

Safety data sheet

acc. to Safe Work Australia - Code of Practice



Oil of mandarin , Italian

article number: **3796**
Version: **GHS 6.0 en**
Replaces version of: 2023-03-17
Version: (GHS 5)

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

| | |
|---------------------------------|----------------------------------|
| Identification of the substance | Oil of mandarin , Italian |
| Article number | 3796 |
| CAS number | 8008-31-9 |
| Alternative name(s) | Oleum Mandariniae |

1.2 Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------|--|
| Relevant identified uses: | Laboratory chemical Laboratory and analytical use |
| Uses advised against: | Do not use for products which come into contact with foodstuffs. Do not use for private purposes (household). Food, drink and animal feeding-stuffs. |

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co. KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
e-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet: Department Health, Safety and Environment

e-mail (competent person): sicherheit@carlroth.de

1.4 Emergency telephone number

| Name | Street | Postal code/city | Telephone | Website |
|--|-----------------|--------------------|-----------|---------|
| NSW Poisons Information Centre Childrens Hospital | Hawkesbury Road | 2145 Westmead, NSW | 131126 | |

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification acc. to GHS

| Section | Hazard class | Cat-egory | Hazard class and category | Hazard statement |
|---------|---------------------------|-----------|---------------------------|------------------|
| 2.6 | Flammable liquid | 3 | Flam. Liq. 3 | H226 |
| 3.2 | Skin corrosion/irritation | 2 | Skin Irrit. 2 | H315 |
| 3.4S | Skin sensitisation | 1 | Skin Sens. 1 | H317 |

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| Section | Hazard class | Cat-egory | Hazard class and category | Hazard statement |
|---------|-------------------|-----------|---------------------------|------------------|
| 3.10 | Aspiration hazard | 1 | Asp. Tox. 1 | H304 |

For full text of abbreviations: see SECTION 16

The most important adverse physicochemical, human health and environmental effects

The product is combustible and can be ignited by potential ignition sources.

2.2 Label elements

Labelling

Signal word

Danger

Pictograms

GHS02, GHS07,
GHS08



Hazard statements

H226 Flammable liquid and vapour
H304 May be fatal if swallowed and enters airways
H315 Causes skin irritation
H317 May cause an allergic skin reaction

Precautionary statements

Precautionary statements - prevention

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P280 Wear protective gloves

Precautionary statements - response

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352 IF ON SKIN: Wash with plenty of soap and water
P331 Do NOT induce vomiting
P370+P378 In case of fire: Use sand, carbon dioxide or powder extinguisher for extinction

Precautionary statements - storage

P403+P235 Store in a well-ventilated place. Keep cool

2.3 Other hazards

Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) at a concentration of $\geq 0,1\%$.

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SECTION 3: Composition/information on ingredients

3.1 Substances

"UVCB substance" (substance of unknown or variable composition).

Name of substance Oil of mandarin

CAS No 8008-31-9

Impurities/additives/constituents:

| Name of substance | Identifier | Wt% |
|----------------------|---------------------|-----------|
| D-(+)-Limonene | CAS No 5989-27-5 | 50 - < 75 |
| γ -Terpinene | CAS No 99-85-4 | 10 - < 25 |
| Myrcene | CAS No 123-35-3 | 1 - < 3 |
| β -Pinene | CAS No 127-91-3 | 1 - < 3 |
| DL- α -Pinene | CAS No 80-56-8 | 1 - < 3 |
| Terpinolene | CAS No 586-62-9 | < 1 |
| Linalool | CAS No 78-70-6 | < 1 |
| p-Cymene | CAS No 99-87-6 | < 1 |

Remarks

For full text of abbreviations: see SECTION 16

SECTION 4: First aid measures

4.1 Description of first aid measures



General notes

Take off contaminated clothing.

Following inhalation

Provide fresh air. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Rinse skin with water/shower. After contact with skin, wash immediately with plenty of water. In case of skin reactions, consult a physician. In case of skin irritation, consult a physician.

Following eye contact

Rinse cautiously with water for several minutes. In all cases of doubt, or when symptoms persist, seek medical advice.

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Following ingestion

Call a physician immediately. Observe aspiration hazard if vomiting occurs.

