

1. COMPANY AND PRODUCT IDENTIFICATION

Product Name : Biodiesel
Substance Name : Fatty acid methyl esters of C16 - C18, mixture of methyl esters.
Application Uses : Fuel, fuel blend
Company Name : Verasuwan Company Limited
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2. HAZARDS IDENTIFICATION

GHS classification : This substance is not classified according to Regulation (EC) No 1272/2008.
This substance is not classified according to Directive 67/548/EEC.

GHS label elements Symbols : Not relevant since substance is not classified as hazardous

Other Hazard : Substance does not meet the criteria for PBT or vPvB in accordance with Annex XIII.
May cause minor eye irritation
Vapor produced by heating, or finely misted materials may irritate the mucous membranes and cause dizziness and nausea
Thermal burns are possible on contact with material at elevated temperature.

3. COMPOSITION AND INFORMATION ON INGREDIENTS**Substances**

Main Constituent
EC Name : Fatty acids, C16-18 and C18-unsatd., Me esters
EC Number : 267-015-4
CAS Name : UVCB substance
CAS Number : 67762-38-3
Description : This substance is identified by SDA Substance Name: C16-C18 and C18 unsaturated alkyl carboxylic acid methyl ester, and SDA Reporting Number: 11-010-00.
Molecular Weight : ca. 296.0
Range
Mixtures: : Not relevant as substance is not a mixture.

4. FIRST AID MEASURES

Description of first aid measures : **INHALATION**
Supply fresh air; consult doctor in case of symptoms.
SKIN
The product is not a dermal irritant. Rinse with soap and water.
EYE
Rinse for 15 – 20 minutes under running water; consult doctor if necessary.
INGESTION
Rinse mouth with water; in case of persistent symptoms consult doctor.

- Most important symptoms and effects, both acute and delayed: : Minor eye irritation possible. Vapor produced by heating, or finely misted materials may irritate the mucous membranes and cause dizziness and nausea. Thermal burns are possible on contact with material at elevated temperatures.
- Indication of any immediate medical attention and special treatment needed: : Not relevant for this substance.

5. FIRE FIGHTING MEASURES

- Extinguishing media : **Appropriate extinguishing media:**
Use firefighting measures that suit the environment – Dry chemical, foam, water spray, carbon dioxide, halon.
Unsuitable extinguishing media:
Water stream may splash the burning liquid and spread fire
- Special hazards arising from the substance : Rags or spill adsorbents soaked with any solvent can be a fire hazard. Store biodiesel soaked rags in an approved safety container. Treat as oil fire.
In combustion emits toxic fumes of carbon dioxide/carbon monoxide
- Advice for fire-fighters : Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : **For non-emergency personnel:**
Eliminate all sources of ignition. If outside do not approach from downwind. If outside keep bystanders upwind and away from danger point. Mark out the contaminated area with signs and prevent access to unauthorised personnel. Turn leaking containers leak-side up to prevent the escape of liquid.
For emergency responders:
Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.
- Environmental precautions : Slightly hazardous for water. Do not allow product to enter drainage systems, surface water or ground water.
- Methods and materials for containment and cleaning up : **Spill containment:**
Absorb by use of liquid binding material (sand, diatomite, acid binder, universal binder, sawdust).
Spill clean-up:
Pick up small spills with adsorbent materials and dispose of properly to avoid spontaneous combustion. Recover large spills for salvage or disposal. Wash hard surfaces with safety solvent or detergent to remove remaining oil film. Greasy nature will result in a slippery surface.
- Reference to other sections : Please refer to Section 8 of this Safety Data Sheet for information on exposure controls and personal protection and Section 13 for information on disposal considerations.

7. HANDLING AND STORAGE

Precautions for safe handling:	:	Do not eat, drink or smoke in work areas; and remove contaminated clothing and protective equipment before entering eating areas.
Conditions for safe storage, including any incompatibilities:	:	Avoid open flames. Store in cool, and well ventilated area. Keep away from sources of ignition. Keep container tightly closed. Below normal ambient temperatures material will start to solidify. Storage life 2 years. Protect from frost. Store at +15°C to +25°C. Keep away from oxidizing agents, excessive heat, and ignition sources.
Specific end use(s):	:	No special measures required. No industry or sector specific guidance is available.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Control parameters	:	No relevant control limits
Exposure Controls	:	Appropriate engineering controls: No relevant engineering controls

Individual protection measures:

Not required if the product is used appropriately. The usual precautionary measures should be adhered to. If vapors or mists are generated, wear a NIOSH approved organic vapor/mist respirator. Safety glasses, goggles, or face shield recommended to protect eyes from mists or splashing. PVC coated gloves recommended to prevent skin contact. Employees must practice good personal hygiene, washing exposed areas of skin several times daily and laundering contaminated clothing before re-use.

