

Common name	Scientific name	Limitations
Walnut husks (hulls), leaves, and green nuts	<i>Juglans nigra</i> L. or <i>J. regia</i> L.	In alcoholic beverages only
Woodruff, sweet .....	<i>Asperula odorata</i> L .....	
Yarrow .....	<i>Achillea millefolium</i> L .....	In beverages only; finished beverage thujone free <sup>1</sup>
Yerba santa .....	<i>Eriodictyon californicum</i> (Hook, et Arn.) Torr.	
Yucca, Joshua-tree .....	<i>Yucca brevifolia</i> Engelm.	
Yucca, Mohave .....	<i>Yucca schidigera</i> Roez. ex Ortgies ( <i>Y. mohavensis</i> Sarg.).	

<sup>1</sup>As determined by using the method (or, in other than alcoholic beverages, a suitable adaptation thereof) in section 9.129 of the "Official Methods of Analysis of the Association of Official Analytical Chemists," 13th Ed. (1980), which is incorporated by reference. Copies may be obtained from the Association of Official Analytical Chemists International, 481 North Frederic Ave., suite 500, Gaithersburg, MD 20877-2504, or may be examined at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC 20408

[42 FR 14491, Mar. 15, 1977, as amended at 43 FR 14644, Apr. 7, 1978; 49 FR 10104, Mar. 19, 1984; 54 FR 24897, June 12, 1989]

**§ 172.515 Synthetic flavoring substances and adjuvants.**

Synthetic flavoring substances and adjuvants may be safely used in food in accordance with the following conditions.

(a) They are used in the minimum quantity required to produce their intended effect, and otherwise in accordance with all the principles of good manufacturing practice.

(b) They consist of one or more of the following, used alone or in combination with flavoring substances and adjuvants generally recognized as safe in food, prior-sanctioned for such use, or regulated by an appropriate section in this part.

- Acetal; acetaldehyde diethyl acetal.
- Acetaldehyde phenethyl propyl acetal.
- Acetanisole; 4'-methoxyacetophenone.
- Acetophenone; methyl phenyl ketone.
- Allyl anthranilate.
- Allyl butyrate.
- Allyl cinnamate.
- Allyl cyclohexaneacetate.
- Allyl cyclohexanebutyrate.
- Allyl cyclohexanehexanoate.
- Allyl cyclohexanepropionate.
- Allyl cyclohexanevalerate.
- Allyl disulfide.
- Allyl 2-ethylbutyrate.
- Allyl hexanoate; allyl caproate.
- Allyl  $\alpha$ -ionone; 1-(2,6,6-trimethyl-2-cyclohexene-1-yl)-1,6-heptadiene-3-one.
- Allyl isothiocyanate; mustard oil.
- Allyl isovalerate.
- Allyl mercaptan; 2-propene-1-thiol.
- Allyl nonanoate.
- Allyl octanoate.
- Allyl phenoxyacetate.
- Allyl phenylacetate.
- Allyl propionate.
- Allyl sorbate; allyl 2,4-hexadienoate.

- Allyl sulfide.
- Allyl tiglate; allyl *trans*-2-methyl-2-butenolate.
- Allyl 10-undecenoate.
- Ammonium isovalerate.
- Ammonium sulfide.
- Amyl alcohol; pentyl alcohol.
- Amyl butyrate.
- $\alpha$ -Amylcinnamaldehyde.
- $\alpha$ -Amylcinnamaldehyde dimethyl acetal.
- $\alpha$ -Amylcinnamyl acetate.
- $\alpha$ -Amylcinnamyl alcohol.
- $\alpha$ -Amylcinnamyl formate.
- $\alpha$ -Amylcinnamyl isovalerate.
- Amyl formate.
- Amyl heptanoate.
- Amyl hexanoate.
- Amyl octanoate.
- Anisole; methoxybenzene.
- Anisyl acetate.
- Anisyl alcohol; *p*-methoxybenzyl alcohol.
- Anisyl butyrate
- Anisyl formate.
- Anisyl phenylacetate.
- Anisyl propionate.
- Beechwood creosote.
- Benzaldehyde dimethyl acetal.
- Benzaldehyde glyceryl acetal; 2-phenyl-*m*-dioxan-5-ol.
- Benzaldehyde propylene glycol acetal; 4-methyl-2-phenyl-*m*-dioxolane.
- Benzenethiol; thiophenol.
- Benzoin; 2-hydroxy-2-phenylacetophenone.
- Benzophenone; diphenylketone.
- Benzyl acetate.
- Benzyl acetoacetate.
- Benzyl alcohol.
- Benzyl benzoate.
- Benzyl butyl ether.
- Benzyl butyrate.
- Benzyl cinnamate.
- Benzyl 2,3-dimethylcrotonate; benzyl methyl tiglate.
- Benzyl disulfide; dibenzyl disulfide.
- Benzyl ethyl ether.
- Benzyl formate.

