

MATERIAL SAFETY DATA SHEET

Stearic Acid ethyl ester

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Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 07/25/2007
Revision: 11/26/2006

Date Created: 11/26/2006

1. Product and Company Identification

Product Code: 10008196
Product Name: Stearic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
CAS Number: 111-61-5
Synonyms: octadecanoic acid, ethyl ester; Ethyl octadecanoate; Ethyl stearate; NSC 8919

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Concentration | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|---------------|---------------------------------|------------|--------------|
| 1. Ethyl stearate | 111-61-5 | 10.0 % | No data. | 10 mg/m3 | No data. |
| 2. Ethyl alcohol | 64-17-5 | 90.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Ethyl stearate | WI3600000 | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.
Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection
Potential Health Effects (Acute and Chronic): Causes eye, skin, or respiratory system irritation.
Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.
LD 50 / LC 50: Please refer to Section 11.
Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.
Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:
If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

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5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |
| Autoignition Pt: | No data. |
| Flash Pt: | 14.00 C Method: TCC |

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| | |
|---|--|
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Specific Gravity (Water = 1): | No data. |
| Vapor Pressure (vs. Air or mm Hg): | 44.6 MM_HG at 20.0 C |
| Vapor Density (vs. Air = 1): | No data. |
| Evaporation Rate (vs Butyl Acetate=1): | No data. |
| Solubility in Water: | Insoluble* at 25.0 C |
| Other Solubility Notes: | *Sol. in EtOH & DMF, see product insert. |
| Percent Volatile: | No data. |
| Corrosion Rate: | No data. |
| Formula: | C20H40O2 |
| Molecular Weight: | 312.50 |
| pH: | No data. |
| Appearance and Odor: | A clear, colorless solution |

10. Stability and Reactivity

| | |
|--|---|
| Stability: | Unstable [] Stable [X] |
| Conditions To Avoid - Instability: | No data available. |
| Incompatibility - Materials To Avoid: | strong inorganic acids strong oxidizing agents |
| Hazardous Decomposition Or Byproducts: | carbon dioxide carbon monoxide |
| Hazardous Polymerization: | Will occur [] Will not occur [X] |
| Conditions To Avoid - Hazardous Polymerization: | No data available. |

11. Toxicological Information

| | |
|---|---|
| Toxicological Information: | The toxicological effects of this compound have not been thoroughly studied. |
| | Toxicity Data: Oral LD50 (rat): >5000 mg/kg Skin LD50 (rabbit): >5000 mg/kg |
| | Irritation Data: Skin 500 mg (rabbit) 24H: moderate effect |
| Carcinogenicity/Other Information: | No data available. |
| Carcinogenicity: | NTP? No IARC Monographs? No OSHA Regulated? No |

12. Ecological Information

| | |
|--------------------------------|---|
| Ecological Information: | Runoff from fire control or dilution water may cause pollution. |
|--------------------------------|---|

13. Disposal Considerations

| | |
|-------------------------------|--|
| Waste Disposal Method: | Dispose in accordance with local, state and federal regulations. |
|-------------------------------|--|

14. Transport Information

| | |
|--|---|
| LAND TRANSPORT (US DOT) | |
| DOT Proper Shipping Name | Ethyl alcohol |
| DOT Hazard Class: | 3 |
| DOT Hazard Label: | FLAMMABLE LIQUID |
| UN/NA Number: | 1170 |
| Packing Group: | II |
| Additional Transport Information: | Transport in accordance with local, state, and federal regulations. |

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Stearic Acid ethyl ester

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15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Ethyl stearate | 111-61-5 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|-----------|------------|
| 1. Ethyl stearate | 111-61-5 | No | No | Inventory | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | Inventory | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

MATERIAL SAFETY DATA SHEET

Myristic Acid ethyl ester

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Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 07/24/2007
Revision: 12/03/2006

