codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 9(a) **CX/FA 09/41/11 Add.1**

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD ADDITIVES

Forty-first Session

Shanghai, China, 16-20 March 2009

PROPOSALS FOR ADDITIONS AND CHANGES TO THE PRIORITY LIST OF FOOD ADDITIVE PROPOSED FOR EVALUATION BY JECFA (REPLIES TO CL 2008/26-FA)

The following comments have been received from the following Codex members and observers:

European Community, Germany and United States of America

EUROPEAN COMMUNITY

The European Community and its Member States would like to reiterate the comments made during the 40th session of CCFA concerning certain flavouring substances.

Following the conclusions in the 68th report of JECFA on exposure assessment, the European Community and its Member States have requested JECFA to reconsider the potential genotoxicity of alpha-beta unsaturated substances and their precursors evaluated in earlier reports. The list with the JECFA numbers of the substances is attached.

In the default evaluation procedure, JECFA employs the maximized survey-derived intake (MSDI) method as a measure of dietary exposure. The MSDI provides an estimate of the mean exposure of consumers to a flavouring agent**.**

In its 68th report JECFA explored an additional new method of dietary exposure assessment (since termed the single-portion exposure technique or SPET) based on the daily consumption of a single portion of food containing the flavouring agent. The SPET was used to estimate dietary exposure for 57 flavouring agents. It was concluded that in general, the estimated dietary exposure using the SPET was up to several orders of magnitude higher than that calculated by the MSDI for any of the three geographic regions for which production volume data were available (Europe, Japan and USA). **The European Community and its Member States appreciate the application of the SPET approach.**

JECFA concluded that the MSDI and SPET dietary exposure estimates provide different and complementary information, however, it would not be necessary to re-evaluate flavouring agents that have already been assessed using the Procedure.

The European Community and its Member States would like to bring to the attention of JECFA the conclusions on genotoxicity of *Aliphatic, Linear alpha-beta unsaturated Aldehydes, Acids and related Alcohols, Acetals and Esters* expressed in the 63rd report of JECFA (WHO food additives series 54, page 374). The conclusion was that such alpha-beta unsaturated components are genotoxic but that at low concentrations, such as those resulting from intake of flavourings substances, alpha – beta unsaturated aldehydes are rapidly metabolised in the high capacity beta-oxidation pathway and that there is no convincing evidence that alpha-beta-unsaturated aldehydes exhibit significant genotoxic potential in vivo.

The European Community would like JECFA to reconsider this conclusion taking into account that for most of the substances the exposure assessment based on the SPET may be orders of magnitude higher than that calculated by MSDI and to consider whether a threshold mechanism for genotoxicity can be assigned.

List of substances for which the European Community and its Member States would request to reconsider potential genotoxicity:

Evaluation of certain food additives and contaminants: Fifty-fifth report of the Joint FAO/WHO expert Committee on food additives, (2000)

JECFA numbers: 647, 648, 656, 650, 652, 649, 651, 654, 653, 655, 673, 678, 677, 681, 682, 687, 689, 688, 686, 685, 684, 743, 740, 742, 741, 739, 751, 451, 450

Evaluation of certain food additives and contaminants: Fifty-seventh report of the Joint FAO/WHO expert Committee on food additives, (2001)

JECFA numbers: 948, 944

Evaluation of certain food additives and contaminants: Fifty-ninth report of the Joint FAO/WHO expert Committee on food additives, (2002)

JECFA numbers: 973, 974, 975, 977, 979, 980, 981, 982, 983, 985, 1020, 1022, 1050, 1051, 1098, 1105, 1106, 1107, 1115, 1111, 1114, 1112, 1113, 1139, 1134, 1149, 1140, 1141, 1124, 1125, 1129, 1131, 1126, 1127, 1132, 1130, 1133, 1135, 1136, 1138, 1152, 1150, 1151, 1153, 1148, 1147.

Evaluation of certain food additives and contaminants: Sixty-first report of the Joint FAO/WHO expert Committee on food additives, (2003)

JECFA numbers: 1163, 1162, 1164, 1172, 1173, 1175, 1179, 1174, 1195, 1196, 1181, 1190, 1184, 1186, 1185, 1182, 1197, 1187, 1189, 1198, 1208, 1216, 1209, 1201, 1214, 1215, 1217, 1227, 1207, 1226, 1223, 1230, 1224, 1200, 1225, 1202, 1228

Evaluation of certain food additives and contaminants: Sixty-third report of the Joint FAO/WHO expert Committee on food additives, (2004)

JECFA numbers: 1306, 1307, 1319, 1354, 1365, 1369, 1374, 1384, 1350, 1363, 1349, 1359, 1364, 1366, 1360, 1362, 1353, 1355, 1378, 1375, 1376, 1381, 1377, 1398, 1403, 1404, 1406, 1405, 1409, 1446, 1449, 1450, 1451, 1456, 1480, 1481, 1482, 1484, 1472, 1473

Evaluation of certain food additives and contaminants: Sixty-fifth report of the Joint FAO/WHO expert Committee on food additives, (2005)

JECFA numbers: 1570, 1571, 1574

GERMANY

In completing this form, only brief information is required. The form may be retyped if more space is needed under any one heading provided that the general format is maintained.

