500 ^a	247/408	2/5	20/60	2/8
SOUPS	0/0	1.5 ^a /2.25 ^a	0/0	50 ^a /500 ^a	2/2	0/0	0/0	0.1/0.8	0/0	0.2/0.2
SUGAR SUBSTITUTES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0/0	0/0	0/0	0/0	3/4	0/0	358/1000 ^a	0/0	5/40	0/0

	2-Nonenal	4-(2,6,6-Trimethyl-1-cyclohex- en-1-yl)-2-buten-4-one	2,3-Dimethylpyrazine	2,6-Dimethylpyrazine	2-Methoxy-3(5 and 6)-isopropylpyrazine	3-(Methylthio)propanol	1-(2,6-Trimethylcyclo- hexa-1,3-dienyl)-2-buten- 1-one	3-Methylpentanoic acid	o-Cresol
FEMA NO.	3213	3243	3271	3273	3358	3415	3420	3437	3480
GRAS PUBLICATION	25	25	25	5	6	25	25	8	10
CATEGORY									
BAKED GOODS	2/3	5/10	10/10	10/10	0/0	0.1/0.1	0.05/0.2	2/5	0/0
BEVERAGES, NON-ALCOHOLIC	1/2	2/10	10/10	10/10	0/0	0.05/0.05	0.05/0.2	2/2	0/0
BEVERAGES, ALCOHOLIC	0.01 ¹ /2 ²	0.01 ¹ /0.1 ³	0.002 ² /2 ²	0.1 ¹ /5 ²	0.001 ¹ /0.01 ³	0.3 ¹ /2 ²	0.01 ¹ /2 ²	0.2 ¹ /100 ³	0.8 ¹ /20 ³
BREAKFAST CEREALS	0.2/0.2	0/0	0.1 ¹ /1 ³	10/10	0/0	0/0	0/0	0/0	0.1/0.5
CHEESES	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
CHEWING GUM	1000/5000	10/100	1/1	0/0	0/0	1/5	100/300	0/0	0/0
CONDIMENTS AND RELISHES	0.1/0.5	0/0	0.1 ¹ /1 ³	10/10	0.05/0.2	0/0	0.05/0.2	0/0	0.1/0.5
CONFECTIONS AND FROSTINGS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	5/5	0/0
EGG PRODUCTS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
FATS AND OILS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
FISH PRODUCTS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
FROZEN DAIRY	2/2	2/10	10/10	10/10	0/0	0/0	0.05/0.2	2/2	0/0
FRUIT ICES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GELATINS AND PUDDINGS	2/2	2/10	10/10	10/10	0.05/0.05	0/0	0.05/0.2	2/2	0/0
GRANULATED SUGAR	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0/0	0/0	10/10	10/10	0/0	0/0	0/0	0/0	0.1/0.5
HARD CANDY	0/0	10/10	10/10	10/10	0/0	0.1/0.1	0.2/0.2	0/0	0/0
IMITATION DAIRY	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
INSTANT COFFEE AND TEA	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
JAMS AND JELLIES	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0.05/0.2	0/0	0/0
MEAT PRODUCTS	2/4	0/0	10/10	10/10	0.2/0.2	0/0	0/0	0/0	0.1/0.5
MILK PRODUCTS	0.2/0.2	0/0	0.1 ¹ /1 ³	10/10	0/0	0/0	0/0	0/0	0/0
NUT PRODUCTS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
OTHER GRAINS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
POULTRY	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
PROCESSED VEGETABLES	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.3/3	0/0