4.2 Most important symptoms and effects, both acute and delayed

Aspiration hazard, Irritation, Allergic reactions

4.3 Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Firefighting measures

5.1 Extinguishing media



Suitable extinguishing media

co-ordinate firefighting measures to the fire surroundings!
water spray, dry extinguishing powder, BC-powder, carbon dioxide (CO₂)

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Combustible. In case of insufficient ventilation and/or in use, may form flammable/explosive vapour-air mixture. Solvent vapours are heavier than air and may spread along floors. Places which are not ventilated, e.g. unventilated below ground level areas such as trenches, conduits and shafts, are particularly prone to the presence of flammable substances or mixtures. Vapours may form explosive mixtures with air.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO₂), May produce toxic fumes of carbon monoxide if burning.

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures



For non-emergency personnel

Avoid contact with skin, eyes and clothes. Do not breathe vapour/spray. Avoidance of ignition sources.

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority.

6.3 Methods and material for containment and cleaning up

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Advice on how to contain a spill

Covering of drains.

Advice on how to clean up a spill

Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provision of sufficient ventilation.

Measures to prevent fire as well as aerosol and dust generation



Keep away from sources of ignition - No smoking.

Take precautionary measures against static discharge.

Advice on general occupational hygiene

Wash hands before breaks and after work. Keep away from food, drink and animal feedingstuffs. When using do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed.

Incompatible substances or mixtures

Observe hints for combined storage.

Consideration of other advice:

Ground/bond container and receiving equipment.

Ventilation requirements

Use local and general ventilation.

Specific designs for storage rooms or vessels

Recommended storage temperature: 15 – 25 °C

7.3 Specific end use(s)

No information available.

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

This information is not available.

Human health values

| Relevant DNELs and other threshold levels | | | | |
|---|--------------------------|------------------------------------|-------------------|----------------------------|
| Endpoint | Threshold level | Protection goal, route of exposure | Used in | Exposure time |
| DNEL | 23.3 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| DNEL | 6.67 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| DNEL | 185.8 µg/cm ² | human, dermal | worker (industry) | acute - local effects |

| Relevant DNELs of components | | | | | | |
|------------------------------|-----------|-----------|-------------------------|------------------------------------|-------------------|----------------------------|
| Name of substance | CAS No | End-point | Threshold level | Protection goal, route of exposure | Used in | Exposure time |
| D-(+)-Limonene | 5989-27-5 | DNEL | 66.7 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| D-(+)-Limonene | 5989-27-5 | DNEL | 9.5 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| γ-Terpinene | 99-85-4 | DNEL | 2.939 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| γ-Terpinene | 99-85-4 | DNEL | 0.833 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| DL-α-Pinene | 80-56-8 | DNEL | 3.8 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| DL-α-Pinene | 80-56-8 | DNEL | 0.542 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| β-Pinene | 127-91-3 | DNEL | 5.69 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| β-Pinene | 127-91-3 | DNEL | 0.8 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| β-Pinene | 127-91-3 | DNEL | 54 µg/cm ² | human, dermal | worker (industry) | chronic - local effects |
| Linalool | 78-70-6 | DNEL | 2.8 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| Linalool | 78-70-6 | DNEL | 16.5 mg/m ³ | human, inhalatory | worker (industry) | acute - systemic effects |
| Linalool | 78-70-6 | DNEL | 2.5 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| Linalool | 78-70-6 | DNEL | 5 mg/kg bw/day | human, dermal | worker (industry) | acute - systemic effects |

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Environmental values

Relevant PNECs and other threshold levels

| End-point | Threshold level | Organism | Environmental compartment | Exposure time |
|-----------|-----------------|-----------------------|------------------------------|------------------------------|
| PNEC | 5.4 µg/l | aquatic organisms | freshwater | short-term (single instance) |
| PNEC | 0.54 µg/l | aquatic organisms | marine water | short-term (single instance) |
| PNEC | 2.1 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| PNEC | 1.3 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| PNEC | 0.13 mg/kg | aquatic organisms | marine sediment | short-term (single instance) |
| PNEC | 0.29 mg/kg | terrestrial organisms | soil | short-term (single instance) |

