



Material Safety Data Sheet

MSDS/SDS Number: M118194
Issue Date: October 12, 2008
Latest Revision Date: --
Revision: --

SECTION 1 PRODUCT AND COMPANY INFORMATION

Product: Serine/Threonine Protein Phosphatase Inhibitor Cocktail
Trade Names and Catalogue Numbers: 20-204
A component of Protein Phosphatase Inhibitor Set, 17-317
Chemical Name: A solution of Cantharidin, (-)-p-Bromotetramisole, and Microcystin LR in Dimethyl sulfoxide
Product use: Biological Research Reagent
Other trade names and synonyms: Ser/Thr Protein Phosphatase Inhibitor Cocktail
Manufacturer/Distributor: Millipore Corporation (Corporate Headquarters) Millipore S.A.S. (European Headquarters)
Postal Address: 290 Concord Road Billerica MA, USA Boite Postale 116 67124 Molsheim Cedex, France
Telephone Number: +1-978-715-1335 +33(0)3 90 46 90 00
Email: msds@millipore.com
CHEMTREC Emergency Telephone Number: International +1-703-527-3887 (collect)
North America 1-800-424-9300 (toll free)

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Component	EINECS or ELINCS No.	CAS No.	Content (weight percent)	Symbol letters*	R Phrases**
Dimethyl sulfoxide	200-664-3	67-68-5	>99.9%	None	None
Cantharidin *	200-263-3	56-25-7	<0.01%	T+	R28 R36/37/38
(-)-p-Bromotetramisole oxalate	263-487-0	62284-79-1	<0.1%	Xn	R21/22
Microcystin	Unlisted	101043-37-2	<0.01%	T+	R26/27/28 R36/37/38 R43

*3a,7a-Dimethylhexahydro-4,7-epoxyisobenzofuran-1,3-dione

* Symbol letters and categories of danger: **T+** = Very toxic, **T** = Toxic, **C** = Corrosive, **Xn** = Harmful, **Xi** = Irritant, **E** = Explosive, **F+** = Extremely flammable, **F** = Very flammable, **N** = Dangerous for the environment, **O** = Oxidising.

** The full text of each phrase is listed in Section 16.

SECTION 3 HAZARD IDENTIFICATION / EMERGENCY OVERVIEW

Appearance: Colorless liquid

Classification: This product is not classified according to Directive 1999/45/EC.

Adverse human health effects

Contact with Eyes: Eye irritant. Exposure may cause redness, blurred vision and pain.

Ingestion: Gastrointestinal tract irritant. Symptoms may include nausea, vomiting and diarrhea. May cause abdominal pain, drowsiness, chills and chest pains. Effects may include nausea, vomiting and diarrhea. May cause liver and kidney damage. May cause garlic smell on the breath and body.

Inhalation (Short Term): Respiratory tract irritant. Symptoms may include coughing, shortness of breath. May cause allergic reaction in sensitive individuals.

Inhalation (Long Term): Possible delayed pulmonary edema.

Skin Contact: Mild skin irritant. Effects may include scaling, burning pain, itching and redness. Dimethyl sulfoxide is rapidly absorbed through the skin, and may cause the increased skin absorption of Cantharidin, (-)-p-Bromotetramisole, and Microcystin LR in this product.

Target Organs: Kidneys, liver, eyes, skin, mucous membranes.

Medical conditions aggravated by exposure: Preexisting skin conditions.

Adverse environmental effects: This product may be highly toxic to aquatic organisms. See section 12.

Adverse physiochemical effects: Combustible liquid and vapor.

SECTION 4 FIRST AID MEASURES

Contact with Eyes: In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Seek immediate medical attention.

Ingestion: If swallowed, summon medical assistance, and then wash out mouth with water provided person is conscious. Do not induce vomiting unless directed to do so by a health care provider.

Inhalation: If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek immediate medical attention.

Skin Contact: In case of contact, immediately wash skin with soap and copious amounts of water. Seek medical attention if irritation or redness occurs. Launder clothing before reuse.