1. Proposal for inclusion submitted by:

Association Management & Regulatory Services Ltd

2. Name of compound; trade name(s); chemical name(s):

Shellac (INS 904)

3. Names and addresses of basic producers:

Stroever GmbH & Co. KG
Auf der Muggenburg 11
28217 Bremen
Germany

4. Has the manufacturer made a commitment to provide data?

Yes

5. Identification of the manufacturer that will be providing data (Please indicate contact person):

Stroever GmbH & Co. KG
Auf der Muggenburg 11
28217 Bremen
Germany

6. Justification for use:

Coating agent

7. Food products and food categories within the GSFA in which the compound is used, including use level(s):

GSFA, INS 904

8. Has the compound been approved for use in 2 or more countries (please identify the countries)?

Approved by Codex Alimentarius, European Union, FDA

9. List of data (toxicology, dietary exposure, specifications on chemical identity and purity, analytical methods) available:

Evaluated by Jecfa, specification defined by Jecfa

10. Date on which data could be submitted to JECFA:

April 2009

UNITED STATES OF AMERICA

This responds to CL 2008/26-FA (August 2008) which requests comments on: 1) the Priority List of food additives proposed for evaluation by JECFA; and 2) the text of the Circular Letter on the Priority List of food additives proposed for evaluation by JECFA. The United States appreciates the opportunity to provide the following comments for consideration at the forthcoming 41st Session of the Codex Committee on Food Additives (CCFA).

1. Additions to the JECFA Priority List

The United States proposes the addition of sucrose esters of fatty acids (INS 473) to the Priority List for revision of specifications of identity and purity only. We also request that the current listing of flavours in the JECFA Priority List be expanded from 247 flavours to 315 flavours.

The required information (as in Annex 2 of CL 2008/26-FA) for sucrose esters of fatty acids and the flavours is included as an Appendix to this comment. The list of flavours is provided as a single table sorted by Chemical Group consisting of the 247 flavours currently on the Priority List plus the proposed 68 new flavours.

Appendix - Required Information based on Annex 2 of CL 2007/27-FA

Sucrose Esters of Fatty Acids

1. Proposal for inclusion submitted by

The United States of America

2. Name of Compound; trade name(s); chemical name

Sucrose esters of fatty acids

Sucrose fatty acid esters

Sucrose monoester of lauric acid

Sucrose monoester of palmitic acid

Sucrose monoester of stearic acid

Sucrose monolaurate

Sucrose monopalmitate

Sucrose monostearate

Trade name: Habo Monoester

3. Names and addresses of basic producers

Compass Foods Pte Ltd
12 Tuas Avenue 1
Singapore
639497

4. Has the manufacturer made a commitment to provide data

Compass Foods Pte Ltd commits to provide data to JECFA.

5. Identification of the manufacturer that will be providing data (please indicate contact person)

Compass Foods Pte Ltd
12 Tuas Avenue 1
Singapore
639497
Contact person Mr. Robert Comstock
Phone: +65 6863 1971
e-mail: bob@compassfoods.com

6. Justification for use

- Sucrose esters of fatty acids have previously been evaluated by JECFA and are listed in numerous Codex standards. This application is for a change in specifications to allow their production from sucrose and the vinyl esters of food fatty acids.
- Sucrose esters of fatty acids with high monoester content have proven valuable for solubilization of flavor and nutraceutical oils. It has been proven possible to create clear beverages and flavor concentrates using only 0.5 : 1 weight ratio of sucrose esters of fatty acids to oil. This low emulsifier ratio reduces unfavorable taste and foaming issues.

7. Food Products and categories within the GSFA in which the compound is used including use levels

Food Category No	**Food Category**	**Average level of use**	**Food Products**
14.1.4	Water-based flavoured drinks, including "sport," "energy," or "electrolyte" drinks and particulated drinks	25 mg/kg	Flavored beverages

8. Has the compound been approved for use in 2 or more countries (please identify countries)

Sucrose esters of fatty acids are allowed in a wide range of countries (USA, European Union, Australia). Current specifications that do not specify the method of manufacture allow use of these sucrose monoesters in China and Japan. In the USA, sucrose monoesters produced from the reaction of sucrose with vinyl esters of lauric, palmitic and stearic acid were determined to be generally recognized as safe (GRAS) for the intended use as emulsifiers in fruit-flavored beverages and beverage concentrates (GRAS Notification #000248). In addition, a specification submission is currently under consideration in the EU.

9. List of data (toxicology, dietary exposure, specifications on chemical identity and purity, analytical methods) available.

