Geraniol and related compounds: Human health tier II assessment

01 July 2016

Chemicals in this assessment

Chemical Name in the Inventory	CAS Number
2,6-Octadien-1-ol, 3,7-dimethyl-, (E)-	106-24-1
2,6-Octadien-1-ol, 3,7-dimethyl-, (Z)-	106-25-2
2,6-Octadien-1-ol, 3,7-dimethyl-	624-15-7

Preface

This assessment was carried out by staff of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) using the Inventory Multi-tiered Assessment and Prioritisation (IMAP) framework.

The IMAP framework addresses the human health and environmental impacts of previously unassessed industrial chemicals listed on the Australian Inventory of Chemical Substances (the Inventory).

The framework was developed with significant input from stakeholders and provides a more rapid, flexible and transparent approach for the assessment of chemicals listed on the Inventory.

Stage One of the implementation of this framework, which lasted four years from 1 July 2012, examined 3000 chemicals meeting characteristics identified by stakeholders as needing priority assessment. This included chemicals for which NICNAS already held exposure information, chemicals identified as a concern or for which regulatory action had been taken overseas, and chemicals detected in international studies analysing chemicals present in babies' umbilical cord blood.

Stage Two of IMAP began in July 2016. We are continuing to assess chemicals on the Inventory, including chemicals identified as a concern for which action has been taken overseas and chemicals that can be rapidly identified and assessed by using Stage One information. We are also continuing to publish information for chemicals on the Inventory that pose a low risk to

human health or the environment or both. This work provides efficiencies and enables us to identify higher risk chemicals requiring assessment.

The IMAP framework is a science and risk-based model designed to align the assessment effort with the human health and environmental impacts of chemicals. It has three tiers of assessment, with the assessment effort increasing with each tier. The Tier I assessment is a high throughput approach using tabulated electronic data. The Tier II assessment is an evaluation of risk on a substance-by-substance or chemical category-by-category basis. Tier III assessments are conducted to address specific concerns that could not be resolved during the Tier II assessment.

These assessments are carried out by staff employed by the Australian Government Department of Health and the Australian Government Department of the Environment and Energy. The human health and environment risk assessments are conducted and published separately, using information available at the time, and may be undertaken at different tiers.

This chemical or group of chemicals are being assessed at Tier II because the Tier I assessment indicated that it needed further investigation.

For more detail on this program please visit:**www.nicnas.gov.au**

Disclaimer

ACRONYMS & ABBREVIATIONS

Grouping Rationale

The chemicals in this group are the *cis* and *trans* isomers of 2,6-Octadien-1-ol,3,7-dimethyl-; citrol is an approximately 50:50 mixture of the two isomers. The chemicals are:

- 2,6-Octadien-1-ol, 3,7-dimethyl- (CAS No. 624-15-7), known as citrol;
- 2,6-Octadien-1-ol, 3,7-dimethyl-, (E)- (CAS No. 106-24-1), known as geraniol; and
- 2,6-Octadien-1-ol, 3,7-dimethyl-, (Z)- (CAS No. 106-25-2), known as nerol.

The chemicals have been grouped due to their related end-uses and their close chemical relationship based on:

- structural similarity, where orientation of the substituents differs only around the double bond at C2; and
- similarity of the physico-chemical properties including melting points, boiling points and water solubility.

Import, Manufacture and Use

Australian

No specific Australian use, import, or manufacturing information has been identified.

International

The following international uses have been identified through:

- the European Union (EU) Registration, Evaluation and Authorization of Chemicals (REACH) dossiers;
- Galleria Chemica;
- the European Commission Cosmetic Ingredients and Substances (CosIng) database;
- the United States (US) Personal Care Products Council International Nomenclature of Cosmetic Ingredients (INCI) Dictionary;
- the Substances and Preparations in Nordic countries (SPIN) database; and
- the US Department of Health and Human Services, Household Products Database (HPD).

The chemicals in this group have reported cosmetic use including:

- as fragrance compounds in perfumes, hair conditioners (including tonics) and colourants (at unspecified concentrations in aerosol/pump spray, liquid, cream and gel personal care products).

