SIGMA-ALDRICH

Material Safety Data Sheet

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Section 1 - Product and Company Information

Product Name Dimethyl sulfoxide, anhydrous, 99.9+%
Product Number 276855
Brand Aldrich Chemical

Company Sigma-Aldrich
Address 3050 Spruce Street
City, State, Zip, Country SAINT LOUIS, MO 63103 US
Technical Phone: 800-325-5832 **Emergency Phone:** 314-776-6555
Fax: 800-325-5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
DIMETHYL SULFOXIDE	67-68-5	No	200-664-3	

Formula C2H6OS
Synonyms A 10846, Deltan, Demeso, Demasorb, Demavet, Demsodrox, Dermasorb, Dimethyl sulfoxide, Dimethyl sulphoxide, Dimexide, Dipirartril-tropico, DMS-70, DMS-90, DMSO, Dolicur, Domoso, Dromisol, Durasorb, Gamasol 90, Hyadur, Infiltrina, M 176, Methane, sulfinylbis-, Methylsulfinylmethane, NSC-763, Rimso-50, Somipront, SQ 9453, Sulfinylbis(methane), Syntexan, Topsym

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

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

Flash Point: 188,6 °F 87 °C

Explosion Limits: **Lower:** 3.5 % **Upper:** 42 %

Autoignition Temp: 301 °C

Extinguishing Media
Suitable
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

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
Suitable
Store under inert gas. Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.

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
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN

(EU) Respiratory protection is not required. Where protection is desired, use multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

Skin-Specific

Chemical resistant apron.

General Hygiene Measures

Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance

Physical State	Color
Clear liquid	Colorless

Molecular Weight:	78.13 AMU		
pH	N/A		
BP/BP Range	189 °C		
MP/MP Range	18.4 °C		
Freezing Point	N/A		
Vapor Pressure	0.42 mmHg	20 °C	
Vapor Density	2.7 g/l		
Saturated Vapor Conc.	N/A		
SG/Density	1.1 g/cm3		
Bulk Density	N/A		
Odor Threshold	N/A		
Volatile%	N/A		
VOC Content	N/A		
Water Content	N/A		
Solvent Content	N/A		
Evaporation Rate	N/A		
Viscosity	0.002 Pas	20 °C	
Partition Coefficient	Log Kow: -2.03		
Decomposition Temp.	> 190 °C		
Flash Point °F	188.6 °F		Method: closed cup
Flash Point °C	87 °C		Method: closed cup
Explosion Limits	Lower: 3.5 % 2.6 % Upper: 42 % 28.5 %	63 °C	
Flammability	N/A		
Autoignition Temp	301 °C		
Refractive Index	1.479		

Solubility

Solubility in Water: Miscible.

Other Solvents: ALCOHOLS, ETHYL ETHERS.

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable

Stable.

Conditions to Avoid

Moisture.

Materials to Avoid

Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents.

Hazardous Decomposition Products

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide, Sulfur oxides.

Hazardous Exothermic Reactions

Hazardous Exothermic Reactions

Methyl sulfoxide (DMSO) undergoes a violent exothermic reaction on mixing with copper wool and trichloroacetic acid. On mixing with potassium permanganate it will flash instantaneously. It reacts violently with: acid halides, cyanuric chloride, silicon tetrachloride, phosphorus trichloride and trioxide, thionyl chloride, magnesium perchlorate, silver fluoride, methyl bromide, iodine pentafluoride, nitrogen periodate, diborane, sodium hydride, and perchloric and periodic acids. When heated above its boiling point methyl sulfoxide degrades giving off formaldehyde, methyl mercaptan, and sulfur dioxide..

Hazardous Polymerization

Hazardous Polymerization

Will not occur.

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 materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body.

RTECS Number: PV6210000

Toxicity Data

Inhalation - Rat: 40,250 ppm(LC50)

Oral - Rat: 3,300 mg/kg(LD50)

Skin - Rabbit: > 5,000 mg/kg(LD50)

Oral - Rat: 14500 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:Conjunctive irritation.

