

FAME (Biodiesel)

Material safety data sheet according to Article 32 of (EC) No 1907/2006



Section 1: Identification of the substance/mixture and of the company

1.1 Product identifier

Product name: FAME (Biodiesel), RME (Rapsmethylester), Bio Diesel 0 °C, Bio Diesel – 10 °C, Fatty Acid Methyl Ester (FAME) + 5

Substance name: Fatty acids, vegetable-oil, Me-esters

EC No.: 273-606-8

CAS No.: 68990-52-3

REACH registration No.: 01-2119485821-32-0029

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

Relevant identified uses: Fuel oil for heating and for combustion engines or solvent.

1.3 Details of the supplier of the safety data sheet

Supplier: Mabanaft Deutschland
Am Strandkai 1
20457 Hamburg
GERMANY

Tel.: +49 (0)40 37004 0

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1.4 Emergency telephone number

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Section 2: Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to (EC) No 1272/2008

This substance is not classified as hazardous according to (EC) No. 1272/2008.

2.2 Label elements

2.2.1 Labelling according to regulation (EC) No 1272/2008

N/A

2.3 Other hazards

Does not meet the criteria for persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB).

May cause slight eye irritation. Fumes may irritate the mucous membranes, cause dizziness and nausea.

Section 3: Composition/information on ingredients

3.1 Substances

The substance consists mainly of saturated and unsaturated fatty acid methyl esters of chain length C16 - C18 of vegetable origin. The substance may contain residues of glycerol and partial glycerides

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(< 3.5 % by volume) as well as traces of methanol. To improve the material properties, low-concentration additives may include: cold flow improvers, mainly composed of oligomers of vinyl acetate and other monomers, and oxidation stabilizers mainly containing sterically hindered phenols. The individual active ingredients do not exceed a concentration of 1000 mg/kg (0.001 % by weight).

3.2 Mixtures

Not applicable.

Section 4: First-aid measures

4.1 Description of first aid measures

Inhalation: If breathing problems or other symptoms of exposure occur, remove affected person from source of exposure and put into a comfortable position in the fresh air. If symptoms persist, seek medical attention immediately. If person is not breathing, initiate artificial respiration immediately. If person has respiratory problems oxygen should be supplied by qualified personnel. Seek medical help immediately.

Skin contact: Remove contaminated shoes and clothing and rinse affected area with water. If the skin surface is damaged, apply sterile cover and seek medical help. If the skin surface is not damaged, clean affected area thoroughly by washing with mild soap and water or a waterless hand cleanser. If irritation or redness develops, seek medical help. Clean contaminated clothing before reuse. If the product is injected into or under the skin or any body part, the person should be immediately examined by a physician, regardless of appearance and size of the wound.

Eye contact: Flush eyes with clean water if irritation occurs. If symptoms persist, consult a doctor.

Chocking: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause lung damage. If victim is drowsy or unconscious put person in safety position. If possible, do not leave the person unattended and continuously monitor breathing. Seek medical help.

4.2 Most important symptoms and effects, both acute and delayed

Acute: Inhalation of larger quantities causes coordination disorders, intoxication, headache, breaching. In case of prolonged exposure: dizziness, unconsciousness and apnea are possible.

Delayed: Repeated exposure may cause skin dryness.

4.3 Indication of any immediate medical attention and special treatment needed

No special medical precautions required.

Section 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing agents: Dry chemical, carbon dioxide or foam is recommended. Spray is recommended to cool exposed materials or structures or to protect them. Carbon dioxide can displace oxygen. Caution in the use of carbon dioxide in confined spaces.

Inappropriate extinguishing agents: Do not use water jet in order to prevent scatter and the spread of the fire. Do not use water and foam on the same surface, as water destroys the foam.

5.2 Special hazards arising from the substance or mixture

Combustion may form smoke, carbon monoxide and other products of incomplete combustion. The formation of nitrogen oxides is also possible. If container is not properly cooled, it can explode due to the heat of the fire.

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5.3 Advice for firefighters

Special protective equipment for fire-fighting: Ambient air-independent breathing apparatus with full face mask in compressed air operation, eye protection as well as fire-resistant protective clothing are required.

Additional information: Cool endangered containers with water spray. Do not inhale explosion gases or fumes. Collect contaminated water separately. Contaminated water must be disposed of in accordance with official regulations.