The chemicals in this group have reported domestic use including:

- in aerosol propellants;
- in cleaning/washing agents;
- as odour agents;
- in paints, lacquers and varnishes;
- in surface treatments; and
- in surface-active agents.

The chemicals in this group, except for citrol, have reported commercial use including:

- in absorbents and adsorbents;
- in impregnation materials;
- in lubricants and additives;
- in softeners; and
- as solvents.

The chemicals in this group have non-industrial uses including in:

- agricultural and non-agricultural pesticides (up to 9.5 % concentration in a liquid product);
- preservatives; and
- pharmaceuticals.

Restrictions

Australian

No known restrictions have been identified.

International

The chemical, geraniol, is listed on the following (Galleria Chemica):

- EU Cosmetics Regulation 1223/2009 Annex III—List of substances which cosmetic products must not contain except subject to the restrictions laid down. 'The presence of the substance must be indicated in the list of ingredients referred to in Article 19(1)g when its concentration exceeds:

  - 0.001% in leave-on products; and

  - 0.01% in rinse-off products.'

- Europe Directive 2009/48/EC of the European Parliament and of the Council on the safety of toys - allergenic fragrances toys shall not contain. 'However, the presence of traces of these fragrances shall be allowed provided that such presence is technically unavoidable under good manufacturing practice and does not exceed 100 mg/kg'

- New Zealand Cosmetic Products Group Standard - Schedule 5: Components Cosmetic Products Must Not Contain Except Subject to the Restrictions and conditions laid down: 'The presence of the substance must be indicated in the list of ingredients referred to in Part 2(2A) of Schedule 1 when its concentration exceeds:

  - 0.001% in leave-on products

  - 0.01% in rinse-off products'

Existing Worker Health and Safety Controls

Hazard Classification

The chemicals in this group are not listed on the Hazardous Substances Information System (HSIS) (Safe Work Australia).

Exposure Standards

Australian

No specific exposure standards are available for the chemicals in this group.

International

No specific exposure standards are available for the chemicals in this group except for citrol.

Exposure limits (TWA) of 111–150 mg/m^3 (20–25 ppm) and short-term exposure limit (STEL) of 300 mg/m^3 (50 ppm) in various countries such as Canada, Estonia and Sweden were identified for the chemical citrol (Galleria Chemica).

Health Hazard Information

The chemicals geraniol and nerol are common natural constituents of essential oils (i.e. rose, citronella, lemon and palmorosa) (Galleria Chemica). Geraniol is present in essential oils at concentrations of 70.1–85.3 % after distillation from whole herb, leaf lamina, leaf sheath and inflorescence of palmarosa plants (Rao BR, Rajput DK et al., 2009).

In the absence of specific information for each individual chemical, available data from chemicals within the group are considered as surrogate data (refer to **Grouping rationale** section), and are included in the relevant sections of the report (REACHa; REACHb).

Toxicokinetics

The chemicals geraniol and nerol are metabolised by two major pathways in animals:

- One route involves the alcohols being successively oxidised to the corresponding aldehydes and carboxylic acids;
- In a second route, alcohols undergo omega-oxidation that yields diacids.

Polar metabolites formed through these two pathways are excreted primarily in the urine as the glucuronic acid conjugates (FFHPVC, 2001).

Acute Toxicity

Oral

Based on the available animal data for geraniol and nerol, the chemicals in this group have low oral toxicity.

The median lethal dose (LD50) was reported to be > 2000 mg/kg bw in rats for both geraniol and nerol. Reported signs of toxicity include depression, coma, exophthalmia (protrusion of the eyeballs), hyperreflexiveness, restlessness, lethargy and loss of righting reflex (REACHa; REACHb).

Dermal

Based on the available animal data for geraniol and nerol, the chemicals in this group have low dermal toxicity.

The median lethal dose (LD50) was reported to be > 2000 mg/kg bw in rabbits for both geraniol and nerol (REACHa; REACHb).

Inhalation

No data are available for the chemicals in this group.

Corrosion / Irritation

Skin Irritation

Based on the available animal data for geraniol and nerol and observations in humans, the chemicals in this group are considered to be moderate skin irritants. Hazard classification is warranted.