Date Created: 12/03/2006

1. Product and Company Identification

Product Code: 10008197
Product Name: Myristic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
CAS Number: 124-06-1
Synonyms: tetradecanoic acid, ethyl ester; Ethyl myristate; Ethyl tetradecanoate; NSC 8917;

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Concentration | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|---------------|---------------------------------|------------|--------------|
| 1. Tetradecanoic acid, Ethyl ester | 124-06-1 | 50.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 50.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Tetradecanoic acid, Ethyl ester | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.
Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection
Potential Health Effects (Acute and Chronic): The hazards identified with this product are those associated with the solvent(s).
Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.
Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.
Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:
If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |
| Autoignition Pt: | No data. |
| Flash Pt: | 14.00 C Method: TCC |

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Myristic Acid ethyl ester

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| | |
|---|--|
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Specific Gravity (Water = 1): | No data. |
| Vapor Pressure (vs. Air or mm Hg): | 44.6 MM_HG at 20.0 C |
| Vapor Density (vs. Air = 1): | No data. |
| Evaporation Rate (vs Butyl Acetate=1): | No data. |
| Solubility in Water: | X mg/ml* at 25.0 C |
| Other Solubility Notes: | *PBS pH 7.2, also sol. in EtOH, DMSO, & DMF, see product insert. |
| Percent Volatile: | No data. |
| Corrosion Rate: | No data. |
| Formula: | C16H32O2 |
| Molecular Weight: | 256.40 |
| pH: | No data. |
| Appearance and Odor: | A clear, colorless solution |

10. Stability and Reactivity

| | |
|--|---|
| Stability: | Unstable [] Stable [X] |
| Conditions To Avoid - Instability: | No data available. |
| Incompatibility - Materials To Avoid: | strong inorganic acids strong oxidizing agents |
| Hazardous Decomposition Or Byproducts: | carbon dioxide carbon monoxide |
| Hazardous Polymerization: | Will occur [] Will not occur [X] |
| Conditions To Avoid - Hazardous Polymerization: | No data available. |

11. Toxicological Information

| | |
|---|--|
| Toxicological Information: | The toxicological effects of this compound have not been thoroughly studied. |
| Carcinogenicity/Other Information: | No data available. |
| Carcinogenicity: | NTP? No IARC Monographs? No OSHA Regulated? No |

12. Ecological Information

| | |
|--------------------------------|---|
| Ecological Information: | Runoff from fire control or dilution water may cause pollution. |
|--------------------------------|---|

13. Disposal Considerations

| | |
|-------------------------------|--|
| Waste Disposal Method: | Dispose in accordance with local, state and federal regulations. |
|-------------------------------|--|

14. Transport Information

LAND TRANSPORT (US DOT)

| | |
|--|---|
| DOT Proper Shipping Name | Ethyl alcohol |
| DOT Hazard Class: | 3 |
| DOT Hazard Label: | FLAMMABLE LIQUID |
| UN/NA Number: | 1170 |
| Packing Group: | II |
| Additional Transport Information: | Transport in accordance with local, state, and federal regulations. |

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Tetradecanoic acid, Ethyl ester | 124-06-1 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|-----------|------------|
| 1. Tetradecanoic acid, Ethyl ester | 124-06-1 | No | No | Inventory | No |

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Myristic Acid ethyl ester

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| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|---------|---------|---------------|-----------|------------|
| 2. Ethyl alcohol | 64-17-5 | No | No | Inventory | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

MATERIAL SAFETY DATA SHEET

Linoleic Acid Ethyl Ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 10/09/2006
Revision: 10/09/2006

Date Created: 10/09/2006

1. Product and Company Identification

Product Code: 10008198
Product Name: Linoleic Acid Ethyl Ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
Synonyms: 9Z,12Z-octadecadienoic acid, ethyl ester; Ethyl linolate; Ethyl linoleate; Telfairic Acid ethyl ester