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Remove ignition sources. Contaminated areas must be marked and access by unauthorized personnel must be prevented. Damaged containers must be turned upwards to avoid leakage of the liquid.

6.2 Environmental precautions

Ensure that leakages can be retained, e.g. with the aid of drip pans or lower areas. Fire residues and contaminated fire fighting water must be disposed of in accordance with local regulations.

6.3 Methods and material for containment and cleaning up

Absorb with liquid-binding material (eg. sand, kieselguhr, universal binder, Penta 77). Collect larger leaks for reprocessing or disposal. Clean solid objects with safety solvents or detergents to remove oily film. The oily behavior causes a slippery surface.

6.4 Reference to other sections

Protection measures in section 8 and 13.

Section 7: Handling and storage

7.1 Precautions for safe handling

Long-chain fatty acid methyl esters are not classified as dangerous according to the criteria of Regulation (EC) No 1272/2007. Special risk management measures are therefore not required. Nevertheless, the exposure of workers during and after normal activities should be minimized by the application of good industrial hygiene. Avoid direct contact with the substance. Do not eat, drink, or smoke at work. Working clothes should not be worn outside the working area. Wash hands before breaks and at the workplace.

7.2 Conditions for safe storage, including any incompatibilities

Requirements to be met by storerooms and receptacles: Keep container tightly closed and in a cool, well-ventilated place. Keep away from sources of ignition. Do not store together with oxidizing agents.

Further information on storage conditions: Recommended storage temperature; 15 °C - 25 °C. The material can solidify below normal ambient temperatures.

German storage class (LGK) according to TRGS 510: 10 "Combustible liquid".

7.3 Specific end use(s)

No application-specific guidelines available.

Section 8: Exposure controls/personal protection

8.1 Control parameters

8.1.1 DNEL for employees

Fatty acids, vegetable-oil, Me-esters (CAS-Nr. 68990-52-3)

Long term exposure, systemic impact, dermal: 10 mg/kg KG/day
Long term exposure, systemic impact, by inhalation: 6,96 mg/m³

8.1.2 DNEL for the general public

Fatty acids, vegetable-oil, Me-esters (CAS-Nr. 68990-52-3)

Long term exposure, systemic impact, dermal: 5 mg/kg KG/day
Long term exposure, systemic impact, by inhalation: 23 mg/m³
Long term exposure, systemic impact, oral: 5 mg/kg KG/day

8.1.3 PNEC water

Fatty acids, vegetable-oil, Me-esters (CAS-Nr. 68990-52-3)

Fresh water: 2,504 mg/l
Seawater: 0,2504 mg/l
Intermittent release: 25,04 mg/l

8.1.4 PNEC water treatment plant

Fatty acids, vegetable-oil, Me-esters (CAS-Nr. 68990-52-3)
Wastewater treatment plants: 520 mg/l

8.2 Exposure controls

Respiratory protection: If air exposure is likely to exceed the exposure limit, use an approved air purifying respirator with type A, organic gasses and vapors (as specified by the manufacturer).

Eye/face protection: Eye protection that meets or exceeds EN 166 is recommended to protect against potential eye contact, irritation or injury. Depending on the operating conditions, a tight-fitting eye and face protection is necessary.

Skin protection: Wearing impervious gloves according to EN 374, which are insensitive to the particular product, is recommended to avoid skin contact. Users should check with the manufacturer to verify the tightness of their products. Depending on the exposure and use, an additional protection is required in order to avoid contact with the skin, including chemical resistant boots, aprons, hoods, overalls, or full body suits. Proposed protective materials: nitrile rubber with the protection index 6 and a penetration time > 480 min according to EN 374. The maximum wearing time is 8 hours.

Technical measures: If current ventilation practices are not sufficient to keep concentrations below the established exposure limits, additional engineering controls may be required.

Other protective equipment: A safety shower and an eye shower should be located in the work area. Clean contaminated clothing and shoes before reuse.

Exposure controls: see section 6, 7, 12 and 13.

The proposals outlined in this section in terms of exposure control and specific types of protective equipment are based on readily available information. Users should confirm the performance of their

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protective equipment by contacting the specific manufacturer. Special circumstances may make it necessary to contact a specialist for good hygiene and safety.