Relevant PNECs of components

| Name of substance | CAS No | End-point | Threshold level | Organism | Environmental compartment | Exposure time |
|-------------------|-----------|-----------|-----------------|-----------------------|------------------------------|------------------------------|
| D-(+)-Limonene | 5989-27-5 | PNEC | 14 µg/l | aquatic organisms | freshwater | short-term (single instance) |
| D-(+)-Limonene | 5989-27-5 | PNEC | 1.4 µg/l | aquatic organisms | marine water | short-term (single instance) |
| D-(+)-Limonene | 5989-27-5 | PNEC | 1.8 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| D-(+)-Limonene | 5989-27-5 | PNEC | 3.85 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| D-(+)-Limonene | 5989-27-5 | PNEC | 0.385 mg/kg | aquatic organisms | marine sediment | short-term (single instance) |
| D-(+)-Limonene | 5989-27-5 | PNEC | 0.763 mg/kg | terrestrial organisms | soil | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 0.003 mg/l | aquatic organisms | freshwater | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 0 mg/l | aquatic organisms | marine water | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 10 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 0.49 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 0.049 mg/kg | aquatic organisms | marine sediment | short-term (single instance) |
| γ-Terpinene | 99-85-4 | PNEC | 0.423 mg/kg | terrestrial organisms | soil | short-term (single instance) |
| DL-α-Pinene | 80-56-8 | PNEC | 0.606 µg/l | aquatic organisms | freshwater | short-term (single instance) |
| DL-α-Pinene | 80-56-8 | PNEC | 0.061 µg/l | aquatic organisms | marine water | short-term (single instance) |
| DL-α-Pinene | 80-56-8 | PNEC | 0.2 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |

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| Relevant PNECs of components | | | | | | |
|------------------------------|----------|-----------|------------------------------|-----------------------|------------------------------|------------------------------|
| Name of substance | CAS No | End-point | Threshold level | Organism | Environmental compartment | Exposure time |
| DL- α -Pinene | 80-56-8 | PNEC | 157 $\mu\text{g}/\text{kg}$ | aquatic organisms | freshwater sediment | short-term (single instance) |
| DL- α -Pinene | 80-56-8 | PNEC | 15.7 $\mu\text{g}/\text{kg}$ | aquatic organisms | marine sediment | short-term (single instance) |
| DL- α -Pinene | 80-56-8 | PNEC | 31.7 $\mu\text{g}/\text{kg}$ | terrestrial organisms | soil | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 1.004 $\mu\text{g}/\text{l}$ | aquatic organisms | freshwater | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 0.1 $\mu\text{g}/\text{l}$ | aquatic organisms | marine water | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 3.26 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 0.337 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 0.034 mg/kg | aquatic organisms | marine sediment | short-term (single instance) |
| β -Pinene | 127-91-3 | PNEC | 0.067 mg/kg | terrestrial organisms | soil | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 0.2 mg/l | aquatic organisms | freshwater | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 0.02 mg/l | aquatic organisms | marine water | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 10 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 2.22 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 0.222 mg/kg | aquatic organisms | marine sediment | short-term (single instance) |
| Linalool | 78-70-6 | PNEC | 0.327 mg/kg | terrestrial organisms | soil | short-term (single instance) |

8.2 Exposure controls

Individual protection measures (personal protective equipment)

Eye/face protection



Use safety goggle with side protection.

Skin protection



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• hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. The times are approximate values from measurements at 22 ° C and permanent contact. Increased temperatures due to heated substances, body heat etc. and a reduction of the effective layer thickness by stretching can lead to a considerable reduction of the breakthrough time. If in doubt, contact manufacturer. At an approx. 1.5 times larger / smaller layer thickness, the respective breakthrough time is doubled / halved. The data apply only to the pure substance. When transferred to substance mixtures, they may only be considered as a guide.

• type of material

NBR (Nitrile rubber)

• material thickness

≥0,4 mm

• breakthrough times of the glove material

>480 minutes (permeation: level 6)

• other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Respiratory protection



Respiratory protection necessary at: Aerosol or mist formation. Type: A (against organic gases and vapours with a boiling point of > 65 °C , colour code: Brown).