3-Benzyl-4-heptanone; benzyl dipropyl ketone.  
 Benzyl isobutyrate.  
 Benzyl isovalerate.  
 Benzyl mercaptan;  $\alpha$ -toluenethiol.  
 Benzyl methoxyethyl acetal; acetaldehyde benzyl  $\beta$ -methoxyethyl acetal.  
 Benzyl phenylacetate.  
 Benzyl propionate.  
 Benzyl salicylate.  
 Birch tar oil.  
 Borneol; *d*-camphanol.  
 Bornyl acetate.  
 Bornyl formate.  
 Bornyl isovalerate.  
 Bornyl valerate.  
 $\beta$ -Bourbonene; 1,2,3,3a,3b $\beta$ ,4,5,6,6a $\beta$ ,6b $\alpha$ -decahydro- $1\alpha$ -isopropyl-3a $_a$ -methyl-6-methylene-cyclobuta [1,2:3,4] dicyclopentene.  
 2-Butanol.  
 2-Butanone; methyl ethyl ketone.  
 Butter acids.  
 Butter esters.  
 Butyl acetate.  
 Butyl acetoacetate.  
 Butyl alcohol; 1-butanol.  
 Butyl anthranilate.  
 Butyl butyrate.  
 Butyl butyryllactate; lactic acid, butyl ester, butyrate.  
 $\alpha$ -Butylcinnamaldehyde.  
 Butyl cinnamate.  
 Butyl 2-decenoate.  
 Butyl ethyl malonate.  
 Butyl formate.  
 Butyl heptanoate.  
 Butyl hexanoate.  
 Butyl *p*-hydroxybenzoate.  
 Butyl isobutyrate.  
 Butyl isovalerate.  
 Butyl lactate.  
 Butyl laurate.  
 Butyl levulinate.  
 Butyl phenylacetate.  
 Butyl propionate.  
 Butyl stearate.  
 Butyl sulfide.  
 Butyl 10-undecenoate.  
 Butyl valerate.  
 Butyraldehyde.  
 Cadinene.  
 Camphene; 2,2-dimethyl-3-methylene-norbornane.  
*d*-Camphor.  
 Carvacrol; 2-*p*-cymenol.  
 Carvacryl ethyl ether; 2-ethoxy-*p*-cymene.  
 Carveol; *p*-mentha-6,8-dien-2-ol.  
 4-Carvomenthenol; 1-*p*-menthen-4-ol; 4-terpinenol.  
*cis* Carvone oxide; 1,6-epoxy-*p*-menth-8-en-2-one.  
 Carvyl acetate.  
 Carvyl propionate.  
 $\beta$ -Caryophyllene.  
 Caryophyllene alcohol.  
 Caryophyllene alcohol acetate.  
 $\beta$ -Caryophyllene oxide; 4-12,12-trimethyl-9-methylene-5-oxatricyclo [8.2.0.0<sup>4,6</sup>] dodecane.  
 Cedarwood oil alcohols.  
 Cedarwood oil terpenes.  
 1,4-Cineole.  
 Cinnamaldehyde ethylene glycol acetal.  
 Cinnamic acid.  
 Cinnamyl acetate.  
 Cinnamyl alcohol; 3-phenyl-2-propen-1-ol.  
 Cinnamyl benzoate.  
 Cinnamyl butyrate.  
 Cinnamyl cinnamate.  
 Cinnamyl formate.  
 Cinnamyl isobutyrate.  
 Cinnamyl isovalerate.  
 Cinnamyl phenylacetate.  
 Cinnamyl propionate.  
 Citral diethyl acetal; 3,7-dimethyl-2,6-octadienal diethyl acetal.  
 Citral dimethyl acetal; 3,7-dimethyl-2,6-octadienal dimethyl acetal.  
 Citral propylene glycol acetal.  
 Citronellal; 3,7-dimethyl-6-octenal; rhodinal.  
 Citronellol; 3,7-dimethyl-6-octen-1-ol; *d*-citronellol.  
 Citronelloxyacetaldehyde.  
 Citronellyl acetate.  
 Citronellyl butyrate.  
 Citronellyl formate.  
 Citronellyl isobutyrate.  
 Citronellyl phenylacetate.  
 Citronellyl propionate.  
 Citronellyl valerate.  
*p*-Cresol.  
 Cuminaldehyde; cuminal; *p*-isopropyl benzaldehyde.  
 Cyclohexaneacetic acid.  
 Cyclohexaneethyl acetate.  
 Cyclohexyl acetate.  
 Cyclohexyl anthranilate.  
 Cyclohexyl butyrate.  
 Cyclohexyl cinnamate.  
 Cyclohexyl formate.  
 Cyclohexyl isovalerate.  
 Cyclohexyl propionate.  
*p*-Cymene.  
 $\gamma$ -Decalactone; 4-hydroxy-decanoic acid,  $\gamma$ -lactone.  
 $\gamma$ -Decalactone; 5-hydroxy-decanoic acid,  $\delta$ -lactone.  
 Decanal dimethyl acetal.  
 1-Decanol; decylic alcohol.  
 2-Decenal.  
 3-Decen-2-one; heptylidene acetone.  
 Decyl acetate.  
 Decyl butyrate.  
 Decyl propionate.  
 Dibenzyl ether.  
 4,4-Dibutyl- $\gamma$ -butyrolactone; 4,4-dibutyl-4-hydroxy-butyric acid,  $\gamma$ -lactone.  
 Dibutyl sebacate.  
 Diethyl malate.  
 Diethyl malonate; ethyl malonate.  
 Diethyl sebacate.  
 Diethyl succinate.  
 Diethyl tartrate.