A data package consisting of an outline of the manufacturing method, specifications and analytical data of manufacturing lots, in addition to analytical data concerning potential impurities, are available upon request. Toxicological data regarding sucrose esters of fatty acids is already available and has been reviewed by JECFA, which has established an ADI of 30 mg/kg bw/d (together with sucroglycerides). Toxicological information on potential impurities introduced by the manufacturing method will be made available.

10. Date on which data could be submitted to JECFA

November, 2009

List of 315 flavours (comprising 68 new proposals and 247 flavours currently on the Priority List)

1. Proposal for inclusion submitted by:

United States of America

2. Name of compound; trade name(s); chemical name(s):

List of 315 flavors (see Appendix A for list of chemical names)

3. Names and addresses of basic producers:

Flavor producers are members of the International Organization of the Flavour Industry (IOFI) and the Flavor and Extract Manufacturers Association (FEMA). All contacts can be made through FEMA.

4. Has the manufacturer made a commitment to provide data?

Yes

5. Identification of the manufacturer that will be providing data (Please indicate contact person):

The Flavor and Extract Manufacturers Association (FEMA), Washington, DC 20006, Timothy Adams, Ph.D. (Scientific Director), 202-331-2325, tadams@therobertsgroup.net

International Organization of the Flavour Industry (IOFI), Brussels, Belgium Thierry Cachet, Ph.D. (Science Director)

6. Justification for use:

Flavor ingredient(s) in foods for human consumption.

7. Food products and food categories within the GSFA in which the compound is used, including use level(s):

Natural occurrence, annual poundage data, and food categories and use levels to be submitted as requested.

8. Has the compound been approved for use in 2 or more countries (please identify the countries)?

Yes (USA for all flavours; Japan, Australia and New Zealand for select flavours)

9. List of data (toxicology, dietary exposure, specifications on chemical identity and purity, analytical methods) available:

Relevant toxicity data, dietary exposure and specifications to be submitted as requested.

10. Date on which data could be submitted to JECFA:

December 31, 2009

Appendix A – List of 315 Flavours

Priority	Chemical Group	Evaluation Number	Name	FEMA Number	CAS Number
1	32	1	Methyl dihydrojasmonate	3408	24851-98-7
1	32	2	4-(2,2,3-Trimethylcyclopentyl)butanoic acid	4529	957136-80-0
1	32	3	*cis*- and *trans*-2-Heptylcyclopropanecarboxylic acid	4130	697290-77-0 (trans) 697290-76-9 (cis)
1	32	4	(2,4) and (3,5) and (3,6)-Dimethyl-3-cyclohexenylcarbaldehyde	4505	27939-60-2
1	32	5	Perillaldehyde propyleneglycol acetal	4530	121199-28-8
1	32	6	(+/-) *cis*- and *trans*-1,2-Dihydroperillaldehyde	4312	22451-50-9 22451-49-6
1	32	7	(+-)-*cis*- and *trans*-2-Methyl-2-(4-methyl-3-pentenyl)cyclopropanecarbaldehyde	4393	97231-35-1
1	32	8	*d*-Limonen-10-ol	4504	38142-45-9
1	32	9	*p*-Menthan-7-ol	4507	5502-75-0
1	32	10	*p*-Menth-1-en-9-ol	4508	18479-68-0
1	32	11	1,3-*p*-Menthadien-7-al	4506	1197-15-5
2	20	1	Methyl octyl sulfide	4573	3698-95-1
2	20	2	Methyl 1-propenyl sulfide	4574	10152-77-9
2	20	3	Di-(1-propenyl)-sulfide (mixture of isomers)	4386	65819-74-1 37981-37-6 37981-36-5
2	20	4	Ethyl 2-hydroxyethyl sulfide	4562	110-77-0
2	20	5	2-(Methylthio)ethyl acetate	4560	5862-47-5
2	20	6	3-(Methylthio)propyl mercaptoacetate	4561	852997-30-9
2	20	7	Ethyl 3-(methylthio)-*cis*-2-propenoate	4563	136115-65-6
2	20	8	Ethyl 3-(methylthio)-*trans*-2-propenoate	4564	136115-65-6
2	20	9	Ethyl 3-(methylthio)-2-propenoate	4565	136115-65-6
2	20	10	4-Methyl-2-(methylthiomethyl)-2-pentenal	4568	40878-73-7
2	20	11	4-Methyl-2-(methylthiomethyl)-2-hexenal	4566	99910-84-6
2	20	12	5-Methyl-2-(methylthiomethyl)-2-hexenal	4567	CAS Pending
2	20	13	1-(3-(Methylthio)-butyryl)-2,6,6-trimethylcyclohexene	4569	68697-67-6
2	20	14	Butyl *beta*-(methylthio)acrylate	4571	CAS Pending
2	20	15	Ethyl 3-(ethylthio)butyrate	4572	90201-28-8
2	20	16	2-Oxothiolane	4570	1003-10-7
2	20	17	Dodecanethiol	4581	112-55-0
2	20	18	2-Hydroxyethanethiol	4582	60-24-2