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Data represents typical values and is not intended for specification purposes.

Physical state:	Liquid
Colour:	Yellowish
Odour:	Weak
Melting point/freezing point:	-17 °C – 16 °C (DIN ISO 3016)
Boiling point and boiling range:	302.5 °C – 570 °C (1013 mbar, ASTM D 7169)
Flammability:	Yes The observed ignition delay was 60 seconds and the temperature rose in the middle of the bottle by 14 °C
Lower and upper explosion limit:	
Flash point:	120 °C – 180 °C (EN ISO 2719)
Auto-ignition temperature:	> 256 °C (EU Method A. 15)
Decomposition temperature:	N/D
pH:	N/A
Kinematic viscosity:	5,5 – 8 mPa·s bei 25 °C (EN ISO 3104)
Solubility:	Soluble in organic solvents. Slightly soluble in water (<0.23 g / L).
Partition coefficient n-octanol/water (log value):	6,2 (OECD 107)
Vapour pressure:	2 – 6 mbar at 25 °C (EN 13016-1)
Relative density:	860 – 900 kg/m ³ at 15 °C (EN ISO 3675)
Relative vapour density:	> 1 (Air = 1)
Particle characteristics:	N/A

9.1 9.2 Other information

N/A

Section 10: Stability and reactivity

10.1 Reactivity

Stable at ambient temperature. No dangerous reactions known.

10.2 Chemical stability

The substance is stable under normal ambient conditions and at normal temperatures / pressures during storage and handling.

10.3 Possibility of hazardous reactions

The reaction with strong bases produces methanol.

10.4 Conditions to avoid

Avoid contact with strong oxidizing agents and strong reducing agents.

10.5 Incompatible materials

Oxidizing agents, reducing agents.

10.6 Hazardous decomposition products

No hazardous decomposition products when properly handled and transported. In the case of a thermal or oxidative decomposition, a complex mixture of air-polluting solids, liquids and gases such as carbon monoxide (CO), carbon dioxide (CO₂), and other organic compounds are formed.

Section 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

The information about toxicological effects of the mixture is based on product data, knowledge about the components and the toxicology of similar products. Unless otherwise stated, the following specifications apply to the product as a whole.

11.1.1 Information on relevant hazard classes

Acute toxicity:	No signs of toxicity. Acute toxicity, oral: > 5000 mg/kg (study similar to OECD 401, GLP) Acute toxicity, dermal: Has been tested at a fixed dose of 2000 mg/kg (C6-C12 ME, rabbit): No signs of toxicity, method: EPA OPPTS 870.1200
Skin corrosion/irritation:	In general, long-chain fatty acid methyl esters (C18 and higher) have no effect on irritation, while short-chain have a (slightly) positive effect. Method: OECD 404
Serious eye damage/irritation:	Influencing the conjunctiva was observed after 1 h exposure. Light chemosis was observed in two to four animals. Two animals had a conjunctiva with single, diffuse purple blood vessels, but these were not easy to detect. These effects disappeared completely after one day. Method: OECD 405
Respiratory or skin sensitization:	Respiratory sensitization: No information, but no respiratory sensitization expected. Skin sensitization: Esterol C in maize oil was tested using the Guinea pig test. Neither clinical signs nor deaths were observed during the study, nor any skin reaction after administration of the substance. It was concluded that under the experimental conditions, no subsequent hypersensitization of the guinea pigs occurs. Method: OECD 406 (GLP)
Reproductive toxicity:	The tested substance shows no effect in reproductive screening at a dose up to 1000 mg/kg. Method: OECD 422
STOT-single exposure:	No information.
STOT-repeated exposure:	The tested substance shows no effect in reproductive screening at a dose up to 1000 mg/kg. Method: OECD 422
Carcinogenicity and germ cell mutagenicity:	Cell mutagenicity in bacteria, Esterol C: Ames test negative, method: OECD 473. Mammalian Mutation Test: Methyl myristate alone has no mitogenic activity. However, co-mitogenic activity was found in conjunction with phyto-hemagglutinin. Method: EU Method B.17 Carcinogenic effect: Methyl oleate and 12-oxo-trans-10-octadecenoate were tested for carcinogenic activity during oral and subcutaneous administration. A positive effect of the

methyl oleate could not be determined, whereas the methyl oxo octadecenoate seems to have a promoter effect. Method: EU Method B.32

Summary of CMR properties: No CMR properties are expected.