2,5-Diethyltetrahydrofuran.  
 Dihydrocarveol; 8-*p*-menthen-2-ol; 6-methyl-3-isopropenylcyclohexanol.  
 Dihydrocarvone.  
 Dihydrocarvyl acetate.  
*m*-Dimethoxybenzene.  
*p*-Dimethoxybenzene; dimethyl hydroquinone.  
 2,4-Dimethylacetophenone.  
 $\alpha,\alpha$ -Dimethylbenzyl isobutyrate; phenyldimethylcarbinyl isobutyrate.  
 2,6-Dimethyl-5-heptenal.  
 2,6-Dimethyl octanal; isodecylaldehyde.  
 3,7-Dimethyl-1-octanol; tetrahydrogeraniol.  
 $\alpha,\alpha$ -Dimethylphenethyl acetate; benzylpropyl acetate; benzylidimethylcarbinyl acetate.  
 $\alpha,\alpha$ -Dimethylphenethyl alcohol; dimethylbenzyl carbinol.  
 $\alpha,\alpha$ -Dimethylphenethyl butyrate; benzylidimethylcarbinyl butyrate.  
 $\alpha,\alpha$ -Dimethylphenethyl formate; benzylidimethylcarbinyl formate.  
 Dimethyl succinate.  
 1,3-Diphenyl-2-propanone; dibenzyl ketone.  
 delta-Dodecalactone; 5-hydroxydodecanoic acid, daltalactone.  
 $\gamma$ -Dodecalactone; 4-hydroxydodecanoic acid  $\gamma$ -lactone.  
 2-Dodecenal.  
 Estragole.  
*p*-Ethoxybenzaldehyde.  
 Ethyl acetoacetate.  
 Ethyl 2-acetyl-3-phenylpropionate; ethylbenzyl acetoacetate.  
 Ethyl aconitate, mixed esters.  
 Ethyl acrylate.  
 Ethyl *p*-anisate.  
 Ethyl anthranilate.  
 Ethyl benzoate.  
 Ethyl benzoylacetate.  
 $\alpha$ -Ethylbenzyl butyrate;  $\alpha$ -phenylpropyl butyrate.  
 Ethyl brassylate; tridecanedioic acid cyclic ethylene glycol diester; cyclo 1,13-ethylenedioxytridecan-1,13-dione.  
 2-Ethylbutyl acetate.  
 2-Ethylbutylaldehyde.  
 2-Ethylbutyric acid.  
 Ethyl cinnamate.  
 Ethyl crotonate; *trans*-2-butenic acid ethylester.  
 Ethyl cyclohexanepropionate.  
 Ethyl decanoate.  
 2-Ethylfuran.  
 Ethyl 2-furanpropionate.  
 4-Ethylguaiaicol; 4-ethyl-2-methoxyphenol.  
 Ethyl heptanoate.  
 2-Ethyl-2-heptenal; 2-ethyl-3-butylacrolein.  
 Ethyl hexanoate.  
 Ethyl isobutyrate.  
 Ethyl isovalerate.  
 Ethyl lactate.  
 Ethyl laurate.  
 Ethyl levulinate.  
 Ethyl maltol; 2-ethyl-3-hydroxy-4H-pyran-4-one.  
 Ethyl 2-methylbutyrate.  
 Ethyl myristate.  
 Ethyl nitrite.  
 Ethyl nonanoate.  
 Ethyl 2-nonynoate; ethyl octyne carbonate.  
 Ethyl octanoate.  
 Ethyl oleate.  
 Ethyl phenylacetate.  
 Ethyl 4-phenylbutyrate.  
 Ethyl 3-phenylglycidate.  
 Ethyl 3-phenylpropionate; ethyl hydrocinnamate.  
 Ethyl propionate.  
 Ethyl pyruvate.  
 Ethyl salicylate.  
 Ethyl sorbate; ethyl 2,4-hexadienoate.  
 Ethyl tiglate; ethyl *trans*-2-methyl-2-butenate.  
 Ethyl undecanoate.  
 Ethyl 10-undecenoate.  
 Ethyl valerate.  
 Eucalyptol; 1,8-epoxy-*p*-menthane; cineole.  
 Eugenyl acetate.  
 Eugenyl benzoate.  
 Eugenyl formate.  
 Eugenyl methyl ether; 4-allylveratrole; methyl eugenol.  
 Farnesol; 3,7,11-trimethyl-2,6,10-dodecatrien-1-ol.  
*d*-Fenchone; *d*-1,3,3-trimethyl-2-norbornanone.  
 Fenchyl alcohol; 1,3,3-trimethyl-2-norbornanol.  
 Formic acid  
 (2-Furyl)-2-propanone; furyl acetone.  
 1-Furyl-2-propanone; furyl acetone.  
 Fusel oil, refined (mixed amyl alcohols).  
 Geranyl acetoacetate; *trans*-3,7-dimethyl-2,6-octadien-1-yl acetoacetate.  
 Geranyl acetone; 6,10-dimethyl-5,9-undecadien-2-one.  
 Geranyl benzoate.  
 Geranyl butyrate.  
 Geranyl formate.  
 Geranyl hexanoate  
 Geranyl isobutyrate.  
 Geranyl isovalerate.  
 Geranyl phenylacetate.  
 Geranyl propionate.  
 Glucose pentaacetate.  
 Guaiacol;  $\mu$ -methoxyphenol.  
 Guaiacyl acetate;  $\mu$ -methoxyphenyl acetate.  
 Guaiacyl phenylacetate.  
 Guaiene; 1,4-dimethyl-7-isopropenyl- $\Delta^9,10$ -octahydroazulene.  
 Guaiol acetate; 1,4-dimethyl-7-( $\alpha$ -hydroxyisopropyl)- $\Delta^9,10$ -octahydroazulene acetate.  
 $\gamma$ -Heptalactone; 4-hydroxyheptanoic acid,  $\gamma$ -lactone.  
 Heptanal; enanthaldehyde.  
 Heptanal dimethyl acetal.  
 Heptanal 1,2-glyceryl acetal.  
 2,3-Heptanedione; acetyl valeryl.  
 3-Heptanol.  
 2-Heptanone; methyl amyl ketone.  
 3-Heptanone; ethyl butyl ketone.  
 4-Heptanone; dipropyl ketone.

