

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Linalool
 Substance name : 3,7-Dimethyl-1,6-octadien-3-ol
 CAS-No. : 78-70-6

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

Use of the Substance/Mixture : Ingredient for fragrances, Ingredient for flavours

1.3 Details of the supplier of the safety data sheet

Company : DSM Nutritional Products Ltd.
 PO Box 2676
 CH-4002 Basel
 Telephone : +41618158888
 Telefax : +41618157253
 E-mail address Responsible/issuing person : sds.nutritionalproducts@dsm.com

1.4 Emergency telephone number

+41 62 866 2314


SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

CAUTION	
Appearance	clear liquid
Colour	colourless
Odour	floral

GHS Classification

Flammable liquids : Category 4
 Skin irritation : Category 2
 Eye irritation : Category 2A
 Skin sensitisation : Category 1

GHS label elements

Hazard pictograms : 

Signal word : Warning

Hazard statements : H227 Combustible liquid.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.

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Precautionary statements : **Prevention:**
 P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
 P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
 P264 Wash skin thoroughly after handling.
 P272 Contaminated work clothing should not be allowed out of the workplace.
 P280 Wear protective gloves/ eye protection/ face protection.
Response:
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
 P337 + P313 If eye irritation persists: Get medical advice/ attention.
 P362 Take off contaminated clothing and wash before reuse.
 P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
 P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal:
 P501 Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Skin Absorption

Target Organs : Skin

Skin : May cause allergic skin reaction.
 May cause skin irritation.
 Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.

Eyes : May cause eye irritation.

Aggravated Medical Condition : None known.

Symptoms of Overexposure : Drowsiness, Disorders of the central nervous system, Respiratory disorders

Additional hazards and advice

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Linalyl alcohol
 1,6-Octadien-3-ol, 3,7-dimethyl-LL

Brief description of the product : Substance

Molecular formula : C10-H18-O

Hazardous components

Component	CAS-No.	Weight percent
linalool	78-70-6	90 - 100

SECTION 4. FIRST AID MEASURES

- General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
- If inhaled : Move to fresh air.
Consult a physician after significant exposure.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
If symptoms persist, call a physician.
- In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
Obtain medical attention.
- Most important symptoms and effects, both acute and delayed : Drowsiness, Disorders of the central nervous system, Respiratory disorders
- Notes to physician : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES**Flammable properties**

- Flash point : 171.0 °F (77.2 °C)
at 1,013 hPa (101,300 mm/HG)
Method: ISO 2719
- Ignition temperature : 260 °C (at 994 hPa, DIN 51794)
- Lower explosion limit : 0.9 %(V)
- Upper explosion limit : 5.2 %(V)

Fire fighting

- Suitable extinguishing media : Alcohol-resistant foam
Dry chemical
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing : High volume water jet

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media

Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Protective equipment and precautions for firefighters

Specific hazards during fire-fighting : None known.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
Ensure adequate ventilation.

Environmental precautions : Try to prevent the material from entering drains or water courses.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : Provide sufficient air exchange and/or exhaust in work rooms.

Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.

Advice on protection against fire and explosion : Take necessary action to avoid static electricity discharge.
Product will burn under fire conditions.

Conditions for safe storage : Keep under inert gas.
Protect against light.
Protect from humidity.

Keep container tightly closed and dry.

Storage temperature : < 77 °F (< 25 °C)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

Components	CAS-No.
linalool	78-70-6

Personal protective equipment

- Respiratory protection : In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
- In the case of vapour formation use a respirator with an approved filter.
- Hand protection : Consider the hazard characteristics of this product and any special workplace conditions when selecting the appropriate type of protective gloves. Glove material: for example nitrile rubber
- Eye protection : Safety glasses with side-shields
- Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