SECTION 8 EXPOSURE CONTROL AND PERSONAL PROTECTION

	Normal Handling Conditions	Emergency Response Conditions
Respiratory protection:	Not normally required for normal use.	If vapors or aerosols are present - air purifying respirator with organic cartridges.
Ventilation:	General room ventilation	If vapors or aerosols are present, provide exhaust ventilation
Eye protection:	Safety glasses with side shields	Chemical splash goggles.
Skin protection:	Nitrile gloves and laboratory coat.	Chemically resistant jacket, pants, gloves, boots and head covering

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless liquid
Odor:	Garlic- like.
Odor Threshold:	<0.15 to 3 ppm
pH:	Not applicable
Melting Point:	18.5°C
Boiling Point:	189°C
Flash Ignition Point:	89°C (closed cup)
Explosive Properties:	Vapor clouds or aerosols of dimethyl sulfoxide may explode in the presence of a source of ignition.
Oxidizing Properties:	Not considered to have oxidizing properties.
Vapor pressure, 20 °C:	<0.42 mm Hg
Specific Gravity (Water = 1.0):	1.1
Solubility	Miscible with water
Vapor Density, 20 °C:	2.7
Viscosity, centipoise:	2.0 (20°C)
Partition coefficient (n-octanol/water):	0.045 (dimethyl sulfoxide)

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Elevated temperature, incompatible materials.
Incompatible With:	Strong oxidizing agents, strong bases, organic halides, and perchlorates.
Hazardous Decomposition Products:	Carbon monoxide and dioxide, oxides of sulfur, formaldehyde, dimethyl disulfide, dimethyl sulfide and, methyl mercaptan.
Hazardous Polymerization:	Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

- Eye Contact:** Will cause eye irritation accompanied by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause chemical conjunctivitis.
- Ingestion:** Will cause gastrointestinal tract irritation.. Symptoms may include nausea, vomiting and diarrhea. May cause abdominal pain, drowsiness, chills and chest pains. Effects may include nausea, vomiting and diarrhea. May cause liver and kidney damage. May cause garlic smell on the breath and body.
- Inhalation:** Will cause respiratory tract irritation. Symptoms may include coughing, shortness of breath, and possible allergic reaction in sensitive individuals.
- Skin Contact:** May cause skin irritation accompanied by burning pain, itching and redness. Dimethyl sulfoxide is rapidly absorbed through the skin, and may increase the toxicity of the Cantharidin, (-)-p-Bromotetramisole, and Microcystin LR.
- Carcinogenicity:** Dimethyl sulfoxide is not listed as carcinogenic by ACGIH, IARC, NTP, OSHA or California proposition 65.
- Chronic Toxicity:** Repeated or prolonged exposure to dimethyl sulfoxide may cause dermatitis, liver and kidney damage. These effects may be delayed.
- Toxicology Data:**
- | | |
|--|----------------------|
| Dimethyl sulfoxide (100%) | RTECS # PV6210000 |
| LD ₅₀ , oral, rat | 14,500 mg/kg |
| LD ₅₀ , oral, mouse | 7,920 mg/kg |
| LD ₅₀ , skin, rat | 40,000 mg/kg |
| Draize test, rabbit, eye, 100 mg | Mild |
| Draize test, rabbit, eye: 500 mg/24H | Mild |
| Draize test, rabbit, skin: 500 mg/24H | Mild |
| Dimethyl sulfoxide has been investigated as a tumorigen, mutagen, reproductive effector, and primary human irritant. | |
| Cantharidin (100%) | RTECS # RN8575000 |
| LDLo, oral, human | 428 µg/kg |
| Cantharidin has been investigated as a tumorigen | |
| (-)-p-Bromotetramisole oxalate | RTECS # - Not Listed |
| Microcystin | RTECS # GT2810000 |
| LD ₅₀ , oral, mouse | 5 mg/kg |

SECTION 12 ECOLOGICAL INFORMATION

Ecotoxicity: Ecotoxicity data are not available for this product as an entity. The data below are for pure DMSO. Limited toxicity data for Cantharidin, (-)-p-Bromotetramisole, and Microcystin LR suggest that this product may have adverse effects on aquatic organisms and should not be allowed to enter natural waters.

Toxicity to fish

LC₅₀, Pimephales promelas (fathead minnow), 96H 34,000 mg/l

LC₅₀, Oncorhynchus mykiss (rainbow trout), 96H 35,000 mg/l

Toxicity to daphnia and other aquatic invertebrates.

EC₅₀, Daphnia pulex (Water flea) - 27,500 mg/l

Toxicity to algae

EC₅₀, Lepomis macrochirus (Bluegill), 96 H > 400,000 mg/l

Environmental Fate: Dimethyl sulfoxide disproportionates in water to dimethyl sulfide and dimethyl sulfone, a reaction catalyzed by light. Dimethyl sulfoxide is difficult to biodegrade. DMSO exhibits essentially no biochemical oxygen demand (BOD) because the molecule itself provides oxygen.