Environmental exposure controls

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|--|
| Physical state | liquid |
| Colour | yellowish brown |
| Odour | characteristic |
| Melting point/freezing point | not determined |
| Boiling point or initial boiling point and boiling range | 160 °C at 1,016 hPa (ECHA) |
| Flammability | flammable liquid in accordance with GHS criteria |
| Lower and upper explosion limit | not determined |
| Flash point | 51 °C at 1,012 hPa (ECHA) |
| Auto-ignition temperature | 235 °C at 1,016 hPa (ECHA) |
| Decomposition temperature | not relevant |
| pH (value) | not determined |
| Kinematic viscosity | not determined |

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Solubility(ies)

Water solubility 0.093 g/l at 25 °C (poorly soluble) (ECHA)

Partition coefficient

Partition coefficient n-octanol/water (log value): 4.27 – 4.88 (ECHA)

Vapour pressure 2.087 hPa at 25 °C

Density and/or relative density

Density 0.84 – 0.85 g/cm³ at 20 °C

Relative vapour density Information on this property is not available.

Particle characteristics not relevant (liquid)

Other safety parameters

Oxidising properties none

9.2 Other information

Information with regard to physical hazard classes: There is no additional information.

Other safety characteristics:

Refractive index 1.47 – 1.48

SECTION 10: Stability and reactivity

10.1 Reactivity

It's a reactive substance. Risk of ignition.

If heated

Risk of ignition. Vapours may form explosive mixtures with air.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Violent reaction with: strong oxidiser

10.4 Conditions to avoid

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5 Incompatible materials

Rubber articles, different plastics

10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Classification acc. to GHS

Acute toxicity

Shall not be classified as acutely toxic.

| Acute toxicity | | | | | |
|----------------|----------|--------------|---------|--------|--------|
| Exposure route | Endpoint | Value | Species | Method | Source |
| oral | LD50 | >5,000 mg/kg | rat | | ECHA |
| dermal | LD50 | >5,000 mg/kg | rabbit | | ECHA |

| Acute toxicity of components | | | | | |
|------------------------------|-----------|----------------|----------|--------------|---------|
| Name of substance | CAS No | Exposure route | Endpoint | Value | Species |
| D-(+)-Limonene | 5989-27-5 | oral | LD50 | >2,000 mg/kg | rat |
| γ-Terpinene | 99-85-4 | oral | LD50 | >2,000 mg/kg | rat |
| γ-Terpinene | 99-85-4 | dermal | LD50 | >2,000 mg/kg | rat |
| DL-α-Pinene | 80-56-8 | dermal | LD50 | >2,000 mg/kg | rat |
| DL-α-Pinene | 80-56-8 | oral | LD50 | 3,700 mg/kg | rat |
| Myrcene | 123-35-3 | oral | LD50 | >3,380 mg/kg | mouse |
| Myrcene | 123-35-3 | dermal | LD50 | >5,000 mg/kg | rabbit |
| β-Pinene | 127-91-3 | oral | LD50 | 4,700 mg/kg | rat |
| p-Cymene | 99-87-6 | oral | LD50 | 4,750 mg/kg | rat |
| p-Cymene | 99-87-6 | dermal | LD50 | >5,000 mg/kg | rabbit |
| Terpinolene | 586-62-9 | oral | LD50 | >2,000 mg/kg | rat |
| Terpinolene | 586-62-9 | dermal | LD50 | >2,000 mg/kg | rat |
| Linalool | 78-70-6 | oral | LD50 | 2,790 mg/kg | rat |
| Linalool | 78-70-6 | dermal | LD50 | 5,610 mg/kg | rabbit |

Skin corrosion/irritation

Causes skin irritation.

Serious eye damage/eye irritation

Shall not be classified as seriously damaging to the eye or eye irritant.

Respiratory or skin sensitisation

May cause an allergic skin reaction.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

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Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

May be fatal if swallowed and enters airways.

Symptoms related to the physical, chemical and toxicological characteristics

• If swallowed

abdominal pain, nausea, aspiration hazard

• If in eyes

causes slight to moderate irritation

• If inhaled

Data are not available.

• If on skin

causes skin irritation, May produce an allergic reaction, pruritis, localised redness

• Other information

none

11.2 Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) at a concentration of $\geq 0,1\%$.