Priority	Chemical Group	Evaluation Number	Name	FEMA Number	CAS Number
2	20	19	4-Mercapto-4-methyl-2-hexanone	4583	CAS Pending
2	20	20	3-Mercapto-3-methylbutyl isovalerate	4584	612071-27-9
2	20	21	(+-) Ethyl 3-mercapto-2-methylbutanoate	4392	888021-82-7
2	20	22	3-Mercaptohexanal	4585	51755-72-7
2	20	23	Diisoamyl disulfide	4575	2051-04-9
2	20	24	*Bis*(2-methylphenyl) disulfide	4576	4032-80-8
2	20	25	Mixture of butyl propyl disulfide and propyl and butyl disulfide	4577	72437-64-0
2	20	26	di-*sec*-Butyl disulfide	4578	5943-30-6
2	20	27	Diisoamyl trisulfide	4580	CAS Pending
2	20	28	Methyl 2-methylphenyl disulfide	4579	35379-09-0
2	20	29	3-Mercaptopropionic acid	4587	107-96-0
2	20	30	Methyl isobutanethioate	4586	42075-42-3
2	20	31	2-Ethylhexyl 3-mercaptopropionate	4588	50448-95-8
2	20	32	Butanal dibenzyl thioacetal	4589	CAS Pending
2	20	33	Methional diethyl acetal	4590	CAS Pending
2	20	34	3-(Methylthio)propyl hexanoate	4436	906079-63-8
2	20	35	(+/-)-*cis*- and *trans*-2-Pentyl-4-propyl-1,3-oxathiane	4499	59323-81-8
2	20	36	2-Pentenyl-4-propyl-1,3-oxathiane (mixture of isomers)	4526	CAS Pending
3	21	1	Hydroxyacetone	4462	116-09-6
3	21	1	Propyl pyruvate	4484	20279-43-0
3	21	2	Methyl 3-hydroxybutyrate	4450	1487-49-6
3	21	2	Dodecyl lactate	4482	6283-92-7
3	21	3	(+-) Ethyl 3-hydroxy-2-methylbutyrate	4391	27372-03-8
3	21	3	Hexadecyl lactate	4483	35274-05-6
3	21	4	Methyl 3-acetoxy-2-methylbutyrate	4451	139564-42-4
3	21	5	1-Hydroxy-4-methyl-2-pentanone	4463	68113-55-3
3	21	6	Ethyl 2-acetylhexanoate	4452	1540-29-0
3	21	7	3-Isopropenyl-6-oxoheptanoic acid	4461	4436-82-2
3	21	8	Ethyl 3-hydroxyoctanoate	4453	7367-90-0
3	21	9	Methyl 3-acetoxyoctanoate	4454	35234-21-0
3	21	10	5-Oxooctanoic acid	4455	3637-14-7
3	21	11	Ethyl 2-acetyloctanoate	4459	29214-60-6
3	21	12	Ethyl 5-acetoxyoctanoate	4443	35234-25-4
3	21	13	5-Oxodecanoic acid	4456	624-01-1
3	21	14	Ethyl 5-oxodecanoate	4457	93919-00-7
3	21	15	Ethyl 5-hydroxydecanoate	4444	75587-06-3
3	21	16	5-Oxododecanoic acid	4458	3637-16-9
3	21	17	Dimethyl adipate	4472	627-93-0
3	21	18	Dipropyl adipate	4473	106-19-4
3	21	19	Diisopropyl adipate	4474	6938-94-9
3	21	20	Diisobutyl adipate	4475	141-04-8
3	21	21	Dioctyl adipate	4476	123-79-5
3	21	22	Ethyl acetoacetate ethyleneglycol ketal	4477	6413-10-1
3	21	23	Methyl levulinate	4478	624-45-3
3	21	24	Propyl levulinate	4480	645-67-0
3	21	25	Isoamyl levulinate	4481	71172-75-3
3	21	26	Ethyl levulinate propyleneglycol ketal	4479	57197-36-1
3	21	27	*cis*-3-Hexenyl acetoacetate	4489	84434-20-8
3	21	28	Hydroxycitronellal propyleneglycol acetal	4485	93804-64-9
3	21/30	29	Propyleneglycol diacetate	4464	623-84-7
3	21	30	6-(5(6)-Decenoyloxy)decanoic acid	4442	85392-05-8 85392-06-9
3	21/30	31	Propyleneglycol dipropionate	4465	10108-80-2
3	21/30	32	Propyleneglycol monobutyrate	4488	29592-95-8
3	21/30	33	Propyleneglycol dibutyrate	4466	50980-84-2
3	21/30	34	Propyleneglycol mono-2-methylbutyrate	4467	923593-56-0 923593-57-1
3	21/30	35	Propyleneglycol di-2-methylbutyrate	4468	CAS Pending
3	21/30	36	Propyleneglycol monohexanoate	4469	39556-41-7 170678-49-6
3	21/30	37	Propyleneglycol dihexanoate	4470	50343-36-7
3	21/30	38	Propyleneglycol dioctanoate	4471	7384-98-7