*cis*-4-Heptenal; *cis*-4-hepten-1-ol.  
 Heptyl acetate.  
 Heptyl alcohol; enanthic alcohol.  
 Heptyl butyrate.  
 Heptyl cinnamate.  
 Heptyl formate.  
 Heptyl isobutyrate.  
 Heptyl octanoate.  
 1-Hexadecanol; cetyl alcohol.  
 $\omega$ -6-Hexadecenlactone; 16-hydroxy-6-  
   hexadecenoic acid,  $\omega$ -lactone;  
   ambrettolide.  
 $\gamma$ -Hexalactone; 4-hydroxyhexanoic acid,  $\gamma$ -lac-  
   tone; tonkalide.  
 Hexanal; caproic aldehyde.  
 2,3-Hexanedione; acetyl butyryl.  
 Hexanoic acid; caproic acid.  
 2-Hexenal.  
 2-Hexen-1-ol.  
 3-Hexen-1-ol; leaf alcohol.  
 2-Hexen-1-yl acetate.  
 3-Hexenyl isovalerate.  
 3-Hexenyl 2-methylbutyrate.  
 3-Hexenyl phenylacetate; *cis*-3-hexenyl phen-  
   ylacetate.  
 Hexyl acetate.  
 2-Hexyl-4-acetoxytetrahydrofuran.  
 Hexyl alcohol.  
 Hexyl butyrate.  
 $\alpha$ -Hexylcinnamaldehyde.  
 Hexyl formate.  
 Hexyl hexanoate.  
 2-Hexylidene cyclopentanone.  
 Hexyl isovalerate.  
 Hexyl 2-methylbutyrate.  
 Hexyl octanoate.  
 Hexyl phenylacetate; *n*-hexyl phenylacetate.  
 Hexyl propionate.  
 Hydroxycitronellal; 3,7-dimethyl-7-hydroxy-  
   octanal.  
 Hydroxycitronellal diethyl acetal.  
 Hydroxycitronellal dimethyl acetal.  
 Hydroxycitronellal; 3,7-dimethyl-1,7-  
   octanediol.  
*N*-(4-Hydroxy-3-methoxybenzyl)-nonanamide;  
   pelargonyl vanillylamide.  
 5-Hydroxy-4-octanone; butyrolin.  
 4-(*p*-Hydroxyphenyl)-2-butanone; *p*-hydroxy-  
   benzyl acetone.  
 Indole.  
 $\alpha$ -Ionone; 4-(2,6,6-trimethyl-2-cyclohexen-1-  
   yl)-3-buten-2-one.  
 $\beta$ -Ionone; 4-(2,6,6-trimethyl-1-cyclohexen-1-  
   yl)-3-buten-2-one.  
 $\alpha$ -Irone; 4-(2,5,6,6-tetramethyl-2-cyclohexen-  
   1-yl)-3-buten-2-one; 6-methylionone.  
 Isoamyl acetate.  
 Isoamyl acetoacetate.  
 Isoamyl alcohol; isopentyl alcohol; 3-methyl-  
   1-butanol.  
 Isoamyl benzoate.  
 Isoamyl butyrate.  
 Isoamyl cinnamate.  
 Isoamyl formate.  
 Isoamyl 2-furanbutyrate;  $\alpha$ -isoamyl furfuryl-  
   propionate.  
 Isoamyl 2-furanpropionate;  $\alpha$ -isoamyl fur-  
   furylacetate.  
 Isoamyl hexanoate.  
 Isoamyl isobutyrate.  
 Isoamyl isovalerate.  
 Isoamyl laurate.  
 Isoamyl 2-methylbutyrate; isopentyl-2-  
   methylbutyrate.  
 Isoamyl nonanoate.  
 Isoamyl octanoate.  
 Isoamyl phenylacetate.  
 Isoamyl propionate.  
 Isoamyl pyruvate.  
 Isoamyl salicylate.  
 Isoborneol.  
 Isobornyl acetate.  
 Isobornyl formate.  
 Isobornyl isovalerate.  
 Isobornyl propionate.  
 Isobutyl acetate.  
 Isobutyl acetoacetate.  
 Isobutyl alcohol.  
 Isobutyl angelate; isobutyl *cis*-2-methyl-2-  
   butenoate.  
 Isobutyl anthranilate.  
 Isobutyl benzoate.  
 Isobutyl butyrate.  
 Isobutyl cinnamate.  
 Isobutyl formate.  
 Isobutyl 2-furanpropionate.  
 Isobutyl heptanoate.  
 Isobutyl hexanoate.  
 Isobutyl isobutyrate.  
 $\alpha$ -Isobutylphenethyl alcohol; isobutyl benzyl  
   carbinol; 4-methyl-1-phenyl-2-pentanol.  
 Isobutyl phenylacetate.  
 Isobutyl propionate.  
 Isobutyl salicylate.  
 2-Isobutylthiazole.  
 Isobutyraldehyde.  
 Isobutyric acid.  
 Isoeugenol; 2-methoxy-4-propenylphenol.  
 Isoeugenyl acetate.  
 Isoeugenyl benzyl ether; benzyl isoeugenol.  
 Isoeugenyl ethyl ether; 2-ethoxy-5-propenyl-  
   anisole; ethyl isoeugenol.  
 Isoeugenyl formate.  
 Isoeugenyl methyl ether; 4-propenyl-  
   veratrole; methyl isoeugenol.  
 Isoeugenyl phenylacetate.  
 Isojasnone; mixture of 2-hexylidenecyclo-  
   pentanone and 2-hexyl-2-cyclopenten-1-one.  
 $\alpha$ -Isomethylionone; 4-(2,6,6-trimethyl-2-  
   cyclohexen-1-yl)-3-methyl-3-buten-2-one;  
   methyl  $\gamma$ -ionone.  
 Isopropyl acetate.  
 $p$ -Isopropylacetophenone.  
 Isopropyl alcohol; isopropanol.  
 Isopropyl benzoate.  
 $p$ -Isopropylbenzyl alcohol; cuminic alcohol;  

-cymen-7-ol.  
 Isopropyl butyrate.  
 Isopropyl cinnamate.  
 Isopropyl formate.  
 Isopropyl hexanoate.  
 Isopropyl isobutyrate.  
 Isopropyl isovalerate.