SECTION 12: Ecological information

12.1 Toxicity

Very toxic to aquatic life with long lasting effects.

| Aquatic toxicity (acute) | | | | |
|--------------------------|---------------------|-----------------------|--------|---------------|
| Endpoint | Value | Species | Source | Exposure time |
| LL50 | $>100 \text{ mg/l}$ | fish | ECHA | 96 h |
| EL50 | 8.9 mg/l | aquatic invertebrates | ECHA | 48 h |
| ErC50 | 0.61 mg/l | algae | ECHA | 72 h |

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| Aquatic toxicity (acute) of components | | | | | |
|--|-----------|----------|------------|--|---------------|
| Name of substance | CAS No | Endpoint | Value | Species | Exposure time |
| D-(+)-Limonene | 5989-27-5 | LC50 | 0.46 mg/l | fish | 96 h |
| D-(+)-Limonene | 5989-27-5 | EC50 | 0.307 mg/l | aquatic invertebrates | 48 h |
| D-(+)-Limonene | 5989-27-5 | ErC50 | 0.32 mg/l | algae | 72 h |
| γ-Terpinene | 99-85-4 | EC50 | 2.792 mg/l | fish | 96 h |
| DL-α-Pinene | 80-56-8 | LC50 | 0.303 mg/l | fish | 96 h |
| DL-α-Pinene | 80-56-8 | EC50 | 0.475 mg/l | aquatic invertebrates | 48 h |
| Myrcene | 123-35-3 | EC50 | 1.47 mg/l | aquatic invertebrates | 48 h |
| Myrcene | 123-35-3 | EC50 | 0.31 mg/l | algae | 72 h |
| Myrcene | 123-35-3 | ErC50 | 0.342 mg/l | algae | 72 h |
| β-Pinene | 127-91-3 | LC50 | 0.68 mg/l | rainbow trout (<i>Oncorhynchus mykiss</i>) | 96 h |
| β-Pinene | 127-91-3 | EC50 | 1.09 mg/l | daphnia magna | 48 h |
| β-Pinene | 127-91-3 | ErC50 | 0.7 mg/l | <i>Pseudokirchneriella subcapitata</i> | 72 h |
| p-Cymene | 99-87-6 | LC50 | 48 mg/l | fish | 96 h |
| p-Cymene | 99-87-6 | EC50 | 3.7 mg/l | aquatic invertebrates | 48 h |
| p-Cymene | 99-87-6 | ErC50 | 4.03 mg/l | algae | 72 h |
| Terpinolene | 586-62-9 | LC50 | 0.805 mg/l | fish | 96 h |
| Terpinolene | 586-62-9 | EC50 | 0.634 mg/l | aquatic invertebrates | 48 h |
| Terpinolene | 586-62-9 | ErC50 | 0.692 mg/l | algae | 72 h |
| Linalool | 78-70-6 | LC50 | 27.8 mg/l | fish | 96 h |
| Linalool | 78-70-6 | EC50 | 59 mg/l | aquatic invertebrates | 48 h |
| Linalool | 78-70-6 | ErC50 | 156.7 mg/l | algae | 96 h |

| Aquatic toxicity (chronic) of components | | | | | |
|--|-----------|----------|-------------|-----------------------|---------------|
| Name of substance | CAS No | Endpoint | Value | Species | Exposure time |
| D-(+)-Limonene | 5989-27-5 | EC50 | <0.67 mg/l | fish | 8 d |
| D-(+)-Limonene | 5989-27-5 | EC50 | 188 µg/l | aquatic invertebrates | 21 d |
| γ-Terpinene | 99-85-4 | EC50 | >1,000 mg/l | microorganisms | 3 h |
| β-Pinene | 127-91-3 | EC50 | 326 mg/l | microorganisms | 3 h |
| Terpinolene | 586-62-9 | EC50 | 69 mg/l | microorganisms | 3 h |
| Linalool | 78-70-6 | EC50 | >100 mg/l | microorganisms | 30 min |

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12.2 Persistence and degradability

Biodegradation

The substance is readily biodegradable.

| Degradability of components | | | | | | |
|-----------------------------|-----------|---------------------------|------------------|------|--------|--------|
| Name of substance | CAS No | Process | Degradation rate | Time | Method | Source |
| D-(+)-Limonene | 5989-27-5 | carbon dioxide generation | 58.8 % | 14 d | | ECHA |
| D-(+)-Limonene | 5989-27-5 | oxygen depletion | 80 % | 28 d | | ECHA |
| γ -Terpinene | 99-85-4 | oxygen depletion | 27 % | 28 d | | ECHA |
| DL- α -Pinene | 80-56-8 | oxygen depletion | 68 % | 28 d | | ECHA |
| Myrcene | 123-35-3 | oxygen depletion | 76 % | 28 d | | ECHA |
| β -Pinene | 127-91-3 | oxygen depletion | 76 % | 28 d | | ECHA |
| p-Cymene | 99-87-6 | oxygen depletion | 88 % | 14 d | | ECHA |
| Terpinolene | 586-62-9 | oxygen depletion | 81 % | 28 d | | ECHA |
| Linalool | 78-70-6 | oxygen depletion | 40.9 % | 5 d | | ECHA |