Priority	Chemical Group	Evaluation Number	Name	FEMA Number	CAS Number
3	21/38	39	2-Oxo-3-ethyl-4-butanolide	4460	923291-29-6
3	21	40	Ethyl 5-hydroxyoctanoate	4610	75587-05-2
3	21	41	Isopropylideneglyceryl 5-hydroxydecanoate	4611	172201-58-0
4	06	1	4-Hydroxy-2-butenoic acid *gamma*-lactone	4138	497-23-4
4	06	2	5-Pentyl-3H-furan-2-one	4323	51352-68-2
4	06	3	5-Hydroxy-4-methylhexanoic acid *delta*-lactone	4141	10413-18-0
4	06	4	2-Nonenoic acid *gamma*-lactone	4188	21963-26-8
4	06	5	4-Hydroxy-2,3-dimethyl-2,4-nonadienoic acid *gamma*-lactone	4050	774-64-1
4	06	6	Isoambrettolide	4145	28645-51-4
4	06	7	7-Decen-4-olide	4439	67114-38-9
4	06	8	9-Decen-5-olide	4440	74585-00-5
4	06	9	8-Decen-5-olide	4441	32764-98-0
4	06	10	Orin Lactone	4449	134359-15-2
4	06	11	9-Dodecen-5-olide	4445	15456-68-5
4	06	12	9-Tetradecen-5-olide	4448	15456-70-9
4	06	13	*gamma*-Octadecalactone	4446	502-26-1
4	06	14	*delta*-Octadecalactone	4447	1227-51-6
5	58	1	*N*-Ethyl-2,2-diisopropylbutanamide	4557	51115-70-9
5	58	2	Cyclopropanecarboxylic acid (2-isopropyl-5-methyl-cyclohexyl)-amide	4558	958660-02-1 958660-04-3
5	58	3	(+/-)-*N*-Lactoyl tyramine	4550	781674-18-8
5	58	4	*N*-(2-(Pyridin-2-yl)ethyl)-3-*p*-menthanecarboxamide	4549	847565-09-7
5	58	5	*N*-*p*-Benzeneacetonitrile-menthanecarboxamide	4496	852379-28-3
5	58	6	N-(2-hydroxyethyl)-2,3-dimethyl-2-isopropylbutanamide	4602	883215-02-9
5	58	7	N-(1,1-dimethyl-2-hydroxyethyl)-2,2-diethylbutanamide	4603	51115-77-6
5	58	8	Choline chloride (also includes choline)	4500	67-48-1
5	58	9	3-(Methylthio)propylamine	4649	4104-45-4
6	24	1	4-Propenylphenol	4062	539-12-8
6	24	2	2-Methoxy-6-(2-propenyl)phenol	4490	579-60-2
6	24	3	2,4,6-Trimethylphenol	4329	527-60-6
6	24	4	Sodium 3-methoxy-4-hydroxycinnamate	3812	24276-84-4
6	24	5	3-(4-Hydroxy-phenyl)-1-(2,4,6-trihydroxy-phenyl)-propan-1-one	4390	60-82-2
6	24	6	Magnolol	4559	528-43-8
6	24	7	Guaiacol butyrate	4607	4112-92-9
6	24	8	Guaiacol isobutyrate	4608	723759-62-4
6	24	9	Guaiacol propionate	4609	7598-60-9
6	24	10	4-(2-Propenyl)phenyl-*beta*-*D*-glucopyranoside	4548	64703-98-6
6	24	11	Phenyl butyrate	4621	4346-18-3
6	24	12	Hydroxy(4-hydroxy-3-methoxyphenyl)acetic acid	4660	55-10-7
6	24	13	1-(4-Hydroxy-3-methoxyphenyl)-decan-3-one	4665	27113-22-0
6	24	14	5,7-Dihydroxy-2-(3-hydroxy-4-methoxy-phenyl)-chroman-4-one	4313	69097-99-0
7	15	1	Dimethyl benzyl carbinyl crotonate	4403	93762-34-6
7	15	2	Dimethylbenzyl carbinyl hexanoate	4404	891781-90-1
7	15	3	Caryophyllene alcohol	4410	56747-96-7
7	15	4	Cubebol	4497	23445-02-5
7	15	5	(-)-Sclareol	4502	515-03-7
7	15	6	(+)-Cedrol	4503	77-53-2
7	15	7	alpha-Bisabolol	4666	23089-26-1
8	18	1	Acetoin propyleneglycol ketal	4532	94089-23-3
8	18	2	3-Hydroxy-5-methyl-2-hexanone or 2-Hydroxy-5-methyl-2-hexanone	3989	163038-04-8
8	18	3	3-Hydroxy-2-octanone	4139	37160-77-3
8	18	4	Octan-2,3-dione	4060	585-25-1
8	18	5	4,5-Octanedione	4533	5455-24-3
8	18	6	3-Methyl-2,4-nonedione	4057	113486-29-6
8	18	7	(+/-) 2-Hydroxypiperitone	4143	490-03-9