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Percentage | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|------------|---------------------------------|------------|--------------|
| 1. Ethyl linoleate, pure | 544-35-4 | 50.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 50.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Ethyl linoleate, pure | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.
Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection
Potential Health Effects (Acute and Chronic): Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.
Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.
Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:
If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Keep tightly closed. Store at correct temperature. Store under nitrogen. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Protective gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Compatible chemical-resistant gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |

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Linoleic Acid Ethyl Ester

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Autoignition Pt: No data.
Flash Pt: 14.00 C Method: TCC
Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C20H36O2
Molecular Weight: 308.50
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: protect from moisture
Incompatibility - Materials To Avoid: acids
bases
reducing agents
strong inorganic acids
strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)

DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
DOT Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Ethyl linoleate, pure | 544-35-4 | No | No | No | No |

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Linoleic Acid Ethyl Ester

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| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|---------|---------------|------------|---------------|---------|
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|----------|------------|
| 1. Ethyl linoleate, pure | 544-35-4 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

MATERIAL SAFETY DATA SHEET

Linolenic Acid ethyl ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 07/24/2007
Revision: 12/03/2006

Date Created: 12/03/2006

1. Product and Company Identification

Product Code: 10008199
Product Name: Linolenic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
CAS Number: 1191-41-9
Synonyms: 9Z,12Z,15Z-octadecatrienoic acid, ethyl ester; Ethyl linolenate; Ethyl .alpha.-linolenate; Ethyl linolenoate; LAEE;

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Concentration | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|---------------|---------------------------------|------------|--------------|
| 1. Ethyl linolenate | 1191-41-9 | 50.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 50.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Ethyl linolenate | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.
Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection
Potential Health Effects (Acute and Chronic): Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.
LD 50 / LC 50: Oral LD50 (mouse): 111250 mg/kg
Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.
Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:
If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove

Linolenic Acid ethyl ester

Printed: 07/24/2007

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contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--|
| Physical States: | <input type="checkbox"/> Gas <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |

Autoignition Pt: No data.
Flash Pt: 14.00 C Method: TCC
Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF, see product insert.
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C20H34O2
Molecular Weight: 306.50
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: No data available.
Incompatibility - Materials To Avoid: strong acids
 strong bases
 strong inorganic acids
 strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
 carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)
DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|-----------|---------------|------------|---------------|---------|
| 1. Ethyl linolenate | 1191-41-9 | No | No | No | No |

MATERIAL SAFETY DATA SHEET

Linolenic Acid ethyl ester

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Printed: 07/24/2007
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| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|---------|---------------|------------|---------------|---------|
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|-----------|---------|---------------|-----------|------------|
| 1. Ethyl linolenate | 1191-41-9 | No | No | Inventory | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | Inventory | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

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MATERIAL SAFETY DATA SHEET

Arachidonic Acid ethyl ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 07/25/2007
Revision: 02/13/2007

Date Created: 02/13/2007

1. Product and Company Identification

Product Code: 10008200
Product Name: Arachidonic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
CAS Number: 1808-26-0
Synonyms: 5Z,8Z,11Z,14Z-eicosatetraenoic acid, ethyl ester; Ethyl Arachidonate;

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Concentration | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|---------------|--|------------|--------------|
| 1. Arachidonic Acid ethyl ester | 1808-26-0 | 10.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 90.0 % | 8H TWA:1000 ppm (1900 mg/m ³) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Arachidonic Acid ethyl ester | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.
Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection
Potential Health Effects (Acute and Chronic): The hazards identified with this product are those associated with the solvent(s).
Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.
LD 50 / LC 50: Please refer to Section 11.
Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.
Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:
If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove

contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |

MATERIAL SAFETY DATA SHEET

Arachidonic Acid ethyl ester

Page: 3
Printed: 07/25/2007
Revision: 02/13/2007

Autoignition Pt: No data.
Flash Pt: 14.00 C Method: TCC
Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF, see product insert.
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C22H36O2
Molecular Weight: 332.50
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: No data available.
Incompatibility - Materials To Avoid: strong inorganic acids
strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.