12.3 Bioaccumulative potential

The substance fulfils the very bioaccumulative criterion.

| | |
|---------------------------|--------------------|
| n-octanol/water (log KOW) | 4.27 – 4.88 (ECHA) |
|---------------------------|--------------------|

| Bioaccumulative potential of components | | | | |
|---|-----------|-----|------------------------------|----------|
| Name of substance | CAS No | BCF | Log KOW | BOD5/COD |
| D-(+)-Limonene | 5989-27-5 | | 4.38 (pH value: 7.2, 37 °C) | |
| γ -Terpinene | 99-85-4 | | 5.4 (25 °C) | |
| DL- α -Pinene | 80-56-8 | | 4.83 | |
| Myrcene | 123-35-3 | | 4.82 (pH value: ~6.5, 30 °C) | |
| p-Cymene | 99-87-6 | | 4.8 (pH value: ~7, 20 °C) | |
| Terpinolene | 586-62-9 | | 4.47 | |
| Linalool | 78-70-6 | | 2.9 (pH value: 7, 20 °C) | |

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Data are not available.

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12.6 Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) at a concentration of $\geq 0,1\%$.

12.7 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods



This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packagings

Only packagings which are approved (e.g. acc. to the Dangerous Goods Regulations) may be used. Handle contaminated packages in the same way as the substance itself. Completely emptied packages can be recycled.

Relevant provisions relating to waste(Basel Convention)

Properties of waste which render it hazardous

H3 Flammable liquids
H11 Toxic (Delayed or chronic)

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions. Non-contaminated packages may be recycled.

SECTION 14: Transport information

14.1 UN number

| | |
|----------------|---------|
| UN RTDG | UN 1197 |
| IMDG-Code | UN 1197 |
| ICAO-TI | UN 1197 |

14.2 UN proper shipping name

| | |
|----------------|------------------|
| UN RTDG | EXTRACTS, LIQUID |
| IMDG-Code | EXTRACTS, LIQUID |
| ICAO-TI | Extracts, liquid |

14.3 Transport hazard class(es)

| | |
|----------------|---|
| UN RTDG | 3 |
| IMDG-Code | 3 |
| ICAO-TI | 3 |

14.4 Packing group

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| | |
|--|--|
| UN RTDG | III |
| IMDG-Code | III |
| ICAO-TI | III |
| 14.5 Environmental hazards | hazardous to the aquatic environment |
| 14.6 Special precautions for user | There is no additional information. |
| 14.7 Transport in bulk according to IMO instruments | The cargo is not intended to be carried in bulk. |

14.8 Information for each of the UN Model Regulations

Transport information National regulations Additional information (UN RTDG)

| | |
|------------------------------|---|
| UN number | 1197 |
| Class | 3 |
| Environmental hazards | Yes Hazardous to the aquatic environment |
| Packing group | III |
| Danger label(s) | 3 Fish and tree |



| | |
|---------------------------------|----------------|
| Special provisions (SP) | 223 UN RTDG |
| Excepted quantities (EQ) | E1 UN RTDG |
| Limited quantities (LQ) | 5 L UN RTDG |
| Emergency Action Code | 3Y |

International Maritime Dangerous Goods Code (IMDG) - Additional information

| | |
|--|--|
| Proper shipping name | EXTRACTS, LIQUID |
| Particulars in the shipper's declaration | UN1197, EXTRACTS, LIQUID, (Oil of mandarin), 3, III, 51°C c.c., MARINE POLLUTANT |
| Marine pollutant | yes (hazardous to the aquatic environment) |
| Danger label(s) | 3, "Fish and tree" |



| | |
|--------------------------|----------|
| Special provisions (SP) | 223, 955 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 5 L |
| EmS | F-E, S-D |
| Stowage category | A |

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International Civil Aviation Organization (ICAO-IATA/DGR) - Additional information

| | |
|---|--|
| Proper shipping name | Extracts, liquid |
| Particulars in the shipper's declaration | UN1197, Extracts, liquid, 3, III |
| Environmental hazards | yes (hazardous to the aquatic environment) |
| Danger label(s) | 3 |
|  | |
| Special provisions (SP) | A3 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 10 L |

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

There is no additional information.