Environmental exposure controls:

Do not allow undiluted product or large quantities of it to reach ground water, water bodies or sewage system. Biodiesel degrades within 2 – 3 weeks.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on the basic physical and chemical properties

Appearance	:	yellowish liquid oil
Odour	:	Mild
Odour threshold	:	Not available
pH	:	Not available
Melting point/freezing point	:	6.29 °C at 1 atm The range of melting temperature goes from -16 °C to +15 °C.
Initial boiling point and boiling range	:	296 °C at 1 atm
Flash point	:	> 123 °C
Evaporation rate	:	Not available
Flammability (solid, gas)	:	Not flammable For the definition of flammability, REACH refers to regulation 67/548. According to this regulation flammability is not required for liquids if the flash point is above 60 °C. The flash point of this substance is 170 °C, well above the limit of 60 °C.

Upper/lower flammability or explosive limits	:	Not available
Vapor pressure	:	4.2 mBar at 25 °C 420 Pa, at 25 °C 3.6 mBar at 20 °C
Vapor density	:	Not available
Relative density	:	0.8881 g/cm ³ at 20 °C
Solubility(ies)	:	< 0.023 mg/l Instrumental detection limit
Partition coefficient: n-octanol/water	:	Log Kow = 6.2 at 25 °C
Auto-ignition temperature	:	261 °C +/- 5 °C The ignition delay observed at this temperature was 60 seconds and a Temperature increase at middle of the flask was 14 °C.
Decomposition temperature	:	Not available
Viscosity	:	6.1 mPa*s at 20 °C
Explosive properties	:	Not explosive. In accordance with column 2 of REACH Annex VII, the study does not need to be conducted since there are no chemical groups associated with explosive proprieties present in the molecule.
Oxidising properties	:	Not oxidizing. In accordance with column 2 of REACH Annex VII, the study does not need to be conducted since the substance is incapable of reacting exothermically with combustible materials based on the chemical structure
Other information	:	No other information available.

10. STABILITY AND REACTIVITY

Reactivity	:	This product is stable and hazardous reaction will not occur
Chemical stability	:	Substance is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Possibility of hazardous reactions	:	The substance reacts with strong bases to produce methanol.
Conditions to avoid	:	See incompatible materials.
Incompatible materials	:	Strong oxidizing agents. Strong bases.
Hazardous decomposition products	:	Combustion produces carbon monoxide, carbon dioxide along with thick smoke.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:			
Hazard class		Result	Test method
Acute toxicity There are 2 mains studies related to acute toxicity	Oral	LD50 > 5000 mg/kg bw (male/female)	Study is closely comparable to OECD guideline 401 and is GLP).
	Dermal	LD50 has been tested in a fixed dose test at 2000 mg/kg/bw on rabbit with fatty acids C6 -C12 methyl esters with no sigh of toxicity	EPA OPPTS 870.1200
Skin corrosion/irritation		In general, esters of long-chain fatty acids are always negative with relation to irritation (from C18 onward), while esters of short-chain fatty acids are always (slightly) positive (up to C10). C16-C18 and C18 unsaturated me esters and fatty acids, rape oil, me esters, show no irritation. Eye irritation tests are negative too and it is unlikely that a substance would be less irritating to eyes than the skin.	OECD Guideline 404
Serious eye damage/irritation		Conjunctivae effects were observed 1 hour after exposure. Slight chemosis and slight conjunctivae were observed in two animals and four animals, respectively. Two animals presented conjunctivae with diffuse, crimson colour and individual vessels not easily discernible. These effects were fully reversible within 1 day.	OECD guideline 405
Sensitization	Respiratory sensitization	No information but no respiratory sensitization is expected.	
	Skin sensitization	In a dermal sensitization study, Esterol C in corn oil was tested using the Guinea pig maximization test. No clinical signs and no deaths were noted during the study. No cutaneous reactions were observed after the challenge application. Under the experimental conditions of the study, it is concluded that Esterol C does not induce delayed contact hypersensitivity in guinea pig.	The study was performed according to OECD guideline 406 and GLP
Germ cell mutagenicity	Reverse gene mutation assay	Strains of Salmonellatyphimurium were exposed to Esterol C in the presence and absence of mammalian metabolic activation. The positive controls induced	This study satisfies the requirement for Test Guideline OECD 471 for in vitro mutagenicity