- p*-Isopropylphenylacetaldehyde; *p*-cymen-7-carboxaldehyde.  
 Isopropyl phenylacetate.  
 3-(*p*-Isopropylphenyl)-propionaldehyde; *p*-isopropylhydrocinnamaldehyde; cuminylyl acetaldehyde.  
 Isopropyl propionate.  
 Isopulegol; *p*-menth-8-en-3-ol.  
 Isopulegone; *p*-menth-8-en-3-one.  
 Isopulegyl acetate.  
 Isoquinoline.  
 Isovaleric acid.  
*cis*-Jasmone; 3-methyl-2-(2-pentenyl)-2-cyclopenten-1-one.  
 Lauric aldehyde; dodecanal.  
 Lauryl acetate.  
 Lauryl alcohol; 1-dodecanol.  
 Lepidine; 4-methylquinoline.  
 Levulinic acid.  
 Linalool oxide; *cis*- and *trans*-2-vinyl-2-methyl-5-(1'-hydroxy-1'-methylethyl) tetrahydrofuran.  
 Linalyl anthranilate; 3,7-dimethyl-1,6-octadien-3-yl anthranilate.  
 Linalyl benzoate.  
 Linalyl butyrate.  
 Linalyl cinnamate.  
 Linalyl formate.  
 Linalyl hexanoate.  
 Linalyl isobutyrate.  
 Linalyl isovalerate.  
 Linalyl octanoate.  
 Linalyl propionate.  
 Maltol; 3-hydroxy-2-methyl-4H-pyran-4-one.  
 Menthadienol; *p*-mentha-1,8(10)-dien-9-ol.  
*p*-Mentha-1,8-dien-7-ol; perillyl alcohol.  
 Menthadienyl acetate; *p*-mentha-1,8(10)-dien-9-yl acetate.  
*p*-Menth-3-en-1-ol.  
 1-*p*-Menthen-9-yl acetate; *p*-menth-1-en-9-yl acetate.  
 Menthol; 2-isopropyl-5-methylcyclohexanol.  
 Menthone; *p*-menthan-3-one.  
 Menthyl acetate; *p*-menth-3-yl acetate.  
 Menthyl isovalerate; *p*-menth-3-yl isovalerate.  
*o*-Methoxybenzaldehyde.  
*p*-Methoxybenzaldehyde; *p*-anisaldehyde.  
*o*-Methoxycinnamaldehyde.  
 2-Methoxy-4-methylphenol; 4-methylguaiaicol; 2-methoxy-*p*-cresol.  
 4-(*p*-Methoxyphenyl)-2-butanone; anisyl acetone.  
 1-(4-Methoxyphenyl)-4-methyl-1-penten-3-one; methoxystyryl isopropyl ketone.  
 1-(*p*-Methoxyphenyl)-1-penten-3-one;  $\alpha$ -methylanisylidene acetone; ethone.  
 1-(*p*-Methoxyphenyl)-2-propanone; anisylmethyl ketone; anisic ketone.  
 2-Methoxy-4-vinylphenol; *p*-vinylguaiaicol.  
 Methyl acetate.  
 4'-Methylacetophenone; *p*-methylacetophenone; methyl *p*-tolyl ketone.  
 2-Methylallyl butyrate; 2-methyl-2-propenyl butyrate.  
 Methyl anisate.  
*o*-Methylanisole; *o*-cresyl methyl ether.
- p*-Methylanisole; *p*-cresyl methyl ether; *p*-methoxytoluene.  
 Methyl benzoate.  
 Methylbenzyl acetate, mixed *o*-,*m*-,*p*-.  
 $\alpha$ -Methylbenzyl acetate; styralyl acetate.  
 $\alpha$ -Methylbenzyl alcohol; styralyl alcohol.  
 $\alpha$ -Methylbenzyl butyrate; styralyl butyrate.  
 $\alpha$ -Methylbenzyl isobutyrate; styralyl isobutyrate.  
 $\alpha$ -Methylbenzyl formate; styralyl formate.  
 $\alpha$ -Methylbenzyl propionate; styralyl propionate.  
 2-Methyl-3-buten-2-ol.  
 2-Methylbutyl isovalerate.  
 Methyl *p*-*tert*-butylphenylacetate.  
 2-Methylbutyraldehyde; methyl ethyl acetaldehyde.  
 3-Methylbutyraldehyde; isovaleraldehyde.  
 Methyl butyrate.  
 2-Methylbutyric acid.  
 $\alpha$ -Methylcinnamaldehyde.  
*p*-Methylcinnamaldehyde.  
 Methyl cinnamate.  
 2-Methyl-1,3-cyclohexadiene.  
 Methylcyclopentenolone; 3-methylcyclopentane-1,2-dione.  
 Methyl disulfide; dimethyl disulfide.  
 Methyl ester of rosin, partially hydrogenated (as defined in §172.615); methyl dihydroabietate.  
 Methyl heptanoate.  
 2-Methylheptanoic acid.  
 6-Methyl-3,5-heptadien-2-one.  
 Methyl-5-hepten-2-ol.  
 6-Methyl-5-hepten-2-one.  
 Methyl hexanoate.  
 Methyl 2-hexanoate.  
 Methyl *p*-hydroxybenzoate; methylparaben.  
 Methyl  $\alpha$ -ionone; 5-(2,6,6-trimethyl-2-cyclohexen-1-yl)-4-penten-3-one.  
 Methyl  $\beta$ -ionone; 5-(2,6,6-trimethyl-1-cyclohexen-1-yl)-4-penten-3-one.  
 Methyl  $\Delta$ -ionone; 5-(2,6,6-trimethyl-3-cyclohexen-1-yl)-4-penten-3-one.  
 Methyl isobutyrate.  
 2-Methyl-3-(*p*-isopropylphenyl)-propionaldehyde;  $\alpha$ -methyl-*p*-isopropylhydrocinnamaldehyde; cyclamen aldehyde.  
 Methyl isovalerate.  
 Methyl laurate.  
 Methyl mercaptan; methanethiol.  
 Methyl *o*-methoxybenzoate.  
 Methyl *N*-methylanthranilate; dimethyl anthranilate.  
 Methyl 2-methylbutyrate.  
 Methyl-3-methylthiopropionate.  
 Methyl 4-methylvalerate.  
 Methyl myristate.  
 Methyl  $\beta$ -naphthyl ketone; 2'-acetophenone.  
 Methyl nonanoate.  
 Methyl 2-nonenoate.  
 Methyl 2-nonynoate; methyl octyne carbonate.  
 2-Methyloctanal; methyl hexyl acetaldehyde.  
 Methyl octanoate.