National regulations(Australia)

Australian Inventory of Chemical Substances(AICS)

Substance is listed.

Other information

Directive 94/33/EC on the protection of young people at work. Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

National inventories

| Country | Inventory | Status |
|---------|-----------|------------------------------|
| AU | AIIC | substance is listed |
| CA | DSL | substance is listed |
| CN | IECSC | substance is listed |
| EU | ECSI | substance is listed |
| KR | KECI | substance is listed |
| NZ | NZIoC | substance is listed |
| PH | PICCS | substance is listed |
| TR | CICR | substance is listed |
| TW | TCSI | substance is listed |
| US | TSCA | substance is listed (ACTIVE) |
| VN | NCI | substance is listed |

Legend

| | |
|-------|---|
| AIIC | Australian Inventory of Industrial Chemicals |
| CICR | Chemical Inventory and Control Regulation |
| DSL | Domestic Substances List (DSL) |
| ECSI | EC Substance Inventory (EINECS, ELINCS, NLP) |
| IECSC | Inventory of Existing Chemical Substances Produced or Imported in China |
| KECI | Korea Existing Chemicals Inventory |
| NCI | National Chemical Inventory |
| NZIoC | New Zealand Inventory of Chemicals |

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Legend

| | |
|-------|---|
| PICCS | Philippine Inventory of Chemicals and Chemical Substances (PICCS) |
| TCSI | Taiwan Chemical Substance Inventory |
| TSCA | Toxic Substance Control Act |

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Indication of changes (revised safety data sheet)

| Section | Former entry (text/value) | Actual entry (text/value) | Safety-relevant |
|---------|--|---|-----------------|
| 2.3 | Endocrine disrupting properties: Does not contain an endocrine disruptor (EDC) in a concentration of $\geq 0,1\%$. | Endocrine disrupting properties: Does not contain an endocrine disruptor (ED) at a concentration of $\geq 0,1\%$. | yes |
| 15.1 | | National inventories: change in the listing (table) | yes |

Abbreviations and acronyms

| Abbr. | Descriptions of used abbreviations |
|----------|--|
| BCF | Bioconcentration factor |
| BOD | Biochemical Oxygen Demand |
| CAS | Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances) |
| COD | Chemical oxygen demand |
| DGR | Dangerous Goods Regulations (see IATA/DGR) |
| DNEL | Derived No-Effect Level |
| EC50 | Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval |
| ED | Endocrine disruptor |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| EL50 | Effective Loading 50 %: the EL50 corresponds to the loading rate required to produce a response in 50% of the test organisms |
| ELINCS | European List of Notified Chemical Substances |
| EmS | Emergency Schedule |
| ErC50 | \equiv EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control |
| GHS | "Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations |
| IATA | International Air Transport Association |
| IATA/DGR | Dangerous Goods Regulations (DGR) for the air transport (IATA) |
| ICAO | International Civil Aviation Organization |
| ICAO-TI | Technical instructions for the safe transport of dangerous goods by air |
| IMDG | International Maritime Dangerous Goods Code |

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| Abbr. | Descriptions of used abbreviations |
|-----------|---|
| IMDG-Code | International Maritime Dangerous Goods Code |
| LC50 | Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval |
| LD50 | Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval |
| LL50 | Lethal Loading 50 %: the LL50 corresponds to the loading rate causing 50 % lethality |
| log KOW | n-Octanol/water |
| NLP | No-Longer Polymer |
| PBT | Persistent, Bioaccumulative and Toxic |
| PNEC | Predicted No-Effect Concentration |
| UN RTDG | UN Recommendations on the Transport of Dangerous Good |
| vPvB | Very Persistent and very Bioaccumulative |

Key literature references and sources for data

Safe Work Australia's Code of Practice for Labelling of Workplace Hazardous Chemicals (under WHS Regulations).

UN Recommendations on the Transport of Dangerous Good. International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

List of relevant phrases (code and full text as stated in section 2 and 3)

| Code | Text |
|------|---|
| H226 | Flammable liquid and vapour. |
| H304 | May be fatal if swallowed and enters airways. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.