11.1.2 Information on likely routes of exposure

Skin and eye contact are the primary routes of exposure. The exposure can also take place by inhalation or accidental ingestion.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Contains no substances with known endocrine-disrupting properties for human health.

Section 12: Ecological information

12.1. Toxicity

Fish toxicity:	LC ₅₀ ≥ 100000 mg/l
Daphnia toxicity:	EC ₅₀ : 2504 mg/l (48 h, Method: OECD 202)
Toxicity to algae:	E EC ₅₀ : 73729 mg/l (72 h, Method: OECD 201)

12.2 Persistence and degradability

All fatty acid methyl esters are readily degradable in water, soil and sediments. In the 10-day window a reduction of 62 % is achieved. The half-life in three ambient media is less than 2-3 days; In some cases even less than 1 day. Method: ISO 10712

12.3 Bioaccumulative potential

All fatty acid methyl esters are readily degradable in water, soil and sediments. In the 10-day window a reduction of 62 % is achieved. The half-life in three ambient media is less than 2-3 days; In some cases even less than 1 day. Method: ISO 10712

12.4 Mobility in soil

The substance is only slightly soluble in water and easily biodegradable. The equilibrium distribution method according to the Fugacity Model III predicts a share of the sediment of 85.5 % on the basis of log K_{oc} > 5.63 at 22 °C. According to the equilibrium distribution model III, the proportion in the soil is 1.61 %. FAME has a primary biodegradation in the soil of less than 2 days.

12.5 Results of PBT and vPvB assessment

Fatty acid methyl esters C16 - C18 and C18 unsaturated are not considered to be PBT or vPvB due to their physicochemical, environmental and toxicological properties. Fatty acid methyl esters C16 - C18 and C18 unsaturated are not considered as P or vP because of their easy biodegradability. Fatty acid methyl esters C16 - C18 and C18 unsaturated are not considered to be bioaccumulative due to the measured BCF of 3. The long-term no-effect concentration (NOEC) for marine or freshwater organisms is not available in the environment because of the high biodegradation rates.

The substance is not classified as a carcinogen (Category 1A or 1B), as a mutagenic (Category 1A or 1B) or toxic for reproduction (Category 1A, 1B or 2).

12.6 Endocrine disrupting properties

This substance has no relevant endocrine disrupting properties for non-target organisms because it does not meet the criteria set out in Section B of Regulation (EU) No 2017/2100.

12.7 Other adverse effects

General information: The substance is considered to be stable in the usual pH range in the environment. Hydrolysis can occur in the presence of strong acids or bases, liberating methanol and fatty acid.

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Section 13: Disposal considerations

13.1 Waste treatment methods

Waste incineration is recommended.

Section 14: Transport information

14.1 Land transport (ADR/RID)

Official designation for carriage:

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Comment:

Not classified for this mode of transport.

14.2 Inland water transport (AND)

Official designation for carriage:

FAME (Biodiesel)

Comment:

Not classified for this mode of transport.

14.3 Sea transport (IMDG-Code)

Marine pollutant:

No.

Official designation for carriage:

FAME (Biodiesel)

Comment:

Not classified for this mode of transport.

14.4 Air transport (ICAO-TI/IATA-DGR)

Official designation for carriage:

FAME (Biodiesel)

Comment:

Not classified for this mode of transport.

14.5 More information

None.

Section 15: Regulatory information

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

15.1.1 EU rules

Mainly local or national tax legislation and quality requirements (DIN EN 14214 and additional provisions).

15.1.2 National regulations (Germany)

Classification in accordance with the German administrative instructions for water pollutants (VwVwS): Water Hazard Class 1 (VwVwS, Annex 2, No. 834)

Consider TRGS 401 when selecting suitable gloves.

The information on legal regulations does not claim to be complete. Other regulations may also apply to the product.

15.2 Chemical safety assessment

For this substance a chemical safety assessment has been carried out.

Section 16: Other information

Date of issue: 10.07.2024

Revision of sheet dated: 22.12.2022

Revised sections: N/A

Important literature and data sources that was used to compile the safety data sheet

Allan J (2010a). Combined Repeatet Dose Toxicity Study with the reproduction/Developmental Toxicity screening Test in Rats, Testing laboratory: Charles River. Report no.: 495325. Owner company: European Biodiesel Board.