- Appearance : clear liquid
- Colour : colourless
- Odour : floral
- Odour Threshold : No information available.
- pH : 4.5 (1.45 g/l, 25 °C)
- Freezing point : < -74 °C (OECD Test Guideline 102)
- Boiling point/boiling range : 196.3 °C (at 992 hPa; OECD Test Guideline 103)
- Flash point : 77.2 °C (1,013 hPa, ISO 2719)
- Evaporation rate : not determined
- Lower explosion limit : 0.9 %(V)
- Upper explosion limit : 5.2 %(V)
- Vapour pressure : 0.273 hPa (25 °C)
- Relative vapour density : not determined
- Density : 0.859 - 0.863 g/cm³ (at 20 °C)
0.858 g/cm³ (at 25 °C; OECD Test Guideline 109)
- Water solubility : 1.47 - 1.65 g/l (25 °C)
slightly soluble
- Solubility in other solvents : various organic solvents: soluble
- Partition coefficient: n-octanol/water : log Pow 2.9 (20 °C; OECD Test Guideline 107)
- Auto-ignition temperature : not pyrophoric

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Ignition temperature	: 260 °C (at 994 hPa, DIN 51794)
Thermal decomposition	: Not relevant
Viscosity, dynamic	: 4.465 mPa.s (at 25 °C, OECD Test Guideline 114)
Explosive properties	: Not explosive
Oxidizing properties	: Not oxidizing

Other information

Refractive index	: 1.460 - 1.464 (589 nm, 20 °C)
Molecular weight	: 154.25 g/mol
Surface tension	: 8.3 mN/m (20 °C)

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No hazards to be specially mentioned.
Chemical stability	: Stable under recommended storage conditions.
Possibility of hazardous reactions	: Decomposes on heating in the presence of air. Strongly exothermic reaction with air.
Conditions to avoid	: Exposure to air. Heat
Incompatible materials	: Oxidizing agents Bases Strong acids
Hazardous decomposition products	: No decomposition if used as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Skin Absorption
Acute oral toxicity	: LD50 (Rat): 2,790 mg/kg : LD50 (Mouse): ca. 2,200 mg/kg
Acute inhalation toxicity	: LCLo (lowest lethal concentration) (Mouse, 1 h): > 50 mg/l
Acute dermal toxicity	: LD50 (Rabbit): 5,610 mg/kg
Skin irritation	: Skin irritation (Rabbit, OECD Test Guideline 404)
Eye irritation	: Eye irritation (Rabbit, OECD Test Guideline 405)

<div style="border-left: 3px double black; border-right: 3px double black; height: 40px; margin-bottom: 10px;"></div> Sensitisation	: May cause sensitisation by skin contact. (Mouse, Local Lymph Node Assay (LLNA), OECD Test Guideline 429) : Did not cause sensitization. (human, HRIPT: Human Repeat Insult Patch Test, 12.7% solution)
Genotoxicity in vitro	: not mutagenic, not genotoxic (Various test systems)
Genotoxicity in vivo	: not genotoxic (Mouse, Bone marrow, OECD Test Guideline 474)
Carcinogenicity	: No indication for carcinogenicity known.
IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
Reproductive toxicity	: No indication for adverse effects on fertility known. NOAEL: 365 mg/kg bw/d (Rat)
Teratogenicity	: not teratogenic not embryotoxic NOAEL: 1,000 mg/kg bw/d (Rat, Oral)
STOT - single exposure (Acute exposure)	: The substance or mixture is not classified as specific target organ toxicant, single exposure.
STOT - repeated exposure	: NOAEL (Oral, Rat) : 117 mg/kg bw/d Subacute toxicity study (28 days) (OECD Test Guideline 407) : NOAEL (Dermal, Rat) : 250 mg/kg bw/d Sub-chronic toxicity study (90-day)
Experience with human exposure	: Overexposure may provoke the following symptoms: : Drowsiness, Disorders of the central nervous system, Respiratory disorders
Further information	: May cause irritation of respiratory tract.
Aspiration toxicity	: No aspiration toxicity classification

SECTION 12. ECOLOGICAL INFORMATION**Toxicity**

- Toxicity to fish : *Salmo gairdneri* (rainbow trout)
LC50 (96 h) 27.8 mg/l
(OECD Test Guideline 203)
- Toxicity to daphnia and other aquatic invertebrates : *Daphnia magna* (Water flea)
EC50 (48 h) 59 mg/l
(OECD Test Guideline 202)
- Toxicity to algae : *Desmodesmus subspicatus* (green algae)
ErC50 (96 h) 156.7 mg/l
(nominal concentration)
(DIN 38412)
: EbC50 (96 h) 88.3 mg/l
(nominal concentration)
- Toxicity to bacteria : activated sludge
EC50 (3 h) > 100 mg/l
(OECD Test Guideline 209)