Priority	Chemical Group	Evaluation Number	Name	FEMA Number	CAS Number
8	18	8	1,1'-(Tetrahydro-6a-hydroxy-2,3a,5-trimethylfuro[2,3-d]-1,3-dioxole-2,5-diyl)bis-ethanone	4303	18114-49-3
9	27	1	4-Hydroxyacetophenone	4330	99-93-4
9	27	2	3-Hydroxy-4-phenylbutan-2-one	4052	5355-63-5
9	27	3	2-Methoxyacetophenone	4163	579-74-8
9	27	4	4-(3,4-Methylenedioxyphenyl)-2-butanone	2701	55418-52-5
9	27	5	2-Aminoacetophenone	3906	551-93-9
9	27	6	2-Methylacetophenone	4316	577-16-2
9	27	7	2-Hydroxy-5-methylacetophenone	4594	1450-72-2
9	27	8	Dihydrogalangal acetate	4555	129319-15-9
9	27	9	2,3,3-Trimethylindanone	4556	54440-17-4
10	36	1	2-(*trans*-2-Pentenyl)cyclopentanone	4284	51608-18-5
10	36	2	Cyclotene propionate	4511	87-55-8
10	36	3	2-Cyclopentylcyclopentanone	4514	4884-24-6
10	36	4	Cyclohexanone diethyl ketal	4516	1670-47-9
10	36	5	2-Cyclohexenone	4517	930-68-7
10	36	6	3,3,5-Trimethylcyclohexyl acetate	4512	67859-96-5
10	36	7	2,6,6-Trimethyl-2-hydroxycyclohexanone	4531	7500-42-7
10	36	8	8,9-Dehydrotheaspirone	4518	85248-56-2
10	36	9	4-(2-Butenylidene)-3,5,5-trimethylcyclohex-2-en-1-one	4663	13215-88-8
10	36	10	4-Hydroxy-4-(3-hydroxy-1-butenyl)-3,5,5-trimethyl-2-cyclohexen-1-one	4661	24427-77-8
10	36	11	Cyclotene butyrate	4648	68227-51-0
10	36	12	(+/-) 2,6,10,10-Tetramethyl-1-oxaspiro[4.5]deca-2,6-dien-8-one	4662	80722-28-7
11	28	1	Benzyl hexanoate	4026	6938-45-0
11	28	2	*o*-Anisaldehyde	4077	135-02-4
11	28	3	Prenyl benzoate	4203	5205-11-8
11	28	4	(+/-) 2-Phenyl-4-methyl-2-hexenal	4194	26643-92-5
11	28	5	Benzyl levulinate	4623	6939-75-9
11	28	6	4-Methylbenzyl alcohol	4624	589-18-4
11	28	7	Benzyl nonanoate	4626	6471-66-5
11	28	8	2-Ethylhexyl benzoate	4630	5444-75-7
11	28	9	4-Methylbenzaldehyde propyleneglycol acetal	4628	58244-29-4
12	13	1	(+/-) Octan-3-yl formate	4009	84434-65-1
12	13	2	(*R*)-(-)-1-Octen-3-ol	4492	3687-48-7
12	13	3	2-Decanone	4271	693-54-9
12	13	4	6-Methyl-5-hepten-2-one propyleneglycol acetal	4400	68258-95-7
12	13	5	2-Pentyl 2-methylpentanoate	4401	90397-36-7
12	13	6	3-Octyl butyrate	4402	20286-45-7
12	13	7	2-Nonanone propyleneglycol acetal	4399	165191-91-3
13	14	1	*cis*-3-Nonen-1-ol	4412	10340-23-5
13	14	2	*cis,cis*-3,6-Nonadienyl acetate	4551	83334-93-4
13	14	3	*trans*-2-Nonenyl acetate	4552	30418-89-4
13	14	4	*trans*-3-Hexenyl acetate	4413	3681-82-1
13	14	5	*cis*-3-Hexenoic acid	4493	1775-43-5
13	14	6	*cis*-3-Nonenyl acetate	4553	13049-88-2
13	14	7	*cis*-6-Nonenyl acetate	4554	76238-22-7
13	14	8	*trans*-3-Nonen-1-ol	4605	10339-61-4
14	08	1	4-Methylpentyl isovalerate	4347	850309-45-4
14	08	2	5-Methylhexyl acetate	4346	180348-60-1
14	08	3	Ethyl 4-methylpentanoate	4343	25415-67-2
14	08	4	Ethyl 2-ethylbutyrate	4344	2983-38-2
14	08	5	Ethyl 2-ethylhexanoate	4345	2983-37-1
14	08	6	3,7-Dimethyloctanal	4348	5988-91-0
15	10	1	Furfural propyleneglycol acetal	4537	4359-54-0
15	10	2	Furfuryl formate	4542	13493-97-5
15	10	3	Furfuryl decanoate	4539	39252-05-6
15	10	4	5-Methylfurfuryl alcohol	4544	3857-25-8
15	10	5	(*E*)-Ethyl 3-(2-furyl)acrylate	4541	53282-12-5
16	38	1	2-(2-Hydroxy-4-methyl-3-cyclohexenyl)propionic acid *gamma*-lactone	4140	57743-63-2