		the appropriate responses in the corresponding strains. No noteworthy increase in the number of revertants was induced in all tested strains with and without metabolic activation.	(bacterial reverse gene mutation) data.
	In vitro cytogenicity test	Primary lymphocyte cultures were exposed to Esterol C with and without metabolic activation. Positive controls induced the appropriate response. There was no evidence of chromosome aberration was induced over background.	OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
	In vitro mammalian cell mutation test	Methyl myristate alone had no mitogenic activity. In combination with phytohemagglutinin, however, a comitogenic activity was found.	EU Method B.17 (Mutagenicity - In Vitro Mammalian Cell Gene Mutation Test).
Carcinogenicity		Two fatty acid methyl esters, methyl oleate and methyl 12-oxo-trans-10-octadecenoate, have been tested for carcinogenicity by oral and subcutaneous administration in ST/a mice of both sexes. A positive effect of methyl oleate could not be assessed, while the results pointed to a promoter effect of methyl oxo-octadecenoate. Given in the diet, this compound increased the incidence and number of forestomach papillomas within 83 weeks after initiation by 4-nitroquinoline 1-oxide.	EU Method B.32 (Carcinogenicity Test)
Reproductive toxicity	Developmental effects	The tested substance revealed no effect in Screening for reproduction for a dose of until 1000 mg/kg/bw	OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
	Fertility effects		

STOT-single exposure	No information	No information
STOT-repeated exposure	The tested substance revealed no effect in Repeated dose oral toxicity for a dose of until 1000 mg/kg/bw	OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
Aspiration hazard	No information	No information
CMR properties assessment	An assessment of the above information leads to a conclusion that no CMR properties are expected.	
The effects of the substance via each possible route of exposure	See Section 2 of this Safety Data Sheet for effects of the substance.	
Potential adverse health effects and symptoms	See Section 2 of this Safety Data Sheet for effects of the substance.	
Information on whether delayed or immediate effects	See Section 2 of this Safety Data Sheet for effects of the substance.	
Interactions	None expected.	
Other information	See Section 2 of this Safety Data Sheet for effects of the substance.	

12. ECOLOGICAL INFORMATION

Toxicity	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)	EC50 (48 hour): 2504 mg/l
	OECD Guideline 201 (Algal, Growth Inhibition Test)	ErC50 (72 hour): > 0.131 mg/L or 72h-ErLR50>100mg/L(expressed as loading rate).
	OECD Guideline 203 (Fish, Acute Toxicity Test)	Visible abnormalities (loss of equilibrium, changes in swimming behaviour, respiratory function, pigmentation, etc.) were not observed in Fish exposed to an average measured loading rate of 0.26 mg/L (limit test),
	Other aquatic/terrestrial toxicological end points	No information.

Persistence and Degradability : FAME is not regarded as P or vP based on ready biodegradability (water primary biodegradation of less than 2 days and a DT50 in fresh water of 5-7 days).

Bioaccumulative Potential : BCF (aquatic species): 3.307

All methyl esters of fatty acids are readily biodegradable in water, soil and sediments. They pass the 10 days windows with 62% of

- degradation. Half-life in the three compartments is less than 2 -3 days. In some case even less than 1 day.
- Mobility in soil** : The substance is poorly soluble in water and readily biodegradable.
The equilibrium partitioning method, following a fugacity model III indicates a partition of the substance on sediments of 85.5 %, based on $\log K_{oc} > 5.63$ at 22 °C. According to equilibrium partitioning Fugacity model III, the soil % is 1.61 %, FAME have a soil primary biodegradation of less than 2 days.
- Results of PBT and vPvB Assessment** : Not available
- Other Adverse Effects** : None

13. DISPOSAL CONSIDERATIONS

- Waste treatment** : Recommendation – large volumes should be handed over to disposers of hazardous waste.

14. TRANSPORT INFORMATION

- UN no.** : Not applicable (not classified)
- UN Proper shipping name** : Not applicable (not classified)
- Transport hazard class(es)** : Not applicable (not classified)
- Packing group** : Not applicable (not classified)
- Environment hazards** : Not applicable (not classified)
- Special precautions for user** : Not applicable (not classified)
- Transport in bulk according to Anex II of MARPOL 73/78 and the IBC Code** : Not applicable (not classified)

15. Regulatory Information

- Safety, health and environmental regulations/legislation specific for the substance** : This substance is not classified according to Regulation (EC) No 1272/2008 (Classification, Labelling and Packaging Regulation (CLP)).
- Chemical safety assessment** : A Chemical Safety Assessment has been carried out for the substance (parts 1-4 only as the substance is not classified as hazardous and is not a BPT/vPvB).

16. Other Information

- SDS revision information** : SDS updated to bring in line with Regulation (EU) No. 453/2010 (amending REACH Regulation (EC) No. 1907/2006).
- Abbreviations** : PBT: substance with persistent, bioaccumulative and toxic properties
vPvB: substance with very persistent and very bioaccumulative properties

Mixture classification information : Not relevant

List of relevant R phrases, hazard statements, safety phrases and/or precautionary statements : Not relevant

Appropriate training : Not relevant

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