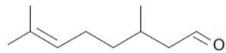


Citronellal

CAS-No.:	106-23-0 5949-05-3	Molecular formula:	C ₁₀ H ₁₈ O
	The scope of this Standard includes, but is not limited to the CAS number(s) indicated above; any other CAS number(s) used to identify this fragrance ingredient should be considered in scope as well.	Structure:	
Synonyms:	106-23-0: 2,3-Dihydrocitral 3,7-Dimethyl-6-octenal 3,7-Dimethyloct-6-enal 6-Octenal, 3,7-dimethyl- Citronellal Extra (Commercial name) Rhodinal (Commercial name) 5949-05-3: 6-Octenal, 3,7-dimethyl-, (3S)- l-Citronellal		

History:	Publication date:	2020 (Amendment 49)	Previous Publications:	Not applicable.
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Implementation dates:	For new submissions*:	February 10, 2021
	For existing fragrance compounds*:	February 10, 2022
*These dates apply to the supply of fragrance mixtures (formulas) only, not to the finished consumer products in the marketplace.		

RECOMMENDATION:	RESTRICTION
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RESTRICTION LIMITS IN THE FINISHED PRODUCT (%):			
Category 1	0.41 %	Category 7A	0.077 %
Category 2	0.16 %	Category 7B	0.077 %

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Category 3	0.026 %	Category 8	0.017 %
Category 4	0.49 %	Category 9	1.4 %
Category 5A	0.33 %	Category 10A	1.4 %
Category 5B	0.051 %	Category 10B	2.3 %
Category 5C	0.10 %	Category 11A	0.017 %
Category 5D	0.017 %	Category 11B	0.017 %
Category 6	0.82 %	Category 12	No Restriction

FLAVOR REQUIREMENTS:

Due to the possible ingestion of small amounts of fragrance ingredients from their use in products in Categories 1 and 6, materials must not only comply with IFRA Standards but must also be recognized as safe as a flavoring ingredient as defined by the IOFI Code of Practice (www.iofi.org). For more details see chapter 1 of the Guidance for the use of IFRA Standards.

CONTRIBUTIONS FROM OTHER SOURCES:

SEE ANNEX I

ANNEX I

Natural Complex Substances (NCS) containing Citronellal

Concentration in NCS (%)	CAS number of ingredient	Name of NCS	Botanical name	CAS number of NCS	Essential oil category
1.3	106-23-0	Balm oil	Melissa officinalis L.	8014-71-9	E2.12
0.2	106-23-0	Citron oil	Citrus medica L.	68991-25-3	G2.5
4.5	106-23-0	Citronella oil, Ceylon type	Cymbopogon nardus (L.) Rendle	8000-29-1	E2.12
36	106-23-0	Citronella oil, Java type	Cymbopogon winterianus Jowitt	8000-29-1	E2.12
11.7	106-23-0	Citrus hystrix extract	Citrus hystrix DC	91771-50-5	G2.5
0.1	106-23-0	Clementine oil	Citrus clementina Hort. Ex Tan	93686-22-7	G2.5
75	106-23-0	Eucalyptus citriodora oil	Corymbia citriodora (Hook.) K.D. Hill & L.A.	85203-56-1	E2.12

Citronellal

			Johnson		
0.6	106-23-0	Fir balsam oleoresin	Abies balsamea (L.) Mill.	8024-15-5	K2.16
0.15	106-23-0	Geranium oil	Pelargonium graveolens l'Hertier ex Aiton	8000-46-2	E2.12
0.4	106-23-0	Ginger oil	Zingiber officinale Rosc.	8007-08-7	A2.12
0.1	106-23-0	Grapefruit oil	Citrus paradisi Macf.	8016-20-4	G2.5
0.1	106-23-0	Grapefruit oil, folded	Citrus paradisi Macf.	68916-46-1	G2.6
3.2	106-23-0	Grapefruit oil, terpeneless	Citrus paradisi Macf.	68916-46-1	G2.29
3	106-23-0	Kumquat oil, Fortunella margarita	Fortunella (Lour.) Swingle	938464-05-2	G2.5
0.03	106-23-0	Lemon extract	Citrus limon (L.) Burm. f.	84929-31-7	G2.20
1	106-23-0	Lemon oil folded (5X)	Citrus limon (L.) Burm. f.	8008-56-8	G2.6
2	106-23-0	Lemon oil folded (10X)	Citrus limon (L.) Burm. f.	8008-56-8	G2.6
3	106-23-0	Lemon oil terpeneless	Citrus limon (L.) Burm. f.	68648-39-6	G2.29
0.1	106-23-0	Lemon oil, distilled	Citrus limon (L.) Burm. f.	8008-56-8	G2.24
0.1	106-23-0	Lemon oil, expressed	Citrus limon (L.) Burm. f.	8008-56-8	G2.5
0.1	106-23-0	Lemon oil, furocoumarin free	Citrus limon (L.) Burm. f.	68916-89-2	G2.33
0.1	106-23-0	Lemon oil. essence	Citrus limon (L.) Burm. f.	8008-56-8	G2.10
0.7	106-23-0	Lemongrass oil, East Indian	Cymbopogon flexuosus (Nees ex Steudel) Will. Watson	8007-02-1	E2.12
0.3	106-23-0	Lemongrass oil, West Indian	Cymbopogon citratus (DC) Stapf.	8007-02-1	E2.12
1.4	106-23-0	Lime oil, cold pressed, furocoumarin free	Citrus aurantifolia (Christman) Swingle	68916-83-6	G2.33
1.4	106-23-0	Lime oil, expressed	Citrus aurantifolia (Christman) Swingle	8008-26-2	G2.5
5	106-23-0	Lime oil. expressed folded (2-5X)	Citrus aurantifolia (Christman) Swingle	93685-55-3	G2.6
1.1	106-23-0	Litsea cubeba oil	Litsea Cubeba(Lour.) Pers.	68855-99-2	G2.12
3	106-23-0	Mandarin oil, terpeneless	Citrus reticulata Blanco	68917-20-4	G2.29
0.2	106-23-0	Meyer lemon oil. cold	Citrus x meyerii	1370641-98-7	G2.5