In an acute dermal irritation and corrosion study (OECD TG 404), 0.5 mL of undiluted geraniol (purity 90.7 %) was applied to 11 rabbits for four hours. Animals were observed at 24, 48 and 72 hours post-exposure. The mean erythema and oedema scores (for the 24–72 hour observation period) were calculated to be 2 and 1.31, respectively. The mean primary dermal irritation index was calculated to be 3.31 indicating severe dermal irritation at 24 hours and 72 hours post-exposure. Irreversible symptoms (evident after the seven day observation period) in all treated animals were reported (REACHa).

In a similar study (OECD TG 404 with study deviations), three New Zealand White rabbits were exposed to 0.5 mL of undiluted nerol (purity unspecified), under semi-occlusive conditions on clipped dorsal skin for four hours, and observed over seven days (at 1, 24, 48 and 72-hour intervals as well as after 7 days) after the patch was removed. Slight erythema in one animal was observed one-hour after the patch was removed. Increased dermal irritation and very slight to well-defined erythema (with or without slight oedema) were observed 24–72 post-exposure. Mean individual scores at 24, 48 and 72 hours after exposure for

the three animals were reported to be 1.7, 1.7, 2.0 for erythema, respectively and 0.7, 0.0, 0.7 for oedema, respectively. Irreversible symptoms after the seven day observation period, such as hyperkeratinisation, were reported for all treated animals.

Eye Irritation

Based on the available animal data for geraniol and nerol, the chemicals in this group are considered to be severe eye irritants. Hazard classification is warranted.

In an acute eye irritation and corrosion study (OECD TG 405), 0.1 mL of geraniol (purity unspecified) was instilled into the eyes of four female Specific Pathogen Free (SPF) White rabbits and observed for 21 days (at 1, 24, 48 and 72-hour intervals as well as after 7, 14 and 21 days). Well defined signs of eye irritation reported 24 hours after exposure included corneal opacity, iris lesion, swelling and crimson red colouration of the conjunctivae. No Draize scores were available. Irreversible symptoms in two out of the four animals were reported after the 21 day observation period (REACHa).

In a similar study (OECD TG 405 with study deviations), 0.1 mL of undiluted nerol was instilled into the eyes of six female New Zealand White rabbits and observed for a period of 7 days (at 24, 48 and 72-hour intervals and then after 4 and 7 days). The chemical was reported to be irritating to the eyes of rabbits, with Draize scores for days 1, 2, 3, 4 and 7 of 31, 21, 15, 5, 1 (out of a maximum score of 110), respectively. Irreversible effects were reported after the seven day observation period (REACHb).

Observation in humans

In various occlusive patch tests, geraniol was found to be a severe skin irritant in humans.

The chemical geraniol was applied (0.2 mL) in a closed patch test conducted on the upper outer arm of 25 subjects (male and female) between the ages of 18 and 65 years old over four hours (at 15 and 30 minute intervals and also after 1, 2, 3 and 4 hours). Reactions were assessed at 24, 48 and 72 hours after patch removal. Dermal exposure to the substance in humans was found to have resulted in irritant effects in 2 out of 25 subjects (REACHa).

In another test, 0.05 g of a solution containing 32 % geraniol was applied to the back of each subject for 48 hours. The reactions were read 30 minutes after patch removal and if necessary at 72, 96 and 120 hours after patch removal. The substance was determined to be a severe irritant at 32 % and given an irritation score of 3 (REACHa).

Sensitisation

Skin Sensitisation

Based on the available animal data for geraniol and nerol, the chemicals in this group are considered to be skin sensitisers. Hazard classification is warranted.

In a study (OECD TG 429), geraniol (98.5 % purity) was reported to be positive for skin sensitisation in a mouse local lymph node assay (LLNA). Female CBA mice (four/dose) were administered daily applications of 2.5 %, 5 %, 10 %, 25 % or 50 % (w/v) of the chemical in ethanol:diethyl phthalate (ratio of 1:3) for three consecutive days. Stimulation indices of 1.7, 2.4, 2.8, 4.8 and 6.0 were reported, respectively. The estimated concentration needed to produce a three-fold increase in lymphocyte proliferation (EC3) was reported to be 11.4 % (REACHa).