Persistence and degradability

- Biodegradability : Readily biodegradable
64.2 % (28 d)
(OECD Test Guideline 301D)

Bioaccumulative potential

- Bioaccumulation : No bioaccumulation is to be expected (log Pow <= 4).
- Partition coefficient: n-octanol/water : log Pow 2.9 (20 °C ; OECD Test Guideline 107)

Mobility in soil

- Distribution among environmental compartments : Adsorption, Soil
Koc 75 (calculated value)
- Surface tension : 8.3 mN/m (20 °C)

Results of PBT and vPvB assessment

- Assessment : The substance does not fulfill the PBT criteria.
: The substance does not fulfill the vPvB criteria.

Other adverse effects

- Regulation 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
- Remarks This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

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Additional ecological information : Harmful to aquatic organisms.

SECTION 13. DISPOSAL CONSIDERATIONS**Disposal methods**

Waste from residues : User must determine if any wastes generated exhibit hazardous characteristics as per 40 CFR Part 261 or other national / local legislation.

Discharge into the environment must be avoided.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging : Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION**International Regulation****UNRTDG**

Not regulated as a dangerous good

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations**49 CFR**

UN/ID/NA number : NA 1993
Proper shipping name : Combustible liquid, n.o.s.
(linalool)
Class : CBL
Packing group : III
Labels : None
ERG Code : 128
Marine pollutant : no

Special precautions for user

Above applies only to containers over 119 gallons or 450 liters. Not regulated if shipped in packages less than or equal to 119 gallons (450 liters).

Remarks : 49CFR: no dangerous good in non-bulk packaging

SECTION 15. REGULATORY INFORMATION**TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

EPCRA - Emergency Planning and Community Right-to-Know Act**CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations**Massachusetts Right To Know**

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know

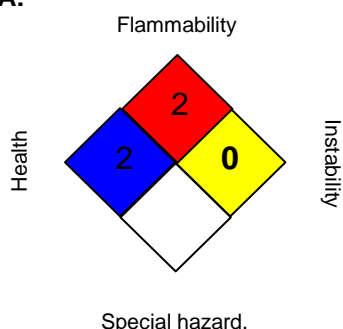
linalool	78-70-6	90 - 100 %
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New Jersey Right To Know

linalool	78-70-6	90 - 100 %
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SECTION 16. OTHER INFORMATION**Full text of other abbreviations**

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; CPR - Controlled Products Regulations; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Cooperation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information**NFPA:****HMIS III:**

HEALTH	3
FLAMMABILITY	2
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,
 2 = Moderate, 3 = High
 4 = Extreme, * = Chronic

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Abbreviations: ACGIH = American Conference of Governmental Industrial Hygienists. CERCLA = Comprehensive Environmental Response, Compensation and Liability Act. CFR = Code of Federal Regulations. CPR = Controlled Products Regulations. DSL = Canadian Domestic Substance List. DOT = Department of Transportation. EINECS = European Inventory of New and Existing Chemical Substances. EPA = Environmental Protection Agency. HCS = Hazardous Communication Standard. HEPA = High Efficiency Particulate Air. HMIS = Hazardous Material Identification System. IARC = International Agency for Research on Cancer. IATA = International Air Transport Association. IMDG = International Maritime Dangerous Good. NFPA = National Fire Protection Association. NIOSH = National Institute of Occupational Safety and Health. NJTSR = New Jersey Trade Secret Registry. NTP = National Toxicology Program. OSHA = Occupational Safety and Health Administration. SARA = Superfund Amendments and Reauthorization Act. TDG = Transportation of Dangerous Goods. TLV = Threshold Limit Value. TSCA = Toxic Substance Control Act. WHMIS = Workplace Hazardous Materials Information System.

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