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16	38	2	2-(2-Hydroxyphenyl) cyclopropanecarboxylic acid *delta*-lactone	4270	5617-64-1
16	38	3	*beta*-Angelicalactone	4438	591-11-7
16	38	4	Phthalide	4195	87-41-2
17	41	1	Methyl hexyl ether	4291	4747-07-3
17	41	2	Myrcenyl methyl ether	4592	24202-00-4
17	41	3	Dill ether	4315	70786-44-6
17	41	4	Ethyl linalyl ether	4591	72845-33-1
17	41	5	Linalool oxide pyranoid	4593	14049-11-7
17	41	6	Butyl beta-naphthyl ether	4634	10484-56-7
17	41	7	Isoamyl phenethyl ether	4635	56011-02-0
17	41	8	Digeranyl ether	4664	31147-36-1
18	46	1	1-Octene	4293	111-66-0
18	46	2	2,4-Nonadiene	4292	56700-78-8
18	46	3	*alpha*-Ionene	4264	475-03-6
18	46	4	2-Methyl-1,3-cyclohexadiene	FDA GRAS	1489-57-2
18	46	5	Mixture of methyl cyclohexadiene and methylene cyclohexene	4311	30640-46-1 1888-90-0
18	46	6	4-Methyl-cis-2-pentene	4650	691-38-3
18	46	7	1-Nonene	4651	124-11-8
18	46	8	1,3,5,7-Undecatetraene	4652	CAS Pending
19	59	2	2-Methyl-3-furyl methylthiomethyl disulfide	4320	333384-99-9
19	59	3	di-2-Furylmethane	4540	1197-40-6
19	59	4	Methyl 3-(furfurylthio)propionate	4538	94278-26-9
19	59	5	3-[(2-Methyl-3-furyl)thio]butanal	4501	915971-43-6
19	59	6	2-Methylbenzofuran	4543	4265-25-2
20	48	1	*dl*-Camphor	4513	21368-68-3
20	48	2	*l*-Fenchone	4519	7787-20-4
20	48	3	2,2,6,7-Tetramethylbicyclo[4.3.0]nona-4,9(1)-dien-8-ol	4521	97866-86-9
20	48	4	2,2,6,7-Tetramethylbicyclo[4.3.0]nona-4,9(1)-dien-8-one	4522	97844-16-1
21	50	1	5-Methyl-3(2*H*)-furanone	4176	3511-32-8
21	50	2	Ethyl 2,5-dimethyl-3-oxo-4(2*H*)-furyl carbonate	4546	39156-54-2
21	50	3	2,5-Dimethyl-3(2*H*)-furanone	4101	14400-67-0
21	50	4	Nerolidol oxide	4536	1424-83-5
21	50	5	2,5-Dimethyl-4-ethoxy-3(2*H*)-furanone	4104	65330-49-6
21	50	6	2-Tetrahydrofurfuryl 2-mercaptopropionate	4535	99253-91-5
21	50	7	4-Acetyl-2,5-dimethyl-3(2*H*)-furanone	4070	36871-78-0
21	50	8	2-Methyl-3-furyl 2-methyl-3-tetrahydrofuryl disulfide	4545	252736-40-6
22	29	1	3-Hydroxybenzoic acid	4431	99-06-9
22	29	2	3,4-Dihydroxybenzoic acid	4430	99-50-3
22	29	3	2-Hydroxy-4-methoxybenzaldehyde	4435	673-22-3
22	29	4	Piperonal propyleneglycol acetal	4622	61683-99-6
22	29	5	4-Formyl-2-methoxyphenyl 2-hydroxypropanoate	4606	930587-76-1
22	29	6	Anisaldehyde propyleneglycol acetal	4627	6414-32-0
23	22	1	Cinnamaldehyde propyleneglycol acetal	4596	4353-01-9
23	22	2	2-Phenylpropanal propyleneglycol acetal	4595	67634-23-5
23	22	3	Ethyl *alpha*-acetylcinnamate	4597	CAS Pending
23	22	4	3-(3,4-Methylenedioxyphenyl)-2-methylpropanal	4599	1205-17-0
23	22	5	Ethyl 2-hydroxy-3-phenylpropionate	4598	CAS Pending
24	04	1	Paraldehyde	4010	123-63-7
24	04	2	(+/-)-Acetaldehyde ethyl isopropyl acetal	4432	25334-93-4
24	04	3	Tridecanal	4335	10486-19-8
24	04	4	Acetaldehyde ethyl isobutyl acetal	4528	6986-51-2
24	04	5	Tridecanoic acid	4336	638-53-9
24	04	6	Acetaldehyde di-isobutylacetal	4527	5669-09-0
24	04	7	Pentadecanoic acid	4334	1002-84-2
25	40	1	Citral glyceryl acetal	4486	5694-82-6
26	26	1	Isopropenylpyrazine	3296	38713-41-6
26	26	2	5-Ethyl-2,3-dimethylpyrazine	4434	15707-34-3