In an additional skin sensitisation study using geraniol (purity unspecified), positive results for skin sensitation in a CBA mouse LLNA were reported. Mice (three/dose) were administered daily applications of 0 %, 12.5 %, 25 % (w/v) of the chemical in acetone:olive oil (4:1 v/v) for three consecutive days (after being pre-exposed with 50 % of the chemical). No stimulation indices or EC3 values were provided. However, increases of lymph node cell proliferation and lymph node weights were reported at the highest dose (REACHa).

Positive results for skin sensitisation were reported for nerol (98.5 % purity) in a mouse local lymph node assay (LLNA) (OECD TG 429). Female CBA/J mice (four/dose) were administered daily applications of 5 %, 10 %, 25 %, 50 % and 100% (w/v) of the

chemical in acetone/olive oil (4/1; v/v) to the dorsal surface of both ears for three consecutive days. Stimulation indices of 1.10, 1.77, 3.16, 5.12 and 2.47 were reported, respectively. The EC3 value was reported to be 23 % (REACHb).

Observation in humans

There are limited human data available for the chemicals in this group. Geraniol was reported to cause skin sensitisation in 1 out of 35 subjects (13 male, 22 female) in a human patch test study (where 8 subjects had previous history of eczematous skin and 12 subjects had cosmetic sensititivity). Subjects were dermally exposed under occlusive conditions to geraniol at 5 % over a 48 hour period. Reactions were recorded at 48 and 96 hours post-exposure. However, it was reported that the positive subject had previous signs of eczematous skin (redness, itching and inflammation) (REACHa).

Repeated Dose Toxicity

Oral

Based on the available animal data for geraniol, repeated oral exposure to the chemicals in this group is not expected to cause adverse effects.

In a sub-chronic oral toxicity study, male and female Osborne-Mendel rats (five/dose/sex) were orally administered geraniol at 10000 ppm (550 mg/kg bw/day) continuously in their diet for 112 days, followed by 1000 ppm (55 mg/kg bw/day) for further 189–196 days. The no observed adverse effect level (NOAEL) was reported as > 550 mg/kg bw/day for both male and female animals. No treatment-related clinical signs were observed at necropsy (REACHa).

In a combined repeated dose and reproductive developmental toxicity screening test (OECD TG 422) (refer to the **Reproductive and developmental toxicity** section), no treatment-related systemic effects were reported from the oral administration of nerol. The NOAEL for systemic toxicity was reported to be 6000 ppm (374 mg/kg bw/day) based on the reduced body weight gain and decreased food consumption in treated animals at 1200 ppm (720 mg/kg bw/day, the highest dose tested (REACHb).

Dermal

Based on the available animal data for geraniol, repeated dermal exposure to the chemicals in this group is most likely associated with local effects (refer to **Corrosion/Irritation** section).

In a combined repeat dose and reproductive developmental toxicity screening test (OECD TG 421), male and female Wistar rats (ten/dose/sex) were dermally exposed to geraniol (purity unspecified), daily, for at least 6 hours under semi-occlusive conditions at concentrations of 0, 50, 150 or 450 mg/kg bw/day. Due to the severity of the local effects observed at the highest dose level, the dose was reduced to 300 mg/kg bw/day from day ten of the study. Treatment-related effects included local inflammatory reactions in the skin charactersed by multi-focal red spots and scales. Slight erythema was reported in treated males at 50 or 150 mg/kg bw/day. A NOAEL of 300 mg/kg bw/day for systemic effects was reported in this study for geraniol. No changes in food consumption and body weight were reported (REACHa).

Inhalation

No data are available for the chemicals in this group.

Genotoxicity

Based on the available data for geraniol and nerol, the chemicals in this group are not considered to be genotoxic.

Several in vitro assays for the chemicals gave negative results (REACHa; REACHb) in the following:

- bacterial reverse mutation assays (*S. typhimurium* TA 1535, TA 1537, TA 98 and TA 100) with and without metabolic activation for geraniol and nerol;
- a mammalian cell gene mutation assay in Chinese hamster ovary (CHO) cells with and without metabolic activation (at doses of up to 200 µg/mL for geraniol); and
- a sister chromatid exchange assay in CHO-K1 cells without metabolic activation (at doses of up to 1000 µM) for geraniol.