SECTION 13 DISPOSAL INFORMATION

Products containing Cantharidin, (-)-p-Bromotetramisole, and Microcystin LR should not be disposed to an industrial sewer system. Waste product must be disposed in a manner consistent with national, state, and local regulations.

European Community: When disposal is required, this product be considered according to the European Waste catalogue (European commission decision of 03/05/01 modifying directives 94/3/CE and 75/442/CE) as part of the following category:

14 06 03* other solvents and solvent mixtures

United States: This product does not meet the definition of a US Environmental Protection Agency RCRA hazardous waste. Unused product should be disposed of in a manner consistent with federal, state and local regulations.

SECTION 14 TRANSPORTATION INFORMATION

The transportation of this product is not regulated by IMDG (sea), ADR (road), RID (rail), ICAO/IATA (air) as a dangerous goods. In the United States, USDOT does not regulate non-bulk quantities of dimethyl sulfoxide as a hazardous material.

SECTION 15 REGULATORY INFORMATION

Australia:	Hazchem Code:	None Allocated	
	Poisons Schedule Number:	S6	
California:	No Significant Risk Level:	Not listed	
Canada:	WHMIS:	This product has a WHMIS classification of unclassified.	
European Community:	Symbols:	None	
	Category of danger:	None	
	Risk phrases:	None	
	Safety phrases:	S24/25	Avoid contact with skin and eyes
		S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
		S37/39	Wear suitable gloves and eye/face protection.
	OECD/High Production Volume (HPV) chemicals:	Dimethyl sulfoxide is listed as a High Volume Production chemical.	
	WEEE and RoHS:	The WEEE and RoHS Directives are not applicable to these products.	
Japan:	Poisonous and Deleterious Substances Control Law:	Dimethyl sulfoxide, of Cantharidin, (-)-p-Bromotetramisole oxalate, and Microcystin LR are not listed by the Poisonous and Deleterious Substances Control Law	
United States	Toxic Substances Control Act (TSCA):	p-Bromotetramisole oxalate and Microcystin LR are not listed on the EPA Toxic Substances Control Act (TSCA) Inventory. In the United States, the use of this product is restricted to research and development and FDA regulated activities.	

Occupational Exposure Limits

	WEEL	OSHA PEL	NIOSH REL	ACGIH TLV
Dimethyl Sulfoxide	250 ppm	None	None	None

SECTION 16 ADDITIONAL INFORMATION

Risk phrases referred to under Section 2:

R21/22	Harmful in contact with skin and if swallowed
R28	Very toxic if swallowed
R26/27/28	Very toxic by inhalation, in contact with skin and if swallowed
R36/37/38	Irritating to eyes, respiratory system and skin
R43	May cause sensitisation by skin contact

Abbreviations Used

ACGIH	American Conference of Government Industrial Hygienists
ADR	European agreement on the international carriage of dangerous goods on road
CAS	Chemical Abstract Service
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EPA	United States Environmental Protection Agency
IARC	International Agency for Research in Cancer.
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	Regulations regarding the transportation of dangerous goods on ocean-going vessels issued by the International Maritime Organization.
IUCLID	International Uniform Chemical Information Database
LC ₅₀	Lethal Concentration 50% is the concentration of a chemical which kills 50% of a sample population
LD ₅₀	Lethal Dose 50% is the dose of a chemical which kills 50% of a sample population.
LDLo	Lowest observed lethal dose
NIOSH	National Institute of Occupational Safety and Health (US)
NTP	National Toxicology Program (US)
OSHA	United States Occupational Safety and Health Administration
RID	International regulations concerning the international carriage of dangerous goods by rail.
RTECS	Registry of Toxic Effects of Chemical Substances (US)
VLE	15 minute short term exposure limit (France)
WEEL	Workplace Environmental Exposure Levels – American Industrial Hygiene Association
WEL	Workplace Exposure Limit (EU)
WHMIS	Workplace Hazardous Materials Information System (Canada)

This safety data sheet has been prepared to comply with the requirements of European Union Directive 2001/58/EC and ANSI Z400.1-1998.

Millipore is a registered trademark of Millipore Corporation.

The "M" logo is a trademark of Millipore Corporation.

© 2008 Millipore Corporation. All rights reserved. The above information is believed to be current and accurate; however, Millipore makes no warranty with respect to such information and assumes no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.