SEASONINGS AND FLAVORS	0/0	0/0	1 ¹ /10 ³	0/0	0/0	0/0	0/0	0/0	0.1/0.5
SNACK FOODS	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
SOFT CANDY	1/2	2/5	10/10	10/10	0/0	0/0	0.05/0.2	1/5	0/0
SOUPS	0.2/0.2	0/0	0.1 ¹ /1 ³	10/10	0/0	0/0	0/0	0/0	0.1/0.5
SUGAR SUBSTITUTES	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0
SWEET SAUCES	0/0	0/0	0.1 ¹ /1 ³	0/0	0/0	0/0	0/0	0/0	0/0

TABLE 3 CONTINUED - Updated Average Usual Use Levels/Average Maximum Use Levels

Average Usual Use Levels (ppm)/Average Maximum Use Levels (ppm) for flavoring substances previously recognized as FEMA GRAS

^a represents a change from previous FEMA GRAS publications

	<i>m</i> -Cresol	4-Propyl-2-methoxyphenol	2-Ethyl-4-hydroxy-5-methyl-3(2H)-furanone	4,5-Dimethyl-3-hydroxy-2,5-dihydrofuran-2-one	Mono-menthyl succinate	Sodium diacetate	(+/-)-2-Methyl-1-butanol	Grape seed extract	1,6-Hexa lactam	2-Acetyl-1-pyrroline
FEMA NO.	3530	3598	3623	3634	3810	3900	3998	4045	4235	4249
GRAS PUBLICATION	11	12	12	25	22	25	20	21	22	22
CATEGORY										
BAKED GOODS	0.5/1	0.015/0.15	1/2	10/20	300/900	40 ^a /1000 ^a	2/9	0/0	5 ^a /20 ^a	0.01 ^a /0.1 ^a
BEVERAGES, NON-ALCOHOLIC	0/0	0.005/1.5	1/2	0/0	50/150	40 ^a /500 ^a	0.1/2	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
BEVERAGES, ALCOHOLIC	0.3 ^a /1 ^a	0.02 ^a /1 ^a	0.4 ^a /2 ^a	0.01 ^a /5 ^a	50/150	0/0	400 ^a /1100 ^a	1242 ^a /2000 ^a	5 ^a /20 ^a	0.001 ^a /0.01 ^a
BREAKFAST CEREALS	0.5 ^a /5 ^a	0/0	0/0	0/0	0/0	40 ^a /1000 ^a	0/0	0/0	5 ^a /20 ^a	0.01 ^a /0.1 ^a
CHEESES	0.1 ^a /0.5 ^a	0/0	0/0	0/0	0/0	100 ^a /2000 ^a	0/0	100/200	5 ^a /20 ^a	0.002 ^a /0.02 ^a
CHEWING GUM	0.1 ^a /0.5 ^a	0.1/15	10/20	1/5	1250/4000	100 ^a /2000 ^a	2/15	0/0	50 ^a /200 ^a	0/0
CONDIMENTS AND RELISHES	0.1 ^a /0.5 ^a	0/0	0/0	2.5/10	0/0	40 ^a /1000 ^a	0/0	100/200	5 ^a /20 ^a	0.01 ^a /0.2 ^a
CONFECTIONS AND FROSTINGS	0.1 ^a /0.5 ^a	0.01/1.5	0.25/0.5	0/0	200/600	40 ^a /500 ^a	0.3/2	0/0	10 ^a /40 ^a	0.01 ^a /0.1 ^a
EGG PRODUCTS	0.1 ^a /0.5 ^a	0/0	0/0	0/0	0/0	100 ^a /1000 ^a	0.3/2	0/0	5 ^a /20 ^a	0.005 ^a /0.05 ^a
FATS AND OILS	0.1 ^a /0.5 ^a	0/0	0/0	0.1/10	0/0	100 ^a /1000 ^a	0.5/15	0/0	5 ^a /20 ^a	0.002 ^a /0.1 ^a
FISH PRODUCTS	0.5 ^a /5 ^a	0/0	0/0	2/10	0/0	100 ^a /1000 ^a	0/0	0/0	5 ^a /20 ^a	0.005 ^a /0.1 ^a
FROZEN DAIRY	0.1 ^a /0.5 ^a	0/0	0/0	0/0	70/210	0/0	1.5/8	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
FRUIT ICES	0.1 ^a /0.5 ^a	0.007/0.07	0/0	0/0	70/210	0/0	0.8/5	0/0	5 ^a /20 ^a	0 ^a /0 ^a