Geraniol gave a negative result in an in vivo mammalian erythrocyte micronucleus test in NMRI male mouse bone marrow cells at doses of up to 1500 mg/kg (REACHa).

Carcinogenicity

No animal toxicity data are available on the carcinogenicity of the chemicals in this group. Based on the available genotoxicity data (refer to **Genotoxicity** section), the chemicals are not considered likely to be carcinogenic.

Furthermore, the chemicals in this group presented no alerts for mutagenicity or carcinogenicity based on its molecular structure as profiled by the OECD Quantitative Structure–Activity Relationship (QSAR) Toolbox v3.2.

Reproductive and Developmental Toxicity

Based on the available animal data for nerol, the chemicals in this group are not considered to be specific reproductive or developmental toxins.

In a combined repeat dose and reproductive/developmental toxicity screening test (OECD TG 422), male and female Wistar Han rats (10/dose/sex, except at 12000 ppm males: 5/dose) were orally exposed to nerol (purity 98.7 %) for up to 53 consecutive days (including gestation days 41–53). Doses of 0, 3000, 6000 or 12000 ppm (0, 191.2, 374 or 720 mg/kg bw/day, respectively) were administered in the diet of animals. The NOAEL for reproductive toxicity was reported to be 12000 ppm (the highest dose tested) as no adverse effects were observed on fertility and post-natal development of offspring at this dose. The NOAEL for developmental toxicity was reported to be 3000 ppm based on increased post-implantation loss at $\geq$ 6000 ppm. The LOAEL for maternal toxicity was reported to be 3000 ppm based on decrease in body weight gain at this dose during the last week of gestation. No treatment-related effects on mating, fertility, gestation length and the viability of the offspring were reported (REACHb).

In another combined repeated dose and reproductive developmental toxicity screening test (OECD TG 421) previously described (refer to the **Repeated dose toxicity: Dermal** section), short-term local effects were observed at all dose levels from the dermal administration of geraniol. No reproductive or developmental effects were reported (REACHa).

Risk Characterisation

Critical Health Effects

The main critical health effects for risk characterisation include local effects (skin and eye irritation; and skin sensitisation).

Public Risk Characterisation

Although use in cosmetic and domestic products in Australia is not known, the chemicals are reported to be used in the formulations of cosmetic and domestic products (at unspecified concentrations in aerosol/pump spray, liquid, cream and gel personal care products) as identified through the Household Products Database, US Department of Health and Human Services (refer to **Import, manufacture and use** section).

The main route of public exposure is expected to be skin and eye contact. There are currently no labelling requirements for products containing the chemicals in Australia. Therefore, in the absence of any regulatory controls, the characterised critical health effects (skin and eye irritation, and skin sensitisation) have the potential to pose an unreasonable risk to the public under the uses identified.

The skin and eye irritation, and skin sensitisation risks could be mitigated by the implementation of concentration limits for cosmetic and domestic products through the *Standard for the Uniform Scheduling of Medicines and Poisons* (SUSMP).

Occupational Risk Characterisation

During product formulation, dermal and ocular exposure of workers to the chemical may occur, particularly where manual or open processes are used. Worker exposure to the chemicals at lower concentrations may also occur while using formulated products containing the chemicals. The level and route of exposure will vary depending on the method of application and work practices employed.

Given the critical local health effects (skin and eye irritation; and skin sensitisation), the chemicals may pose an unreasonable risk to workers unless adequate control measures to minimise dermal and ocular exposure to the chemical are implemented. The chemicals should be appropriately classified and labelled to ensure that a person conducting a business or undertaking (PCBU) at a workplace (such as an employer) has adequate information to determine appropriate controls.

The data available support an amendment to the hazard classification in the HSIS (Safe Work Australia) (refer to **Recommendation** section).

NICNAS Recommendation

Further risk management is required. Sufficient information is available to recommend that risks to public health and safety from the potential use of these chemicals in cosmetic and/or domestic products be managed through changes to the SUSMP, and risks for workplace health and safety be managed through changes to classification and labelling (HSIS).