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		pressed			
0.1	106-23-0	Murcote oil, expressed	Citrus reticulata spp. murcote, Swingle	93686-22-7	G2.5
2	106-23-0	Orange peel oil, sweet terpeneless	Citrus sinensis (L.) Osbeck	68606-94-0	G2.29
2	106-23-0	Orange sweet oil folded	Citrus sinensis (L.) Osbeck	8008-57-9	G2.6
1.4	106-23-0	Persian lime oil, expressed	Citrus latifolia Tanaka	8008-26-2	G2.5
0.05	106-23-0	Petitgrain bigarade oil	Citrus aurantium L. spp. Amara Link	8014-17-3	E2.12
1	106-23-0	Petitgrain lemon oil	Citrus limon (L.) Burm. f.	8048-51-9	E2.12
0.05	106-23-0	Petitgrain mandarin oil	Citrus reticulata Blanco	8014-17-3	E2.12
0.1	106-23-0	Petitgrain mandarin oil terpeneless	Citrus reticulata Blanco	84929-38-4	E2.29
0.1	106-23-0	Rose oil	Rosa x damascena Mill.	8007-01-0	F2.12
0.1	106-23-0	Tangelo oil, expressed	Citrus x tangelo Ingram and Moore	72869-73-9	G2.5
0.1	106-23-0	Tangerine oil	Citrus reticulata blanco	8016-85-1	G2.5
3	106-23-0	Tangerine oil terpeneless	Citrus reticulata blanco	68607-01-2	G2.29
0.1	106-23-0	Tangor oil, expressed	Citrus reticulata x Citrus sinensis	93686-22-7	G2.5

This is a non-exhaustive indicative list of typical natural presence for Citronellal and is intended to be used in the absence of own analytical data. If analysis has shown that the level of the restricted ingredient in a natural complex substance is different from what is provided in this Annex I, then the analytically determined level should be used in place of the indicative level.

It should further be noted that natural complex substances themselves can be restricted by an IFRA Standard.

For a detailed list of natural contributions, please refer to the Annex I of IFRA Standards, publicly available on the IFRA website (www.ifragrance.org).

INTRINSIC PROPERTY DRIVING RISK MANAGEMENT:	DERMAL SENSITIZATION AND SYSTEMIC TOXICITY
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RIFM SUMMARIES:

Recommended concentration levels are based on a comprehensive safety assessment, considering various endpoints. Depending on the outcome of the safety assessment, it might be one or more endpoint(s) that will drive the derivation of the concentration levels. If more than one endpoint is of relevance, the recommended concentration levels for each product category is derived from comparing maximum permitted level per endpoint consideration (dermal

Citronellal

sensitization and/or systemic toxicity). Such recommended concentration levels correspond to the lowest level obtained per category.

Additional information is available in the RIFM safety assessment for Citronellal, which can be downloaded from the RIFM Safety Assessment Sheet Database: <http://fragrancematerialsafetyresource.elsevier.com/>.

EXPERT PANEL FOR FRAGRANCE SAFETY RATIONALE / CONCLUSION:

The Expert Panel for Fragrance Safety reviewed all the available data for Citronellal and recommends the limits for the 12 different product categories, which are the acceptable use levels of Citronellal in the various product categories.

REFERENCES:

The IFRA Standard on Citronellal is based on at least one of the following publications:

- The RIFM Safety Assessment on Citronellal if available at the RIFM Safety Assessment Sheet Database: <http://fragrancematerialsafetyresource.elsevier.com>
- Api A.M., Belsito D., Bruze M., Cadby P., Calow P., Dagli M. L., Dekant W., Dent M., Ellis G., Fryer A. D., Fukayama M., Griem P., Hickey C., Kromidas L., Lalko J., Liebler D.C., Miyachi Y., Politano V.T., Renskers K., Ritacco G., Salvito D., Schultz T.W., Sipes I. G., Smith B., Vitale D., Wilcox D.K. (2015). Criteria for the Research Institute for Fragrance Materials, Inc. (RIFM) safety evaluation process for fragrance ingredients. *Food Chem Toxicol.* 2015 Aug;82 Suppl:S1-S19 (http://fragrancematerialsafetyresource.elsevier.com/sites/default/files/Criteria_Document_Final.pdf).
- IDEA project (International Dialogue for the Evaluation of Allergens) Final Report on the QRA2: Skin Sensitisation Quantitative Risk Assessment for Fragrance Ingredients, September 30, 2016 (<http://www.ideaproject.info/uploads/Modules/Documents/qra2-dossier-final--september-2016.pdf>).
- Salvito D.T., Senna R. J., Federle T.W. (2002). A framework for prioritizing fragrance materials for aquatic risk assessment. *Environ Toxicol Chem.* 2002;21:1301-1308 (<https://www.ncbi.nlm.nih.gov/pubmed/12069318>).

Additional information on the application of IFRA Standards is available in the Guidance for the use of IFRA Standards, publicly available at www.ifrafragrance.org.