GELATINS AND PUDDINGS	0.1 ^a /0.5 ^a	0.01/0.1	1.5/3	0/0	150/450	0/0	0.2/2	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
GRANULATED SUGAR	0.1 ^a /0.5 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
GRAVIES	0.3/0.5	0.5/1	0.5/1	2/10	0/0	100 ^a /1000 ^a	0.3/2.5	0/0	5 ^a /20 ^a	0.005 ^a /0.1 ^a
HARD CANDY	0.1 ^a /0.5 ^a	0.025/0.25	1/2	0/0	300/1000	40 ^a /1000 ^a	0.3/3	0/0	10 ^a /40 ^a	0.004 ^a /0.04 ^a
IMITATION DAIRY	0.1 ^a /0.5 ^a	0/0	0.25/1	0/0	0/0	0/0	0/0	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
INSTANT COFFEE AND TEA	0.3/0.5	0/0	0/0	0/0	0/0	0/0	0.1/1	100/200	5 ^a /20 ^a	0.01 ^a /0.1 ^a
JAMS AND JELLIES	0.1 ^a /0.5 ^a	0.01/1.5	0/0	0/0	150/450	0/0	0.4/4	0/0	10 ^a /40 ^a	0/0
MEAT PRODUCTS	0.3/1 ^a	0/0	0.5/1	2/10	0/0	1500/2500	0/0	0/0	0.2/1.0	0.005 ^a /0.1 ^a
MILK PRODUCTS	0.1 ^a /0.5 ^a	0/0	0.25/0.5	0/0	60/180	0/0	0.1/1	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
NUT PRODUCTS	0.3/0.5	0/0	0/0	0/0	0/0	15000/30000	0/0	0/0	5 ^a /20 ^a	0.002 ^a /0.02 ^a
OTHER GRAINS	0.5 ^a /5 ^a	0/0	0/0	0/0	0/0	0/0	0/0	0/0	5 ^a /20 ^a	0.001 ^a /0.01 ^a
POULTRY	0.5 ^a /5 ^a	0/0	0/0	2/10	0/0	1500/2500	0/0	0/0	5 ^a /20 ^a	0.01 ^a /0.1 ^a
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0.4/2	0 ^a /0 ^a
PROCESSED VEGETABLES	0/0	0/0	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	0/0	0.2/0.5	0/0	0/0	0/0	50 ^a /500 ^a	0/0	0/0	5 ^a /20 ^a	0/0
SEASONINGS AND FLAVORS	1 ^a /10 ^a	0/0	0/0	0.1/20	0/0	15000/30000	0.3/2.5	100/200	5 ^a /20 ^a	0.005 ^a /0.1 ^a
SNACK FOODS	0.3/0.5	1/1.5	0/0	0/0	300 ^a /1000 ^a	15000/30000	0.4/4	0/0	5 ^a /20 ^a	0.005 ^a /0.1 ^a
SOFT CANDY	0/0	0.01/0.1	0/0	0/0	200/600	40 ^a /2000 ^a	0.4/4	0/0	10 ^a /40 ^a	0.002 ^a /0.02 ^a
SOUPS	0.3/0.5	0.5/1	0/0	2/10	0/0	100 ^a /1000 ^a	0.2/2	100/200	5 ^a /20 ^a	0.001 ^a /0.01 ^a
SUGAR SUBSTITUTES	0.1 ^a /0.5 ^a	0/0	0/0	0/0	0/0	0/0	0/0	100/200	0/0	0/0
SWEET SAUCES	0.1 ^a /0.5 ^a	0/0	0/0	2.5/10	0/0	0/0	0/0	0/0	5 ^a /20 ^a	0/0

	Ammonia (also includes ammonium chloride)	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	3-[(4-Amino-2,2-dioxido-1H-2,1,3-benzotriazin-5-yl)oxy]-2-dimethyl-N-propylpropanamide	GlutamyL-valyl-glycine	N-[N-(3-(3-Hydroxy-4-methoxyphenyl)propyl)-L-methoxyphenyl]-L-phenylalanine 1-methyl ester, monohydrate	(E)-3-benzo[1,3]dioxol-5-yl-N,N-diphenyl-2-propenamide	Glucosylated <i>Rubus suavis</i> extract, 20-30% glucosylated rubusoside glucosides	Erythritol	(E)-3-(3,4-Dimethoxyphenyl)-N-[2-(4-methoxyphenyl)ethyl]-acrylamide