Assessment of the chemicals are considered to be sufficient provided that risk management recommendations are implemented and all requirements are met under workplace health and safety and poisons legislation as adopted by the relevant state or territory.

Regulatory Control

Public Health

Appropriate scheduling and labelling should be undertaken to mitigate risk for the chemicals use in both cosmetic and domestic products. Due to the skin and eye irritation, and skin sensitisation potential, these chemicals should be considered for listing in the SUSMP, consistent with the *Scheduling Policy Framework* guidelines. Matters to be taken into consideration include:

- Local effects (particularly skin sensitisation) which may occur following exposure to the chemicals;
- The known cosmetic and domestic uses of the chemicals, including reported widespread use in cosmetic and domestic products overseas at unknown concentrations according to the US Household Products Database;
- The presence of the chemicals in essential oils, the use of which is not subject to existing controls; and
- Overseas restrictions on the domestic or cosmetic uses of the chemicals. The restrictions on the use of these chemicals in cosmetic products in the European Union (refer to **Restrictions**: **international** section) are considered appropriate to mitigate the risk.

Exemptions to scheduling might be applicable at low concentrations.

Work Health and Safety

The chemicals are recommended for classification and labelling under the current Approved Criteria and adopted GHS as below. This assessment does not consider classification of physical and environmental hazards.

Hazard	Approved Criteria (HSIS)[a]	GHS Classification (HCIS)[b]
Irritation / Corrosivity	Risk of serious eye damage (Xi; R41) Irritating to skin (Xi; R38)	Causes serious eye damage - Cat. 1 (H318) Causes skin irritation - Cat. 2 (H315)
Sensitisation	May cause sensitisation by skin contact (Xi; R43)	May cause an allergic skin reaction - Cat. 1 (H317)

[a] Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)].

[b] Globally Harmonized System of Classification and Labelling of Chemicals (GHS) United Nations, 2009. Third Edition.

[*] Existing Hazard Classification. No change recommended to this classification

Advice for consumers

Products containing the chemicals should be used according to the instructions on the label.

Advice for industry

Control measures

Control measures to minimise the risk from dermal and ocular exposure to the chemicals should be implemented in accordance with the hierarchy of controls. Approaches to minimise risk include substitution, isolation and engineering controls. Measures required to eliminate, or minimise risk arising from storing, handling and using a hazardous chemical depend on the physical form and the manner in which the chemical is used. Examples of control measures which could minimise the risk include, but are not limited to:

- using closed systems or isolating operations;
- using local exhaust ventilation to prevent the chemical from entering the breathing zone of any worker;
- air monitoring to ensure control measures in place are working effectively and continue to do so;
- minimising manual processes and work tasks through automating processes;
- work procedures that minimise splashes and spills;
- regularly cleaning equipment and work areas; and
- using protective equipment that is designed, constructed, and operated to ensure that the worker does not come into contact with the chemical.

Guidance on managing risks from hazardous chemicals are provided in the *Managing risks of hazardous chemicals in the workplace—Code of practice* available on the Safe Work Australia website.

Personal protective equipment should not solely be relied upon to control risk and should only be used when all other reasonably practicable control measures do not eliminate or sufficiently minimise risk. Guidance in selecting personal protective

equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

Obligations under workplace health and safety legislation

Information in this report should be taken into account to help meet obligations under workplace health and safety legislation as adopted by the relevant state or territory. This includes, but is not limited to:

- ensuring that hazardous chemicals are correctly classified and labelled;
- ensuring that (material) safety data sheets ((M)SDS) containing accurate information about the hazards (relating to both health hazards and physicochemical (physical) hazards) of the chemical are prepared; and
- managing risks arising from storing, handling and using a hazardous chemical.

Your work health and safety regulator should be contacted for information on the work health and safety laws in your jurisdiction.

Information on how to prepare an (M)SDS and how to label containers of hazardous chemicals are provided in relevant codes of practice such as the *Preparation of safety data sheets for hazardous chemicals—Code of practice* and *Labelling of workplace hazardous chemicals—Code of practice*, respectively. These codes of practice are available from the Safe Work Australia website.

A review of the physical hazards of the chemicals have not been undertaken as part of this assessment.