Allan J (2010b). Combined Repeated Dose Toxicity Study with the reproduction/Developmental Toxicity screening Test in Rats. Testing laboratory: Charles River. Report no.: 495325. Owner xompany: European Biodiesel Board.

Andre D, Mariette-Korotkoff I (2009). Flash Point determination of Esterol A – Equilibrium method, closed cup. Testing laboratory; Centre de Recherche Rhone-Alpes. Report no.: ANA GSP 1797-08. Owner company: Arkema. Report date: 2009-03-31.

Arffmann E., Glavind J. (1971). Tumor promoting activity of fatty acid methyl esters in mice. *Experientia* 27 (12), 1465-1466 (1971).

Arffmann E., Glavind J. (1974). Carcinogenicity in mice of some fatty acid methyl esters. Skin application. *Acta Pathol. Microbiolog. Scand.*, 1974;82:127-136

Baxter S., Fish A.L. (1981). PARALLEL ACTIVITIES OF FATTY ACID METHYL ESTERS AND ANALOGOUS PHORBOL DIESTERS TOWARDS MOUSE LYMPHOCYTES. Vol. 103, No. 1, 1981 BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS November 16, 1981 Pages 168-174.

Defleur P (1999a). Ester methylique de colza. Etude eco toxicologique pour determination du WGK. Testing laboratory: Laboratoire BFB oil research S.A. Report no.: 15728. Owner company: Diester Industrie.

Defleur P (1999b). Ester methylique de colza. Etude eco toxicologique pour determination du WGK. Testing laboratory: Laboratoire BFB oil research S.A. Report no.: 15728. Owner company: Diester Industrie.

Defleur P (1999ac). Ester methylique de colza. Etude eco toxicologique pour determination du WGK. Testing laboratory: Laboratoire BFB oil research S.A. Report no.: 15728. Owner company: Diester Industrie.

Dr. Van Dievoet (1999). Etude toxicologique. Testing laboratory: BFB oil research. Owner company: BFB oil research. Study number 14447.

Fina Research (1997). Assessment of the bioconcentration factor (BFC) of the fluid (67762-26-9) in the blue Mussel *Mytilus edulis*. Testing laboratory: Fina Research Laboratories. Report no.: ERT 97/241. Onwer company: Fina Research. Study number: 184-6-2.

Gancet C (2009a). Fatty acids, C16 C18 and C18 unsaturated, methyl esters – fish(Danio, rerio), acute toxicity test under semistatic conditions. Testing laboratory: Groupment de recherche de LACQ (GRL). Report no.: 0048/08/B. Owner company: Arkema. Report date: 2009-08-20.

Haddouk H. (1999). Bacterial reverse mutation test. Testing laboratory: CIT. Report no.: 18051 MMO. Owner company: ARKEMA former ATOCHEM. Report date: 1999-07-27.

Haddouk H. (2000). In vitro mammalian chromosome aberration test in cultured human lymphocytes. Testing laboratory: CIT. Report no.: 19877MLH. Owner company: ARKEMA former Elf Atochem SA. Report date: 2000-12-08.

Jackson D., Ogilvie S: (1994). Acute Dermal Toxicity (Limit) Test in Rabbit. Testing laboratory: Inveresk Research International. Report no.: 555703:94018/COCH:10482.

Kaysen A. (1984a). METILOIL A. Evaluation de la toxicité aiguë chez le rat par voie orale. Testing laboratory: CIT. Report no.: 576 TAR. Owner company: ARKEMA former ATOCHEM. Report date: 1984-08-08.

Kaysen A. (1984b). METILOIL A. Evaluation de l'irritation cutanée chez le lapin. Testing laboratory: CIT. Report no.: 577 TAL. Owner company: ARKEMA former ATOCHEM. Report date: 1984-07-31.

Kaysen A. (1984c). METILOIL A. Evaluation de l'irritation oculaire chez le lapin. Testing laboratory: CIT. Report no.: 578 TAL. Owner company: ARKEMA former ATOCHEM. Report date: 1984-07-30.

Kenneth May (2008). Bacterial Reverse Mutation Test. Testing laboratory: Huntingdon Life Sciences. Owner company: Perstorp Speciality Chemicals AB. Study number: PGF0001. Report date: 2008-09-02.