Arachidonic Acid ethyl ester - Toxicity Data:
Oral LD50 (rat): > 20000 mg/kg
Oral LD50 (mouse): > 20000 mg/kg
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)
DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

MATERIAL SAFETY DATA SHEET
Arachidonic Acid ethyl ester

Page: 4
Printed: 07/25/2007
Revision: 02/13/2007

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|-----------|---------------|------------|---------------|---------|
| 1. Arachidonic Acid ethyl ester | 1808-26-0 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|-----------|---------|---------------|-----------|------------|
| 1. Arachidonic Acid ethyl ester | 1808-26-0 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | Inventory | No |

16. Other Information

Company Policy or Disclaimer

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MATERIAL SAFETY DATA SHEET

Oleic Acid Ethyl Ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 10/09/2006
Revision: 10/09/2006

Date Created: 10/09/2006

1. Product and Company Identification

Product Code: 10008201
Product Name: Oleic Acid Ethyl Ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
Synonyms: 9Z-octadecenoic acid, ethyl ester; Ethyl oleate

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Percentage | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|------------|---------------------------------|------------|--------------|
| 1. Ethyl oleate | 111-62-6 | 50.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 50.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Ethyl oleate | RG3715000 | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.

Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection

Potential Health Effects (Acute and Chronic): Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.

LD 50/LC 50: Please refer to Section 11.

Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.

Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:

If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.

In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Keep tightly closed. Store at correct temperature. |
| Other Precautions: | Air and light sensitive. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |

MATERIAL SAFETY DATA SHEET

Oleic Acid Ethyl Ester

Page: 3
Printed: 10/09/2006
Revision: 10/09/2006

Autoignition Pt: No data.
Flash Pt: 14.00 C Method: TCC
Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C20H38O2
Molecular Weight: 310.50
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: protect from air
protect from light
protect from moisture
Incompatibility - Materials To Avoid: strong inorganic acids
strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.

Oral LD50 (rat): >5000 mg/kg
Skin LD50 (rabbit): >5000 mg/kg
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)

DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
DOT Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

MATERIAL SAFETY DATA SHEET
Oleic Acid Ethyl Ester

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Ethyl oleate | 111-62-6 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|----------|------------|
| 1. Ethyl oleate | 111-62-6 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

16. Other Information

Company Policy or Disclaimer

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MATERIAL SAFETY DATA SHEET

Palmitic Acid ethyl ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 01/19/2007
Revision: 01/16/2007

Date Created: 01/16/2007

1. Product and Company Identification

Product Code: 10008202
Product Name: Palmitic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
Synonyms: hexadecanoic acid, ethyl ester; Ethyl hexadecanoate; Ethyl palmitate

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Percentage | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|------------|---------------------------------|------------|--------------|
| 1. Hexadecanoic acid, Ethyl ester | 628-97-7 | 10.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 90.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Hexadecanoic acid, Ethyl ester | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.

Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection

Potential Health Effects (Acute and Chronic): The hazards identified with this product are those associated with the solvent(s).
Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.

Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.

Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:

If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.

In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

MATERIAL SAFETY DATA SHEET

Palmitic Acid ethyl ester

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Printed: 01/19/2007
Revision: 01/16/2007

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |
| Autoignition Pt: | No data. |
| Flash Pt: | 14.00 C Method: TCC |

MATERIAL SAFETY DATA SHEET

Palmitic Acid ethyl ester

Page: 3
Printed: 01/19/2007
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Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: > Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF, see product insert.
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C18H36O2
Molecular Weight: 284.50
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: No data available.
Incompatibility - Materials To Avoid: strong inorganic acids
strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)

DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
DOT Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Hexadecanoic acid, Ethyl ester | 628-97-7 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|----------|------------|
| 1. Hexadecanoic acid, Ethyl ester | 628-97-7 | No | No | No | No |

MATERIAL SAFETY DATA SHEET
Palmitic Acid ethyl ester

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Printed: 01/19/2007
Revision: 01/16/2007

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|---------|---------|---------------|----------|------------|
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

MATERIAL SAFETY DATA SHEET

Lauric Acid ethyl ester

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Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 01/18/2007
Revision: 01/12/2007

Date Created: 01/12/2007

1. Product and Company Identification

Product Code: 10008203
Product Name: Lauric Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
Synonyms: dodecanoic acid, ethyl ester

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Percentage | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|-----------|------------|---------------------------------|------------|--------------|
| 1. Ethyl laurate | 106-33-2 | 10.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 90.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Ethyl laurate | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.

Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection

Potential Health Effects (Acute and Chronic): Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.

Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.

Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures: If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.
If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.
In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.
In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Lauric Acid ethyl ester

Printed: 01/18/2007

Revision: 01/12/2007

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |
| Autoignition Pt: | No data. |
| Flash Pt: | 14.00 C Method: TCC |

MATERIAL SAFETY DATA SHEET

Lauric Acid ethyl ester

Page: 3
Printed: 01/18/2007
Revision: 01/12/2007

Explosive Limits: LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C
Specific Gravity (Water = 1): No data.
Vapor Pressure (vs. Air or mm Hg): 44.6 MM_HG at 20.0 C
Vapor Density (vs. Air = 1): No data.
Evaporation Rate (vs Butyl Acetate=1): No data.
Solubility in Water: > Insoluble* at 25.0 C
Other Solubility Notes: *Sol. in EtOH, DMSO, & DMF, see product insert.
Percent Volatile: No data.
Corrosion Rate: No data.
Formula: C14H28O2
Molecular Weight: 228.40
pH: No data.
Appearance and Odor: A clear, colorless solution

10. Stability and Reactivity

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: No data available.
Incompatibility - Materials To Avoid: strong inorganic acids
strong oxidizing agents
Hazardous Decomposition Or Byproducts: carbon dioxide
carbon monoxide
Hazardous Polymerization: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Polymerization: No data available.

11. Toxicological Information

Toxicological Information: The toxicological effects of this compound have not been thoroughly studied.
Carcinogenicity/Other Information: No data available.
Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

12. Ecological Information

Ecological Information: Runoff from fire control or dilution water may cause pollution.

13. Disposal Considerations

Waste Disposal Method: Dispose in accordance with local, state and federal regulations.

14. Transport Information

LAND TRANSPORT (US DOT)

DOT Proper Shipping Name: Ethyl alcohol
DOT Hazard Class: 3
DOT Hazard Label: FLAMMABLE LIQUID
UN/NA Number: 1170
DOT Packing Group: II
Additional Transport Information: Transport in accordance with local, state, and federal regulations.

15. Regulatory Information

US EPA SARA Title III

| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
|--------------------------------------|----------|---------------|------------|---------------|---------|
| 1. Ethyl laurate | 106-33-2 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

US EPA CAA, CWA, TSCA

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|----------|---------|---------------|----------|------------|
| 1. Ethyl laurate | 106-33-2 | No | No | No | No |

MATERIAL SAFETY DATA SHEET
Lauric Acid ethyl ester

Page: 4
Printed: 01/18/2007
Revision: 01/12/2007

| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
|--------------------------------------|---------|---------|---------------|----------|------------|
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |

16. Other Information

Company Policy or Disclaimer

For research use only, not for human or veterinary clinical use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

MATERIAL SAFETY DATA SHEET

Palmitoleic Acid ethyl ester

Page: 1

Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Printed: 07/25/2007
Revision: 11/26/2006