FEMA NO.	4494	4669	4701	4709	4716	4788	4800	4819	4877
GRAS PUBLICATION	24	26	28	27	25	27	28	28	28
CATEGORY									
BAKED GOODS	282*/423*	5/10	10/22	15/30	20*/20*	0*/0*	150*/400*	0/0	0/0
BEVERAGES, NON-ALCOHOLIC	150*/225*	7.5/15	5*/22*	20/50	1.35/1.5	0.02/0.2	150/350	5000/12500	0/0
BEVERAGES, ALCOHOLIC	200*/300*	7.5/15	5/22	20*/50*	3*/3*	0.04/2	75/200	5000*/12500*	0/0
BREAKFAST CEREALS	0/0	10/20	10*/22	80/160	0/0	0*/0*	150/400	12500*/17500*	15/30
CHEESES	0/0	0/0	0/0	20/50	0/0	0/0	0/0	0/0	20/50
CHEWING GUM	0/0	10/50	30/300	10/30	40/50	150*/500*	400/1000	0/0	0/0
CONDIMENTS AND RELISHES	420*/630*	10*/20*	5*/22	30/60	3*/3*	0/0	300*/400*	0/0	25/50
CONFECTIONS AND FROSTINGS	500/1500	10/25	10/22	0/0	3.75*/3.75*	10*/150*	150/300	0/0	0/0
EGG PRODUCTS	1000/3000	0/0	0/0	15/45	0/0	0*/0*	0/0	0/0	0/0
FATS AND OILS	200*/300*	0/0	0/0	30/60	3*/3*	0*/0*	0/0	0/0	20/50
FISH PRODUCTS	1000/3000	0/0	5*/22	15/45	0/0	0/0	0/0	0/0	15/50
FROZEN DAIRY	0/0	7.5/15	5/22	20/50	0.9/1	0*/0*	200/300	12500*/17500*	0/0
FRUIT ICES	0/0	7.5/15	5/22	20/50	0/0	0*/0*	100/300	5000/12500	0/0
GELATINS AND PUDDINGS	0/0	5/10	5/22	0/0	3.75*/3.75*	0*/0*	150/300	0/0	0/0
GRANULATED SUGAR	0/0	0/0	0/0	0/0	0/0	0*/0*	0/0	0/0	0/0
GRAVIES	420*/630*	0/0	0/0	30/60	0/0	0/0	100/150	0/0	20/50
HARD CANDY	1000/3000	10/25	15/75	0/0	0/0	40*/400*	400/1000	0/0	0/0
IMITATION DAIRY	0/0	7.5/15	5/22	20/50	0.75*/0.75*	0*/0*	0/0	12500*/17500*	20*/25*
INSTANT COFFEE AND TEA	0/0	7.5/15	5/22	10/30	0/0	0*/0*	150/350	5000/12500	0/0
JAMS AND JELLIES	0/0	10/25	10/22	0/0	0/0	0*/0*	150/300	0/0	0/0
MEAT PRODUCTS	1000/3000	0/0	5*/22	15/45	0/0	0/0	100/150	0/0	20/50
MILK PRODUCTS	1000/3000	7.5/15	5*/22	15/45	0.9/1	0*/0*	200/300	12500*/17500*	20*/25*
NUT PRODUCTS	420*/630*	0/0	0/0	0/0	0/0	0/0	200*/400*	12500*/17500*	0/0
OTHER GRAINS	420*/630*	0/0	0/0	0/0	0/0	0/0	200*/400*	12500*/17500*	0/0
POULTRY	420*/630*	0/0	5*/22	15/45	0/0	0/0	0/0	0/0	15/50
PROCESSED FRUITS	0/0	0/0	0/0	0/0	0/0	0*/0*	0/0	5000/12500	0/0
PROCESSED VEGETABLES	325*/488*	0/0	0/0	15/45	0/0	0/0	0/0	0/0	0/0
RECONSTITUTED VEGETABLE PROTEIN	400*/630*	0/0	0/0	15/45	0/0	0/0	0/0	0/0	20/50
SEASONINGS AND FLAVORS	1000/3000	5/15	10/22	80/160	0/0	0/0	100/150	0/0	50/80
SNACK FOODS	420*/630*	5/15	0/0	80/160	0/0	0/0	0/0	0/0	50/80
SOFT CANDY	0/0	10/25	15/75	0/0	3.75*/3.75*	20*/200*	400/1000	0/0	0/0
SOUPS	420*/630*	0/0	0/0	20/50	0/0	0*/0*	100/150	0/0	20/50
SUGAR SUBSTITUTES	0/0	300/600	0/0	80/160	0/0	0*/0*	0/0	0/0	0/0
SWEET SAUCES	0/0	10/25	10/22	30/60	0/0	0/0	0/0	0/0	0/0