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26	26	3	3,5 and 3,6-Dimethyl-2-isobutylpyrazine	4100	38888-81-2 70303-42-3
26	26	4	2-Ethyl-3-methylthiopyrazine	4631	72987-62-3
26	26	5	2-Ethoxy-3-isopropylpyrazine	4632	72797-16-1
26	26	6	2-Ethoxy-3-ethylpyrazine	4633	35243-43-7
27	05	1	3-Methylhexanal	4261	19269-28-4
27	05	2	6-Methylheptanal	4498	63885-09-6
27	05	3	(+/-)-6-Methyloctanal	4433	30689-75-9
28	11/36	1	Menthyl formate	4509	2230-90-2
28	11/36	2	Menthyl propionate	4510	86014-82-6
28	11/36	3	*l*-Menthyl butyrate	4524	68366-64-3
28	11/36	4	Dimenthyl glutarate	4604	406179-71-3
29	16/36	1	Pinocarvyl isobutyrate	4525	929116-08-5
29	16/36	2	Carvyl palmitate	4515	929222-96-8
29	16	3	6-Hydroxycarvone	4523	51200-86-3
30	17	1	*trans-alpha*-Damascone	4088	24720-09-0
30	17	2	*beta*-Isomethylionone	4151	79-89-0
30	17	3	Pseudoionone	4299	141-10-6
32	45	1	1-Ethyl-2-pyrrolecarboxaldehyde	4317	2167-14-8
32	45	2	1-Methyl-1*H*-pyrrole-2-carboxaldehyde	4332	1192-58-1
32	45	3	2,4-Dimethylpyridine	4389	108-47-4
32	45	4	2-Acetyl-4-isopropenylpyridine	4636	142896-11-5
32	45	5	4-Acetyl-2-isopropenylpyridine	4637	142896-12-6
32	45	6	2-Acetyl-4-isopropylpyridine	4638	142896-09-1
32	45	7	2-Methoxypyridine	4639	1628-89-3
32	45	8	6-Methoxyquinoline	4640	5263-87-6
33	03	1	Allyl valerate	4074	6321-45-5
33	03	2	Allyl crotonate	4072	20474-93-5
34	33	1	Phenethyl decanoate	4314	61810-55-7
34	33	2	Phenethyl benzoate	2860	94-47-3
34	33	3	Phenylacetaldehyde diethyl acetal	4625	6314-97-2
34	33	4	Phenylacetaldehyde propyleneglycol acetal	4629	5468-05-3
34	33	5	Propyl 4-tert-butylphenylacetate	4619	CAS Pending
34	33	6	2-Phenoxyethanol	4620	122-99-6
34	33	7	2-Phenoxyethyl propionate	4618	23495-12-7
35	34	1	2-Pentylthiophene	4387	4861-58-9
35	34	2	3,4-Dimethylthiophene	4645	632-15-5
35	34	3	2-Thienylmethanol	4642	636-72-6
35	34	4	2-Acetyl-5-methylthiophene	4643	13679-74-8
35	34	5	1-(2-Thienyl)ethanethiol	4646	94089-02-8
35	34	6	2-Pentylthiazole	4641	37645-62-8
35	35	7	4,5-Dimethyl-2-isobutylthiazole	4647	53498-32-1
35	34	8	5-Ethyl-2-methylthiazole	4388	19961-52-5
35	34	9	4-Methyl-3-thiazoline	4644	52558-99-3
36	49	1	*l*-Ornithine monochlorohydrate/Ornithine	4190	3184-13-2
37	52	1	Ethyl maltol isobutyrate	4534	852997-28-5
38	57	1	ethyl alpha-ethyl-beta-methyl-beta-phenylglycidate	4653	19464-94-9
38	57	2	methyl beta-phenylglycidate	4654	37161-74-3
38	57	3	d-8-p-menthene-1,2-epoxide	4655	1195-92-2
38	57	4	L-8-p-menthene-1,2-epoxide	4656	203719-53-3
38	57	5	2,3-epoxyoctanal	4657	42134-50-9
38	57	6	2,3-epoxyheptanal	4658	58936-30-4
38	57	7	2,3-epoxydecanal	4659	102369-06-2
39	67	1	2-Ethyl-2-hexenal	4612	26266-68-2
39	67	2	Ethyl 2-hexenoate	4613	1552-67-6
39	67	3	Propyl sorbate	4614	10297-72-0
39	67	4	cis-2-Octenol	4615	26001-58-1
39	67	5	2-Hexylidenehexanal	4616	13019-16-4
39	67	6	trans-2-Tridecenol	4617	74962-98-4