Sigma-Aldrich

Material Safety Data Sheet

Date Printed: 03/23/2005
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Version 1.11

Section 1 - Product and Company Information

Product Name: Dimethyl Sulfoxide, Sterile-filtered
Product Number: D2650
Brand: Sigma Chemical
Company: Sigma-Aldrich
Street Address: 3030 Spruce Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 314 771 5765
Fax: 800 335 9052
Emergency Phone: 414 273 3850 Ext. 5896

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</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMETHYL SULFOXIDE</td>
<td>67-68-5</td>
<td>No</td>
<td>200-654-3</td>
<td></td>
</tr>
</tbody>
</table>

Formula
A 10846, Detox, Demeso, Demasor, Dexamet, Damsodor, Dermalog, Dimethyl sulfoxide, Dimethyl sulfoxide, Dimedex, Dipanil-HIP, DMS-70, DMS-90, DMSO, Dolor, Domosol, Dromos, Durasor, Gamasol 90, Hydros, Intidin, M 179, Methane, sulfynilbutyric, Methylsulfinylmethane, NSC-793, Rimeco-50, Sompront, SQ 9453, Sulfynil(methan), Synertex, Texpyn

Section 3 - Hazards Identification

Emergency Overview
Combustible. Readily absorbed through skin. Target organ(s): Eyes. Skin.

HMIS Rating
Health: 0 Flammability: 2 Reactivity: 1

NFPA Rating
Health: 0 Flammability: 2 Reactivity: 1

*additional chronic hazards present.
For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

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

Section 5 - Fire Fighting Measures

Flash Point: 188.6 °F
Explosion Limits: Lower: 3.5 % Upper: 42 %
Autoignition Temp: 301 °C
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)
Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

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

Methods for Cleaning Up
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Environmental Precaution(s)
Avoid contaminating sewers and waterways with this material.

Section 7 - Handling and Storage

Handling
User Exposure
Do not breathe vapor. Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.

Storage

Special Requirements
Store under inert gas. Hygroscopic.

Section 8 - Exposure Controls / PPE

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

Personal Protective Equipment
Respiratory: Government approved respirator.

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Page 2 Sigma-Aldrich Corporation
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Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>78.13 AMU</td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
</tr>
<tr>
<td>BP/Flash Point</td>
<td>189 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>0.42 mm Hg</td>
</tr>
<tr>
<td>Saturated Vapor Pressure</td>
<td>2.7 g/s</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>1.1 g/cm³</td>
</tr>
<tr>
<td>Odor</td>
<td>N/A</td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>Log Kow: -2.03</td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>&gt; 190 °C</td>
</tr>
<tr>
<td>Flash Point</td>
<td>195.6 °F</td>
</tr>
<tr>
<td>Flammability</td>
<td>N/A</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Miscible</td>
</tr>
<tr>
<td>Other Solvents</td>
<td>ACETONE, ETHYL ETHERS</td>
</tr>
<tr>
<td>N/A = not available</td>
<td></td>
</tr>
</tbody>
</table>

Section 11 - Toxicological Information

**Route of Exposure**
- **Skin Contact**: May cause skin irritation.
- **Skin Absorption**: May be harmful if absorbed through the skin. Readily absorbed through skin.
- **Eye Contact**: May cause eye irritation.
- **Inhalation**: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
- **Ingestion**: May be harmful if swallowed.

**Target Organ(s) or System(s)**
- Eyes, Skin.

**Conditions Aggravated by Exposure**
Avoid contact with DMSO solutions containing toxic materials or solvents with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body.

**RTECS Number**: PV8210000

**Toxicity Data**
- **Inhalation**: Rat: 40,250 ppm (LC50)
- **Oral**: Rat: 3,300 mg/kg (LD50)
- **Skin**: Rabbit: > 5,000 mg/kg (LD50)
- **Oral**: Rat: 14,500 mg/kg (LD50)
- **Subcutaneous**: Rat: 12 GM/KG (LD50)
- **Intraperitoneal**: Rat: 12,000 mg/kg (LD50)
- **Intravenous**: Rat: 5,360 MG/KG (LD50)
- **Mouse**: 7,020 mg/kg (LD50)

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### Skin - Mouse: 50000 mg/kg (LD50)

**Intraperitoneal - Mouse: 2500 MG/KG (LD50)**
- Subcutaneous - Mouse: 14 GM/KG (LD50)
  - Remarks: Behavioral change in motor activity (speculative assay).
  - Lung, Thorax, or Respiration: Other changes.
  - Kidney, Ureter, Bladder: Hematuria.
- Intravenous - Mouse: 3100 MG/KG (LD50)
  - Remarks: Sense organs and Special Senses (Nose, Eye, Ear, and Taste): Eye Hemorrhage, Sense organs and Special Senses (Nose, Eye, Ear, and Taste): Eye Conjunction irritation.
- Oral - Dog: > 15000 mg/kg (LD50)
- Intravenous - Dog: 2500 MG/KG (LD50)
  - Remarks: Cardiac: Other changes.
  - Kidney, Ureter, Bladder: Hematuria.
- Oral - Mammal: 21400 mg/kg (LD50)
- Oral - Bird (wild): 100 mg/kg (LD50)