Methyl 2-octynoate; methyl heptene carbonate.  
 4-Methyl-2,3-pentanedione; acetyl isobutyryl.  
 4-Methyl-2-pentanone; methyl isobutyl ketone.  
 $\beta$ -Methylphenethyl alcohol; hydratropyl alcohol.  
 Methyl phenylacetate.  
 3-Methyl-4-phenyl-3-butene-2-one.  
 2-Methyl-4-phenyl-2-butyl acetate; dimethylphenylethyl carbonyl acetate.  
 2-Methyl-4-phenyl-2-butyl isobutyrate; dimethylphenyl ethylcarbonyl isobutyrate.  
 3-Methyl-2-phenylbutyraldehyde;  $\alpha$ -isopropyl phenylacetaldehyde.  
 Methyl 4-phenylbutyrate.  
 4-Methyl-1-phenyl-2-pentanone; benzyl isobutyl ketone.  
 Methyl 3-phenylpropionate; methyl hydrocinnamate.  
 Methyl propionate.  
 3-Methyl-5-propyl-2-cyclohexen-1-one.  
 Methyl sulfide.  
 3-Methylthiopropionaldehyde; methional.  
 2-Methyl-3-tolylpropionaldehyde, mixed *o*-, *m*-, *p*-.  
 2-Methylundecanal; methyl nonyl acetaldehyde.  
 Methyl 9-undecenoate.  
 Methyl 2-undecynoate; methyl decyne carbonate.  
 Methyl valerate.  
 2-Methylvaleric acid.  
 Myrcene; 7-methyl-3-methylene-1,6-octadiene.  
 Myristaldehyde; tetradecanal.  
*d*-Neomenthol; 2-isopropyl-5-methylcyclohexanol.  
 Nerol; *cis*-3,7-dimethyl-2,6-octadien-1-ol.  
 Nerolidol; 3,7,11-trimethyl-1,6,10-dodecatrien-3-ol.  
 Neryl acetate.  
 Neryl butyrate.  
 Neryl formate.  
 Neryl isobutyrate.  
 Neryl isovalerate.  
 Neryl propionate.  
 2,6-Nonadien-1-ol.  
 $\gamma$ -Nonalactone; 4-hydroxynonanoic acid,  $\gamma$ -lactone; aldehyde C-18.  
 Nonanal; pelargonic aldehyde.  
 1,3-Nonanediol acetate, mixed esters.  
 Nonanoic acid; pelargonic acid.  
 2-Nonanone; methylheptyl ketone.  
 3-Nonanon-1-yl acetate; 1-hydroxy-3-nonanone acetate.  
 Nonyl acetate.  
 Nonyl alcohol; 1-nonanol.  
 Nonyl octanoate.  
 Nonyl isovalerate.  
 Nootkatone; 5,6-dimethyl-8-isopropenylbicyclo[4,4,0]-dec-1-en-3-one.  
 Ocimene; *trans*- $\beta$ -ocimene; 3,7-dimethyl-1,3,6-octatriene.  
 $\gamma$ -Octalactone; 4-hydroxyoctanoic acid,  $\gamma$ -lactone.  
 Octanal; caprylaldehyde.  
 Octanal dimethyl acetal.  
 1-Octanol; octyl alcohol.  
 2-Octanol.  
 3-Octanol.  
 2-Octanone; methyl hexyl ketone.  
 3-Octanone; ethyl amyl ketone.  
 3-Octanon-1-ol.  
 1-Octen-3-ol; amyl vinyl carbinol.  
 1-Octen-3-yl acetate.  
 Octyl acetate.  
 3-Octyl acetate.  
 Octyl butyrate.  
 Octyl formate.  
 Octyl heptanoate.  
 Octyl isobutyrate.  
 Octyl isovalerate.  
 Octyl octanoate.  
 Octyl phenylacetate.  
 Octyl propionate.  
 $\omega$ -Pentadecalactone; 15-hydroxypentadecanoic acid,  $\omega$ -lactone; pentadecanolid; angelica lactone.  
 2,3-Pentanedione; acetyl propionyl.  
 2-Pentanone; methyl propyl ketone.  
 4-Pentenoic acid.  
 1-Penten-3-ol.  
 Perillaldehyde; 4-isopropenyl-1-cyclohexene-1-carboxaldehyde; *p*-mentha-1,8-dien-7-yl al.  
 Perillyl acetate; *p*-mentha-1,8-dien-7-yl acetate.  
 $\alpha$ -Phellandrene; *p*-mentha-1,5-diene.  
 Phenethyl acetate.  
 Phenethyl alcohol;  $\beta$ -phenylethyl alcohol.  
 Phenethyl anthranilate.  
 Phenethyl benzoate.  
 Phenethyl butyrate.  
 Phenethyl cinnamate.  
 Phenethyl formate.  
 Phenethyl isobutyrate.  
 Phenethyl isovalerate.  
 Phenethyl 2-methylbutyrate.  
 Phenethyl phenylacetate.  
 Phenethyl propionate.  
 Phenethyl salicylate.  
 Phenethyl senecioate; phenethyl 3,3-dimethylacrylate.  
 Phenethyl tiglate.  
 Phenoxyacetic acid.  
 2-Phenoxyethyl isobutyrate.  
 Phenylacetaldehyde;  $\alpha$ -toluic aldehyde.  
 Phenylacetaldehyde 2,3-butylene glycol acetal.  
 Phenylacetaldehyde dimethyl acetal.  
 Phenylacetaldehyde glyceryl acetal.  
 Phenylacetic acid;  $\alpha$ -toluic acid.  
 4-Phenyl-2-butanol; phenylethyl methyl carbinol.  
 4-Phenyl-3-buten-2-ol; methyl styryl carbinol.  
 4-Phenyl-3-buten-2-one.  
 4-Phenyl-2-butyl acetate; phenylethyl methyl carbonyl acetate.  
 1-Phenyl-3-methyl-3-pentanol; phenylethyl methyl ethyl carbinol.  
 1-Phenyl-1-propanol; phenylethyl carbinol.  
 3-Phenyl-1-propanol; hydrocinnamyl alcohol.

