SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name Substance	: Beta-Ionone-dsm-firmenich
name	: (E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one
CAS-No.	: 79-77-6

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

Use of the Substance/Mixture	: Ingredient for fragrances

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

Appearance	oily liquid
Colour	pale yellow
Odour	characteristic

GHS Classification

Not a hazardous substance or mixture.

GHS Label element

Not a hazardous substance or mixture.

Potential Health Effects

Aggravated Medical Condition	: None known.
Symptoms of Overexposure	: No specific symptoms known.

Carcinogenicity:

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.
ACGIH	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
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.

Additional hazards and advice

In case of extensive air contact (e.g. soaked rags, moistened clothes) an exothermic autooxidation (self-ignition) is possible.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms 3-Buten-2-one, 4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-, (E)-

Brief description of the product Substance

Molecular formula C13-H20-O

Hazardous components No hazardous ingredients

Further ingredients

Component	CAS-No.	Weight percent
(E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one	79-77-6	90 - 100

SECTION 4. FIRST AID MEASURES

General advice : No hazards which require special first aid measures.

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.

In case of eye contact : Flush eyes with water as a precaution. 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. If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed : No specific symptoms known.

Notes to physician : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Flammable properties

Flash point	: 259 °F (126 °C) Method: Tested according to Directive 92/69/EEC.
Ignition temperature	: 273 °C (Tested according to Directive 92/69/EEC.)
Lower explosion limit	: not determined
Upper explosion limit	: not determined

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 media	: High volume water jet
Further information	: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. 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	: Do not allow run-off from fire fighting to enter drains or water courses.
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	: Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	: Wipe up with absorbent material (e.g. cloth, fleece). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	: For personal protection see section 8. Dispose of rinse water in accordance with local and national regulations. handle under inert gas
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	: Protect against light.

Protect from humidity. Keep under inert gas.

Keep container tightly closed and dry.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.

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.

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 : 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

9.1 Information on basic physical and chemical properties

Appearance	: oily liquid
Colour	: pale yellow
Odour	: characteristic
Odour Threshold	: No information available.
pH	: No data available
Melting point/range	: < -20 °C
Boiling point/boiling range	: 267.1 °C (at 1,013 hPa)
Flash point	: 126 °C (Tested according to Directive 92/69/EEC.)
Evaporation rate	: not determined
Lower explosion limit	: not determined
Upper explosion limit	: not determined
Vapour pressure	: 0.072 hPa (at 25 °C)
Relative vapour density	: not determined

Density	: 0.9447 g/cm3 (at 20 °C)
Water solubility	: 0.11 g/l (20 °C; OECD Test Guideline 105) practically insoluble
Solubility in other solvents	: Ethanol: soluble Diethylether: soluble Dichloromethane: soluble
Partition coefficient: n-octanol/water	: log Pow 4 (25 °C)
Ignition temperature Thermal	: 273 °C (Tested according to Directive 92/69/EEC.)
decomposition Viscosity,	: No data available
dynamic Explosive	: 11.2 mPa.s (at 20 °C, OECD Test Guideline 114)
properties Oxidizing	: Not explosive
properties	: Not oxidizing

9.2 Other information

Molecular weight	192.3 g/mol
Surface tension	ca. 27 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	: In case of extensive air contact (e.g. soaked rags, moistened clothes) an exothermic autooxidation (self-ignition) is possible.
Conditions to avoid	: Heat. Exposure to air.
Incompatible materials	: Strong acids and strong bases Oxidizing agents
Hazardous decomposition products	: No decomposition if used as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	: LD50 (Rat): > 4,000 mg/kg
Acute dermal toxicity	: LD50 (Rat, male and female): > 2,000 mg/kg tested with an isomer mixture (OECD Test Guideline 402)
Skin irritation	: No skin irritation (Rabbit, OECD Test Guideline 404)
	: No skin irritation (human)