Date Created: 11/26/2006

1. Product and Company Identification

Product Code: 10008204
Product Name: Palmitoleic Acid ethyl ester
Manufacturer Information
Company Name: Cayman Chemical Company
Emergency Contact: Cayman Chemical Company (800)364-9897
Information: Cayman Chemical Company (734)971-3335
Chemical Family: Fatty Acids
Synonyms: 9Z-hexadecenoic acid, ethyl ester; Ethyl Palmitoleate

2. Composition/Information on Ingredients

| Hazardous Components (Chemical Name) | CAS # | Concentration | OSHA PEL | ACGIH TLV | Other Limits |
|--------------------------------------|------------|---------------|---------------------------------|------------|--------------|
| 1. Palmitoleic Acid ethyl ester | 56219-10-4 | 10.0 % | No data. | No data. | No data. |
| 2. Ethyl alcohol | 64-17-5 | 90.0 % | 8H TWA:1000 ppm (1900 mg/m3) | 1000 ppm | No data. |
| Hazardous Components (Chemical Name) | RTECS # | OSHA STEL | OSHA CEIL | ACGIH STEL | ACGIH CEIL |
| 1. Palmitoleic Acid ethyl ester | NA | No data. | No data. | No data. | No data. |
| 2. Ethyl alcohol | KQ6300000 | No data. | No data. | No data. | No data. |

3. Hazards Identification

Emergency Overview: No data available.

Route(s) of Entry: Inhalation? Yes Skin? Yes Eyes? Yes Ingestion? Yes Other: Injection

Potential Health Effects (Acute and Chronic): The hazards identified with this product are those associated with the solvent(s).
Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.
Material is irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
Repeated exposure may cause skin dryness or cracking.
Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the CNS system of the fetus, producing a collection of effects which together constitute fetal alcohol syndrome. These include mental and physical retardation, disturbances of learning, motor and language deficiencies, behavioral disorders and small size head.
The toxicological properties of this compound have not been fully evaluated.

Signs and Symptoms Of Exposure: Exposure may cause: Dizziness, drowsiness, headache, nausea, and vomiting.

Medical Conditions Generally Aggravated By Exposure: Repeated exposure to ethanol may aggravate liver injury produced from other causes.

4. First Aid Measures

Emergency and First Aid Procedures:

If inhaled remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

If swallowed, wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

In case of contact with eyes, hold eyelids apart and flush eyes with plenty of water. After initial flushings, remove any contact lenses and continue flushing for at least 20 minutes. Have eyes examined and tested by medical personnel.

In case of skin contact, immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

5. Fire Fighting Measures

| | |
|--|---|
| Flash Pt: | 14.00 C Method Used: TCC |
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Fire Fighting Instructions: | As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. Note: Flammable as diluted in ethanol. |
| Flammable Properties and Hazards: | Can release vapors that form explosive mixtures at temperatures at or above the flashpoint. Container explosion may occur under fire conditions. Emits toxic fumes under fire conditions. Flammable liquid. Vapors can travel to a source of ignition and flash back. |
| Hazardous Combustion Products: | carbon dioxide carbon monoxide |
| Extinguishing Media: | Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray when fighting fires involving this material. |
| Unsuitable Extinguishing Media: | No data available. |

6. Accidental Release Measures

| | |
|---|---|
| Steps To Be Taken In Case Material Is Released Or Spilled: | Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. After removal, ventilate contaminated area and flush thoroughly with water. |
|---|---|

7. Handling and Storage

| | |
|---|--|
| Hazard Label Information: | Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Handling: | Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not reuse this container. Keep away from sources of ignition. Use with adequate ventilation. Wash thoroughly after handling. |
| Precautions To Be Taken in Storing: | Store at correct temperature. |