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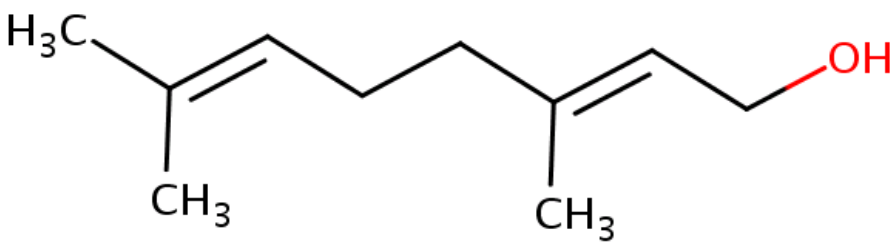
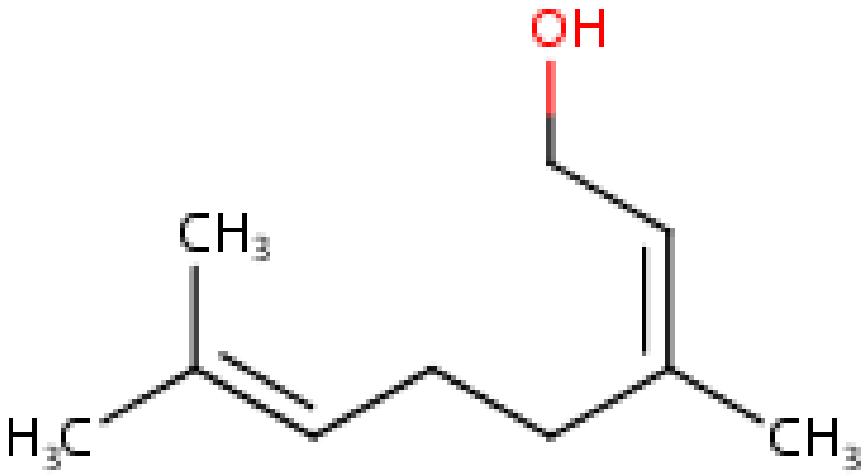
Last Update 01 July 2016

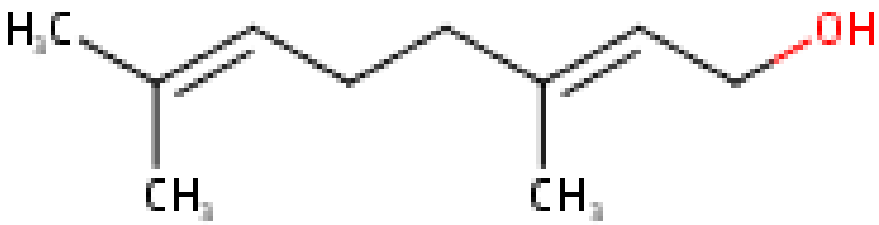
Chemical Identities

Chemical Name in the Inventory and Synonyms	**2,6-Octadien-1-ol, 3,7-dimethyl-, (E)-** geraniol geranyl alcohol geranol lemonol 3,7-dimethyl-2,6-octadien-1-ol, (E)-
CAS Number	106-24-1
Structural Formula	
Molecular Formula	C10H18O
Molecular Weight	154.25

Chemical Name in the Inventory and Synonyms	**2,6-Octadien-1-ol, 3,7-dimethyl-, (Z)-** nerol cis-geraniol neryl alcohol 2,6-dimethyl-2,6-octadien-8-ol 3,7-dimethyl-2,6-octadien-1-ol, (Z)-
CAS Number	106-25-2
Structural Formula	

	
Molecular Formula	C10H18O
Molecular Weight	154.25

Chemical Name in the Inventory and Synonyms	**2,6-Octadien-1-ol, 3,7-dimethyl-** citrol 2,6-dimethyl-trans-2,6-octadien-8-ol 2,6-octadien-1-ol, 3,7-dimethyl- 3,7-dimethyl-2,6-octadien-1-ol 3,7-dimethyl-2,6-octadienol
CAS Number	624-15-7
Structural Formula	

	
Molecular Formula	C10H18O
Molecular Weight	154.25

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