Kiaer H.W., Arffmann, Glavind (1975). Carcinogenicity in mice of some fatty acit methyl esters. 2. Peroral and subcutaneous application. *Acta Pathol Microbiol Scand A*. 1975 Sep;83(5):550-8.

L'Haridon J (2003). Esterol A, Algal inhibition test. Testing laboratory: CIT, Evreux, France. Report no.: 23691. Owner company: Arkema formerly Atofina. Report date: 2003-04-02.

Manciaux X. (1999). Skin sensitization test in guinea-pigs (Maximization method of Magnusson, B. and Kligman, A. M.). Testing laboratory: CIT. Report no.: 18050. Owner company: ARKEMA former Elf Atochem S.A. Report date: 1999-08-20.

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- Mattson F.H. (1972). Hydrolysis of fully esterified alcohols containing from one to eight hydroxyl groups by the lipolytic enzymes of rat pancreatic juice. *Journal of Lipid Research* Volume 13, 1972.
- Murray T.K., Campell J.A., Hopkins C.Y., Chrisholm M.J. (1958). The effect of mono-enoic fatty acid esters on the growth and fecal lipides of rats. *Journal of American Oil Chemists' Society*, 35, 156-158.
- Renner H.W. (1986). The anticlastogenic potential of fatty acid methyl esters. *Mutation Research/Genetic Toxicology* Volume 172, Issue 3, December 1986, Pages 265-269.
- Stolz, JF, Follis, P, Donofrio, r, Buzzelli, J, Griffin, M (1995). Aerobic and Anaerobic Biodegradation of the Methyl Esterified Fatty Acids of Soy Diesel in Freshwater and Soil Environments. www.biodiesel.org/resourses/reportsdatabase/viewall.asp. Testing laboratory: Duquesne University Pittsburg.
- Swern D et al (1970). Investigation of Fatty Acids and Derivatives for Carcinogenic Activity. *CANCER RESEARCH* 30, 1037-1046, April 1970.
- Thiebaud H (1997). Esterol A Toxicité aiguë vis à vis des daphnies. Testing laboratory; DCRD Centre d'Application de Levallois, Service Analyse Environnement. Report no.: 97-SAEK/1356/CKE. Owner company: Arkema formerly ELF ATOCHEM S.A. Study number: 3714/94/A. Report date: 1997-11-06.
- Thiébaud H (1995). Esterol A, détermination de la biodégradabilité facile, essai de dégagement de CO2. Testing laboratory: DCRD, Centre d'Application de Levallois, Service Analyse Environnement. Report no.: 3714/94/B. Owner company: Arkema formerly ELF ATOCHEM S.A. Report date: 1995-04-21.
- Van Divoet (1999). Etude toxicologique. Testing laboratory: BFB research. Owner company: BFB research. Study number: no data. Report date: 2000-07-21.
- Wertz, W, Downing D.T. (1990). Metabolism of topically applied fatty acid methyl esters in BALB/C mouse epidermis. *Journal of dermatological science*, 1 (1990) 33-38 – Elsevier.
- Zhan x., Peterson c.L., Reece D., Möller G., Haws R. (1998). Biodegradability of Biodiesel in the Aquatic Environment. Testing laboratory: Analytical Science Lab, Food Science and Toxicology. Owner company: University of Idaho, USA.

Abbreviations and Acronyms

ACGIH	= American Conference of Industrial Hygienists
N/A	= Not applicable
N/D	= Not determined
STEL	= Short Term Exposure Limit
L ₅₀	= effective loading rate lethal to 50 % of the test population
E _r L ₅₀	= effective loading rate that causes 50 % reduction in algal growth rate
LL ₅₀	= Lethal loading rate required to kill 50 % of test population
PBT	= Persistent, bioaccumulative, toxic
vPvB	= very persistent, very bioaccumulative
IARC	= International agency for research on cancer
PPE	= Personal protective equipment

Note: The information in this MSDS is based on our current knowledge and experience. These data is not a guarantee of the properties of the product. The use of the product for other use than intended can be dangerous. Data contained in this MSDS does not release the user from the obligation to inform themselves about current regulations and apply them to his work. He has to bear the sole responsibility for the precautions required when using this product.