Skin - Rat: 40000 mg/kg (LD50)

Intraperitoneal - Rat: 8200 MG/KG (LD50)

Subcutaneous - Rat: 12 GM/KG (LD50)
Remarks: Behavioral:Change in motor activity (specific assay).
Lungs, Thorax, or Respiration:Dyspnea.

Intravenous - Rat: 5360 MG/KG (LD50)
Remarks: Behavioral:Tremor.
Behavioral:Muscle weakness.
Lungs, Thorax, or Respiration:Dyspnea.

Oral - Mouse: 7920 mg/kg (LD50)

Skin - Mouse: 50000 mg/kg (LD50)

Intraperitoneal - Mouse: 2500 MG/KG (LD50)

Subcutaneous - Mouse: 14 GM/KG (LD50)
Remarks: Behavioral:Change in motor activity (specific assay).
Lungs, 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:Conjunctive irritation.

Oral - Dog: > 10000 mg/kg (LD50)

Intravenous - Dog: 2500 MG/KG (LD50)
Remarks: Cardiac:Other changes.
Kidney, Ureter, Bladder:Hematuria.
Kidney, Ureter, Bladder:Other changes.

Oral - Chicken: 12000 mg/kg (LD50)

Oral - Mammal: 21400 mg/kg (LD50)

Oral - Bird (wild): 100 mg/kg (LD50)

Irritation Data

Skin - Rabbit: 4 HOURS
Remarks: No irritation effect

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: 59 GM/KG 81W I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Rat - Subcutaneous: 220 GM/KG 82W I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Mouse - Oral: 65340 MG/KG 66W I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Blood:Leukemia Skin and Appendages: Other: Tumors.

Mouse - Subcutaneous: 66 GM/KG 66W I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Skin and Appendages: Other: Tumors.

Chronic Exposure - Teratogen

Species	*Dose*	*Route of Application*	*Exposure Time*
Mouse	210 GM/KG	Intraperitoneal	(6-12D PREG)
Result:Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system.			
Mouse	5500 MG/KG	Intraperitoneal	(10D PREG)
Result:Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.			
Hamster	11 GM/KG	Oral	(7D PREG)
Result:Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system.			
Hamster	5500 MG/KG	Intraperitoneal	(8D PREG)
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. Specific Developmental Abnormalities: Central nervous system.			
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 abnormalities.			

Chronic Exposure - Mutagen

Species	*Dose*			*Cell Type*	*Mutation test*
Human	140 MMOL/L			lymphocyte	Other mutation test systems
Rat	25 GM/KG	Intraperitoneal	5D		Cytogenetic analysis
Mouse	75 MMOL/KG	Intraperitoneal			DNA damage
Mouse	93 GM/L			lymphocyte	Cytogenetic analysis
Mouse	1 MOL/L			lymphocyte	Mutation in mammalian somatic cells.
Hamster	19 PPH			ovary	Cytogenetic analysis
Hamster	1 PPH			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: Abortion.			
Rat	6600 MG/KG	Intraperitoneal	(7-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			
Rat	30750 MG/KG	Subcutaneous	(8-10D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).			
Mouse	16 MG/KG	Oral	(5-9D PREG)
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: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.			
Mouse	8250 MG/KG	Intraperitoneal	(10D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			
Mouse	240 GM/KG	Intravenous	(1-20D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			

Section 12 - Ecological Information

Acute Ecotoxicity Tests

Test Type
LC50 Fish
Species
Onchorhynchus mykiss (Rainbow trout)
Time: 96.0 h
Value: 35,000 mg/l

Test Type
EC50 Daphnia
Species
Daphnia pulex
Value: 27,500 mg/l

Test Type
EC50 Algae
Species
Lepomis macrochirus (Bluegill)
Time: 96.0 h
Value: > 400,000 mg/l

Test Type
LC50 Fish

Species
Pimephales promelas (Fathead minnow)

Time:	Value:
96.0 h	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#: NA1993
Class: COMBUSTIBLE LIQUID
Packing Group: Packing Group III
Hazard Label: None
PIH: Not PIH

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.