8. Exposure Controls/Personal Protection

| | |
|---|--|
| Protective Equipment Summary - Hazard Label Information: | Eye wash station in work area Lab coat Latex disposable gloves Safety glasses Safety shower in work area Vent Hood |
| Respiratory Equipment (Specify Type): | No data available. |
| Eye Protection: | Safety glasses |
| Protective Gloves: | Latex disposable gloves |
| Other Protective Clothing: | Lab coat |
| Engineering Controls (Ventilation etc.): | Good general ventilation should be sufficient to control airborne levels. |
| Work/Hygienic/Maintenance Practices: | Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Wash thoroughly after handling. |

9. Physical and Chemical Properties

| | |
|-------------------------|--------------------------------|
| Physical States: | [] Gas [X] Liquid [] Solid |
| Melting Point: | No data. |
| Boiling Point: | No data. |
| Autoignition Pt: | No data. |
| Flash Pt: | 14.00 C Method: TCC |

Palmitoleic Acid ethyl ester

| | |
|---|---|
| Explosive Limits: | LEL: 3.3% at 25.0 C UEL: 19% at 25.0 C |
| Specific Gravity (Water = 1): | No data. |
| Vapor Pressure (vs. Air or mm Hg): | 44.6 MM_HG at 20.0 C |
| Vapor Density (vs. Air = 1): | No data. |
| Evaporation Rate (vs Butyl Acetate=1): | No data. |
| Solubility in Water: | Insoluble* at 25.0 C |
| Other Solubility Notes: | *Sol. in EtOH, DMSO, & DMF, see product insert. |
| Percent Volatile: | No data. |
| Corrosion Rate: | No data. |
| pH: | No data. |
| Appearance and Odor: | A clear, colorless solution |

10. Stability and Reactivity

| | |
|--|---|
| Stability: | Unstable [] Stable [X] |
| Conditions To Avoid - Instability: | No data available. |
| Incompatibility - Materials To Avoid: | strong inorganic acids strong oxidizing agents |
| Hazardous Decomposition Or Byproducts: | carbon dioxide carbon monoxide |
| Hazardous Polymerization: | Will occur [] Will not occur [X] |
| Conditions To Avoid - Hazardous Polymerization: | No data available. |

11. Toxicological Information

| | |
|---|--|
| Toxicological Information: | The toxicological effects of this compound have not been thoroughly studied. |
| Carcinogenicity/Other Information: | No data available. |
| Carcinogenicity: | NTP? No IARC Monographs? No OSHA Regulated? No |

12. Ecological Information

| | |
|--------------------------------|---|
| Ecological Information: | Runoff from fire control or dilution water may cause pollution. |
|--------------------------------|---|

13. Disposal Considerations

| | |
|-------------------------------|--|
| Waste Disposal Method: | Dispose in accordance with local, state and federal regulations. |
|-------------------------------|--|

14. Transport Information

| | |
|--|---|
| LAND TRANSPORT (US DOT) | |
| DOT Proper Shipping Name | Ethyl alcohol |
| DOT Hazard Class: | 3 |
| DOT Hazard Label: | FLAMMABLE LIQUID |
| UN/NA Number: | 1170 |
| Packing Group: | II |
| Additional Transport Information: | Transport in accordance with local, state, and federal regulations. |

15. Regulatory Information

| US EPA SARA Title III | | | | | |
|--------------------------------------|------------|---------------|---------------|---------------|------------|
| Hazardous Components (Chemical Name) | CAS # | Sec.302 (EHS) | Sec.304 RQ | Sec.313 (TRI) | Sec.110 |
| 1. Palmitoleic Acid ethyl ester | 56219-10-4 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | No | No |
| US EPA CAA, CWA, TSCA | | | | | |
| Hazardous Components (Chemical Name) | CAS # | EPA CAA | EPA CWA NPDES | EPA TSCA | CA PROP 65 |
| 1. Palmitoleic Acid ethyl ester | 56219-10-4 | No | No | No | No |
| 2. Ethyl alcohol | 64-17-5 | No | No | Inventory | No |

16. Other Information

Company Policy or Disclaimer

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DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.