tested with an isomer mixture

Eye irritation	: No eye irritation (Rabbit, OECD Test Guideline 405)
Sensitisation	: Does not cause skin sensitisation. (Guinea pig, OECD Test Guideline 406) tested with the racemate
Carcinogenicity	: No indication for carcinogenicity known.
Genotoxicity in vitro	: negative (Ames test) tested with an isomer mixture : positive (Chromosome aberration test in vitro) Test performed using a similar product.
Genotoxicity in vivo	: not genotoxic (Chromosome aberration test in vitro, Mouse, Intraperitoneal injection, OECD Test Guideline 474)
Reproductive toxicity	: NOAEL: 720 mg/kg bw/d (Rat, males, Oral, OECD Test Guideline 408)
Teratogenicity	: NOAEL: 400 mg/kg bw/d (Rat, Oral, OECD Test Guideline 414) : NOAEL: 50 mg/kg bw/d (Rabbit, Oral, OECD Test Guideline 414)
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, male) : 71.8 mg/kg body weight Sub-chronic toxicity study (90-day) (OECD Test Guideline 408)
Experience with human exposure	: May cause sensitisation of susceptible persons., (Cases have been reported rarely.)
Aspiration toxicity	: No aspiration toxicity classification

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	: Pimephales promelas (fathead minnow) LC50 (96 h) 5.09 mg/l
Toxicity to daphnia and other aquatic invertebrates	: Daphnia magna (Water flea) EC50 (48 h) 4.03 mg/l (OECD Test Guideline 202)

Toxicity to algae	: Desmodesmus subspicatus (green algae) EC50 (72 h) 21.2 mg/l (DIN 38412)
Toxicity to bacteria	: activated sludge EC50 (3 h) 100 - 200 mg/l (OECD Test Guideline 209)
Ecotoxicology Assessment	
Chronic aquatic toxicity	: Toxic to aquatic life with long lasting effects.
Persistence and degradability	: Readily biodegradable.
Biodegradability	70 - 80 % (28 d) (Tested according to Annex V of Directive 67/548/EEC.)

Bioaccumulative potential

Partition coefficient: n-octanol/water	: log Pow 4 (25 °C)
Mobility in soil	: Adsorption/Soil
Distribution among environmental compartments	log Koc 2.8 (calculated value) Mobile in soils
Surface tension	: ca. 27 mN/m (20 °C)

Results of PBT and vPvB assessment

Assessment	: The substance does not fullfill the PBT criteria. : The substance does not fullfill 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).

Additional ecological information : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	Organic materials (e.g. rags, paper, wood) which are soaked with this product can heat up and catch fire in the presence of air, even at room temperature: store in the absence of air (e.g. in water) and send it for incineration (or dispose of in accordance with local regulations).
Beta Ionone - dsm-firmenich	Discharge into the environment must be avoided. Do not contaminate ponds, waterways or ditches with chemi-

cal or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed disposal company.

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

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

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No.	: UN 3082
Proper shipping name	: Environmentally hazardous substance, liquid, n.o.s. ((E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one)
Class	: 9
Packing group	: III
Labels	: Miscellaneous Dangerous Goods
Packing instruction (cargo aircraft)	: 964
Packing instruction (passenger aircraft)	: 964

IMDG-Code

UN number	: UN 3082
Proper shipping name	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. ((E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one)
Class	: 9
Packing group	: III
Labels	: 9
EmS Code	: F-A, S-F
Marine pollutant	: yes

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	: UN 3082
Proper shipping name	: Environmentally hazardous substances, liquid, n.o.s. ((E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one)
Class	: 9
Packing group	: III
Labels	: CLASS 9
ERG Code	: 171
Marine pollutant	: yes ((E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one)
Remarks	: No additional requirements.

SECTION 15. REGULATORY INFORMATION

TSCA list : Not relevant

Not relevant

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 : No SARA Hazards

SARA 302 : No chemicals in this material are subject to the reporting re quirements 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 12 (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 SOCMI 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

Massachusetts Right To Know

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

Pennsylvania Right To Know

(E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one	79-77-6	90 - 100 %

New Jersey Right To Know

(E)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-3-buten-2-one	79-77-6	90 - 100 %

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

SECTION 16. OTHER INFORMATION

Further information

NFPA:

Flammability

Special hazard.

HMIS III:

HEALTH	1
FLAMMABILITY	1
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.