Section 1 - Product and Company Information

Product Name: D-MALIC ACID, 100MG, NEAT
Product Number: 469404U
Brand: Supelco Chemical
Company: Sigma-Aldrich
Street Address: 3000 Spruce Street
City, State, Zip: SAINT LOUIS, MO 63103 US
Technical Phone: 800-325-5532
Fax: 600-325-5352
Emergency Phone: 314-776-5555

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
<th>EC No</th>
<th>Annex I Index Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(+)-MALIC ACID, UNNATURAL FORM</td>
<td>536-61-3</td>
<td>No</td>
<td>211-262-2</td>
<td></td>
</tr>
</tbody>
</table>

Formula: C4H6O5
Synonym: L(+)-Malic acid

Section 3 - Hazards Identification

Emergency Overview
Inhaling irritant to respiratory system and skin. Risk of Serious damage to eyes.

HMIS Rating
Health: 2
Flammability: 0
Reactivity: 0

NFPA Rating
Health: 2
Flammability: 0
Reactivity: 0

For additional information on toxicity, please refer to Section 11

Section 4 - First Aid Measures

Oral Exposure
If swallowed: wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Autoignition Temp: N/A
Extinguishing Media
Suitable: Water spray, Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure(s) of Personal Protection(s)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment
Respiratory
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand
Compatible chemical-resistant gloves.
Eye
Chemical safety goggles.

General Hygiene Measures
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance
Physical State: Solid
Color: White
Form: Powder

Supelco Chemical - 469404U
Page 2

Sigma-Aldrich Corporation
www.sigma-aldrich.com
Molecular Weight 134.06 AMU
pH N/A
BP/BP Range N/A
MP/MP Range 98 °C
Freezing Point N/A
Vapor Pressure N/A
Vapor Density N/A
Saturated Vapor Conc. N/A
SG/Density N/A
Bulk Density N/A
Odor Threshold N/A
Vapor % N/A
VOC Content N/A
Water Content N/A
Solvent Content N/A
Evaporation Rate N/A
Viscosity N/A
Partition Coefficient N/A
Decomposition Temp. N/A
Flash Point °F N/A
Flash Point °C N/A
Explosion Limits N/A
Flammability N/A
Autoignition Temp N/A
Optical Rotation Degree of Rotation +31 - +27 (°=2) Solvent: Pyridine 65 g/l
Solubility N/A
N/A is not available

Section 10 - Stability and Reactivity
Stability
Stable
Conditions to Avoid
Heat,
Materials to Avoid
Evans Oxidizing agents. Reducing agents, Alkali metals

Hazardous Decomposition Products
Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information
Route of Exposure
Skin Contact
Causes skin irritation.
Skin Absorption
May be harmful if absorbed through the skin.
Eye Contact
Causes severe eye irritation.
Inhalation
Material is irritating to mucous membranes and upper respiratory tract! May be harmful if inhaled.

Ingestion
May be harmful if swallowed.

Signs and Symptoms of Exposure
Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

RTECS Number ON/2670000

Toxicity Data
Oral - Rat 5500 mg/kg (LD50)

Section 12 - Ecological Information
No data available.

Section 13 - Disposal Considerations
Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material.

Oxidizable or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information
DOT
Proper Shipping Name: None
Non-Hazardous for Transport This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport Non-hazardous for air transport.

Section 15 - Regulatory Information
EU Additional Classification
Symbol of Danger: XI
Indication of Danger Instant.
Risk Statements R: 37/36 41
Inhalation to respiratory system and skin. Risk of serious damage to eyes.
Safety Statements S: 26/36
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice/Wear suitable protective clothing.

US Classification and Label Text
Indication of Danger Instant.
Risk Statements
Inhalation to respiratory system and skin. Risk of serious damage to eyes.
Safety Statements In case of contact with eyes, rinse immediately with plenty of water and seek medical advice/Wear suitable protective clothing, gloves, and eye/face protection.

United States Regulatory Information
SARA Listed: No

Canada Regulatory Information
WHMIS Classification
This product has been classified in accordance with the hazard criteria of the CPR. and the MSDS contains all the information required by the CPR.

Supelco Chemical - 46840-U
Page 3
Sigma-Aldrich Corporation
www.sigmaaldrich.com

Supelco Chemical - 46840-U
Page 4
Sigma-Aldrich Corporation
www.sigmaaldrich.com
Section 16 - Other Information

Disclaimer
For R&D use only. Not for drug, household or other uses.

Warranty
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc. shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.