2-Phenylpropionaldehyde; hydratropaldehyde.	Rhodinyl formate.
3-Phenylpropionaldehyde; hydrocinnamaldehyde.	Rhodinyl isobutyrate.
2-Phenylpropionaldehyde dimethyl acetal; hydratropic aldehyde dimethyl acetal.	Rhodinyl isovalerate.
3-Phenylpropionic acid; hydrocinnamic acid.	Rhodinyl phenylacetate.
3-Phenylpropyl acetate.	Rhodinyl propionate.
2-Phenylpropyl butyrate.	Rum ether; ethyl oxyhydrate.
3-Phenylpropyl cinnamate.	Salicylaldehyde.
3-Phenylpropyl formate.	Santalol, $\alpha$ and $\beta$ .
3-Phenylpropyl hexanoate.	Santalyl acetate.
2-Phenylpropyl isobutyrate.	Santalyl phenylacetate.
3-Phenylpropyl isobutyrate.	Skatole.
3-Phenylpropyl isovalerate.	Sorbitan monostearate.
3-Phenylpropyl propionate.	Styrene.
2-(3-Phenylpropyl)-tetrahydrofuran.	Sucrose octaacetate.
$\alpha$ -Pinene; 2-pinene.	$\alpha$ -Terpinene.
$\beta$ -Pinene; 2(10)-pinene.	$\gamma$ -Terpinene.
Pine tar oil.	$\alpha$ -Terpineol; <i>p</i> -menth-1-en-8-ol.
Pinocarveol; 2(10)-pinen-3-ol.	$\beta$ -Terpineol.
Piperidine.	Terpinolene; <i>p</i> -menth-1,4(8)-diene.
Piperine.	Terpinyl acetate.
<i>d</i> -Piperitone; <i>p</i> -menth-1-en-3-one.	Terpinyl anthranilate.
Piperitenone; <i>p</i> -mentha-1,4(8)-dien-3-one.	Terpinyl butyrate.
Piperitenone oxide; 1,2-epoxy- <i>p</i> -menth-4-(8)-en-3-one.	Terpinyl cinnamate.
Piperonyl acetate; heliotropyl acetate.	Terpinyl formate.
Piperonyl isobutyrate.	Terpinyl isobutyrate.
Polylimonene.	Terpinyl isovalerate.
Polysorbate 20; polyoxyethylene (20) sorbitan monolaurate.	Terpinyl propionate.
Polysorbate 60; polyoxyethylene (20) sorbitan monostereate.	Tetrahydrofurfuryl acetate.
Polysorbate 80; polyoxyethylene (20) sorbitan monooleate.	Tetrahydrofurfuryl alcohol.
Potassium acetate.	Tetrahydrofurfuryl butyrate.
Propenylguaethol; 6-ethoxy- <i>m</i> -anol.	Tetrahydrofurfuryl propionate.
Propionaldehyde.	Tetrahydro-pseudo-ionone; 6,10-dimethyl-9-undecen-2-one.
Propyl acetate.	Tetrahydrolinalool; 3,7-dimethyloctan-3-ol.
Propyl alcohol; 1-propanol.	Tetramethyl ethylcyclohexenone; mixture of 5-ethyl-2,3,4,5-tetramethyl-2-cyclohexen-1-one and 5-ethyl-3,4,5,6-tetramethyl-2-cyclohexen-1-one.
<i>p</i> -Propyl anisole; dihydroanethole.	2-Thienyl mercaptan; 2-thienylthiol.
Propyl benzoate.	Thymol.
Propyl butyrate.	Tolualdehyde glyceryl acetal, mixed <i>o</i> , <i>m</i> , <i>p</i> .
Propyl cinnamate.	Tolualdehydes, mixed <i>o</i> , <i>m</i> , <i>p</i> .
Propyl disulfide.	<i>p</i> -Tolylacetaldehyde.
Propyl formate.	<i>o</i> -Tolyl acetate; <i>o</i> -cresyl acetate.
Propyl 2-furanacrylate.	<i>p</i> -Tolyl acetate; <i>p</i> -cresyl acetate.
Propyl heptanoate.	4-( <i>p</i> -Tolyl)-2-butanone; <i>p</i> -methylbenzylacetone.
Propyl hexanoate.	<i>p</i> -Tolyl isobutyrate.
Propyl <i>p</i> -hydroxybenzoate; propylparaben.	<i>p</i> -Tolyl laurate.
3-Propylidene-phthalide.	<i>p</i> -Tolyl phenylacetate.
Propyl isobutyrate.	2-( <i>p</i> -Tolyl)-propionaldehyde; <i>p</i> -methylhydratropic aldehyde.
Propyl isovalerate.	Tributyl acetylcitrate.
Propyl mercaptan.	2-Tridecenal.
$\alpha$ -Propylphenethyl alcohol.	2,3-Undecadione; acetyl nonyryl.
Propyl phenylacetate.	$\gamma$ -Undecalactone; 4-hydroxyundecanoic acid
Propyl propionate.	$\gamma$ -lactone; peach aldehyde; aldehyde C-14.
Pulegone; <i>p</i> -menth-4(8)-en-3-one.	Undecenal.
Pyridine.	2-Undecanone; methyl nonyl ketone.
Pyroligneous acid extract.	9-Undecenal; undecenoic aldehyde.
Pyruvaldehyde.	10-Undecenal.
Pyruvic acid.	Undecen-1-ol; undecylenic alcohol.
Rhodinol; 3,7-dimethyl-7-octen-1-ol; <i>l</i> -citronellol.	10-Undecen-1-yl acetate.
Rhodinyl acetate.	Undecyl alcohol.
Rhodinyl butyrate.	Valeraldehyde; pentanal.
	Valeric acid; pentanoic acid.
	Vanillin acetate; acetyl vanillin.