### Irritation Data
- **Skin - Rabbit:** 4 HOURS
  - Remarks: No irritation affect
- **Eyes - Rabbit:**
  - Remarks: Mild irritation effect
- **Skin - Rabbit:** 10 mg; 24H
  - Remarks: Open irritation test
- **Skin - Rabbit:** 500 mg; 24H
  - Remarks: Mild irritation effect
- **Eyes - Rabbit:** 100 mg
- **Eyes - Rabbit:** 500 mg; 24H
  - Remarks: Mild irritation effect

### Chronic Exposure - Carcinogen
**Rat:** Oral: 50 GM/KG 8W 1
- Result: Tumorigenic Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.
  - Subcutaneous: 220 GM/KG 82W 1
  - Result: Tumorigenic Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.
- **Mouse:** Oral: 65340 MG/KG 86W 1
  - Subcutaneous: 65 GM/KG 66W 1
  - Result: Tumorigenic Equivocal tumorigenic agent by RTECS criteria. Lung, Thorax, or Respiration: Tumors. Skin and Appendages: Other: Tumors.

### Chronic Exposure - Teratogen
**Mouse:** 210 GM/KG
- Result: Specific Developmental Abnormalities: Central nervous system.
  - Subcutaneous: 5500 MG/KG 1
  - Result: Effects on Embryo: Fetal toxicity (except death, e.g., stunted fetus).
  - Specific Developmental Abnormalities: Musculoskeletal system.
- **Hamster:** 11 GM/KG
  - Result: Specific Developmental Abnormalities: Central nervous system.
  - Subcutaneous: 5500 MG/KG 1
  - Result: Specific Developmental Abnormalities: Musculoskeletal system.
  - Specific Developmental Abnormalities: Central nervous system.

### Specific Developmental Abnormalities: Craniofacial (including nose and tongue)
- **Hamster:** 4400 MG/KG Intraperitoneal 8D PREG
  - Result: Effects on Embryo or Fetus: Fetal death.
- **Hamster:** 2500 MG/KG Intravenous 8D PREG
  - Result: Specific Developmental Abnormalities: Central nervous system.
- **Specific Developmental Abnormalities: Craniofacial (including nose and tongue):**
- **Specific Developmental Abnormalities: Musculoskeletal system:**
- **Hamster:** 2500 MG/KG Intravenous 8D PREG
  - Result: Specific Developmental Abnormalities: Other developmental anomalies.

### Chronic Exposure - Mutagen
**Species** | **Dose** | **Route of Application** | **Cell Type** | **Mutation Test**
--- | --- | --- | --- | ---
**Human** | 140 MMOL/L | Intraperitoneal 5D | lymphocyte | Other mutation test systems
**Rat** | 26 GM/KG | Intraperitoneal | lymphocyte | Cytogenetic analysis
**Mouse** | 75 MG/KG | Intraperitoneal | lymphocyte | DNA damage
**Mouse** | 93 GWL | Intraperitoneal | lymphocyte | Cytogenetic analysis
**Hamster** | 16 PHH | Oral | ovary | Mutation in mammalian somatic cells
**Hamster** | 1 PHH | Oral | lung | Cytogenetic analysis

### Chronic Exposure - Reproductive Hazard
**Species** | **Dose** | **Route of Application** | **Exposure Time**
--- | --- | --- | ---
**Rat** | 56 GM/KG | Intraperitoneal | (6-12D PREG)
- Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
- Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
- Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
- Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetal toxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.
- Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
- Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

### Ecotoxicity Tests
**Test Type:** LC50 Fish
**Species** | **Daphnia magna** (Rainbow trout)
- **Time:** 96.0 h
  - Value: 30,000 mg/l
- **Test Type:** EC50 Algae
  - **Species:** Leptombrachius macrochiris (Bluegill)
    - **Time:** 96.0 h
      - Value: > 400,000 mg/l

### Section 12 - Ecological Information
**Sigma Chemical - D2650**
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Species
Pimephales promelas (Fathead minnow)
Time: 96.0 h
Value: 34,000 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material.
This combustible material may be burned 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: Combustible liquid, n.o.s.
UN#: 1993
Class: COMBUSTIBLE LIQUID
Packing Group: Packing Group III
Hazard Label: None
PH: Not PH

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

Section 15 - Regulatory Information

US Classification and Label Text
US Statements
Combustible. Readily absorbed through skin. Target organ(s): Eyes. Skin.

United States Regulatory Information
SARA Listed: No

TSCA Inventory Item: Yes

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.
DSL: Yes
NDSL: No

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 or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.