Veratraldehyde.  
 Verbenol; 2-pinen-4-ol.  
 Zingerone; 4-(4-hydroxy-3-methoxyphenyl)-2-butanone.

(c)  $\Delta$ -Decalactone and  $\Delta$ -dodecalactone when used separately or in combination in oleomargarine are used at levels not to exceed 10 parts per million and 20 parts per million, respectively, in accordance with §166.110 of this chapter.

(d) BHA (butylated hydroxyanisole) may be used as an antioxidant in flavoring substances whereby the additive does not exceed 0.5 percent of the essential (volatile) oil content of the flavoring substance.

[42 FR 14491, Mar. 15, 1977, as amended at 42 FR 23148, May 6, 1977; 43 FR 19843, May 9, 1978; 45 FR 22915, Apr. 4, 1980; 47 FR 27810, June 25, 1982; 48 FR 10812, Mar. 15, 1983; 48 FR 51907, Nov. 15, 1983; 49 FR 5747, Feb. 15, 1984; 50 FR 42932, Oct. 23, 1985; 54 FR 7402, Feb. 21, 1989; 61 FR 14245, Apr. 1, 1996]

**§172.520 Cocoa with dioctyl sodium sulfosuccinate for manufacturing.**

The food additive "cocoa with dioctyl sodium sulfosuccinate for manufacturing," conforming to §163.117 of this chapter and §172.810, is used or intended for use as a flavoring substance in dry beverage mixes whereby the amount of dioctyl sodium sulfosuccinate does not exceed 75 parts per million of the finished beverage. The labeling of the dry beverage mix shall bear adequate directions to assure use in compliance with this section.

**§172.530 Disodium guanylate.**

Disodium guanylate may be safely used as a flavor enhancer in foods, at a level not in excess of that reasonably required to produce the intended effect.

**§172.535 Disodium inosinate.**

The food additive disodium inosinate may be safely used in food in accordance with the following prescribed conditions:

(a) The food additive is the disodium salt of inosinic acid, manufactured and purified so as to contain no more than 150 parts per million of soluble barium in the compound disodium inosinate with seven and one-half molecules of water of crystallization.

(b) The food additive is used as a flavoring adjuvant in food.

**§172.540 DL-Alanine.**

DL-Alanine (a racemic mixture of D- and L-alanine; CAS Reg. No. 302-72-7) may be safely used as a flavor enhancer for sweeteners in pickling mixtures at a level not to exceed 1 percent of the pickling spice that is added to the pickling brine.

[56 FR 6968, Feb. 21, 1991]

**§172.560 Modified hop extract.**

The food additive modified hop extract may be safely used in beer in accordance with the following prescribed conditions:

(a) The food additive is used or intended for use as a flavoring agent in the brewing of beer.

(b) The food additive is manufactured by one of the following processes:

(1) The additive is manufactured from a hexane extract of hops by simultaneous isomerization and selective reduction in an alkaline aqueous medium with sodium borohydride, whereby the additive meets the following specifications:

(i) A solution of the food additive solids is made up in approximately 0.012 *n* alkaline methyl alcohol (6 milliliters of 1 *n* sodium hydroxide diluted to 500 milliliters with methyl alcohol) to show an absorbance at 253 millimicrons of 0.6 to 0.9 per centimeter. (This absorbance is obtained by approximately 0.03 milligram solids permilliliter.) The ultraviolet absorption spectrum of this solution exhibits the following characteristics: An absorption peak at 253 millimicrons; no absorption peak at 325 to 330 millimicrons; the absorbance at 268 millimicrons does not exceed the absorbance at 272 millimicrons.

(ii) The boron content of the food additive does not exceed 310 parts per million (0.0310 percent), calculated as boron.

(2) The additive is manufactured from hops by a sequence of extractions and fractionations, using benzene, light petroleum spirits, and methyl alcohol as solvents, followed by isomerization by potassium carbonate treatment. Residues of solvents in the modified hop extract shall not exceed 1.0 part