Thiophanate-methyl

sc-251236

Material Safety Data Sheet

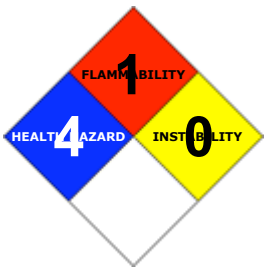
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Thiophanate-methyl

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800
EMERGENCY:
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C12-H14-N4-O4-S2, "allophanic acid, 4, 4' -o-phenylenebis(3-thio-, dimethyl ester", o-bis(3-methoxycarbonyl-2-thioureido)benzene, "1, 2-bis(methoxycarbonylthioureido)benzene", "1, 2-bis(3-(methoxycarbonyl)-2-thioureido)benzene", "carbamic acid, (1, 2-phenylenebis(iminocarbonothioyl))bis-, dimethyl ester", "dimethyl-((1, 2-phenylene)bis-(iminocarbonothioyl))bis(carbamate)", "dimethyl-4, 4' -o-phenylene-bis-(3-thioallophanate)", "BAS 3200F", "Cercobin M, Methyl", Cycosin, Ditek, "Enovit M, Methyl, Super", Frumidor, Fungitox, "Fungo 50", Labilite, "Methyl Topsin", Neotopsin, "NF 44", "Pelt 14, 44", Sigma, Sipcaplant, Sipcasan, Sipcavit, "Topsin M, NF-44, Turf and Ornamentals, WP Methyl", Trevin, Zyban, "pesticide / fungicide"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	0		
Reactivity:	1		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Harmful by inhalation.
May cause SENSITISATION by skin contact.
Possible risk of irreversible effects.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Strong evidence exists that the substance may cause irreversible but non-lethal mutagenic effects following a single exposure.
■ Accidental ingestion of the material may be damaging to the health of the individual.
■ High doses of thiophenate methyl administered to rats produced tremour, leading to tonic and clonic convulsion. In rabbits and dogs thiophanate-methyl produced decreased respiration rate, lethargy, loss of abdominal muscle tone, discharge from the eyes, and mydriasis prior to death
Thiophanate methyl undergoes metabolism to carbendazole.
■ Acute toxicity of carbendazim is very low. Carbendazim is the major metabolite of benomyl and thiophanate-methyl (TM). Acute toxicity of TM in rats caused tremors leading to tonic or clonic convulsions, nose bleeding and lachrymation. In rats carbendazim is rapidly metabolised and eliminated (< 12 hours) and does not accumulate in animal tissue.
In rabbits and dogs TM produced decreased respiration rate, lethargy, loss of abdominal muscle tone, discharge from the eyes, and mydriasis prior to death.
■ Benzimidazole carbamate anthelmintics, when administered in therapeutic doses, have produced allergic reaction (which may be associated with destruction of parasites), raised liver enzyme values,and may be associated with leukopenia and alopecia. Extremely large oral doses may produce intestinal cramps, anorexia, lethargy, pulmonary haemorrhage, oedema, hepatic and epicardial haemorrhage, and nausea, vomiting and diarrhoea. Other symptoms include dizziness, giddiness, tinnitus, insomnia, anxiety, confusion, convulsions, hallucinations and headache. Overdose may produce gastrointestinal symptoms, visual disturbance and psychic alterations. Absorption is generally limited.
Animal studies suggest that this family of drugs may also be teratogenic.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
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SKIN

■ Skin contact is not thought to produce harmful health effects (as classified using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.
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■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normalhandling, may be harmful.
■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ Symptoms exhibited by mice exposed to 100,000 mg/m3 thiophanate methyl included lachrymation, salivation, and nasal exudation within 5 to 6 minutes of the exposure. After a few days of wheezing and crust formation around the eyes recovery was complete.

CHRONIC HEALTH EFFECTS

■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Exposure to the material may result in a possible risk of irreversible effects. The material may produce mutagenic effects in man. This concern is raised, generally, on the basis of
appropriate studies using mammalian somatic cells in vivo. Such findings are often supported by positive results from in vitro mutagenicity studies.
There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, on the basis that similar materials tested in appropriate animal studies provide some suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
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In a two-year study, rats were given 640 ppm thiophanate methyl in the diet. This produced a slight reduction in growth of both male and female rats and a slight enlargement in the relative weight of the kidneys in male rats, and some enlargement of thyroid epithelial cells. In a

further study of shorter length with higher doses there was a slight enlargement of the liver in rats and mice. A slight but significant reduction in the number of live foetuses was observed in a study with pregnant rats fed 1000 mg/kg/day.
Maternal and paternal reproductive effects were reported in rats following repeated administration prior to mating.
It is reported that a metabolite of thiophanate-methyl, methyl 2- benzimidazole carbamate (MBC) may cause mutagenic risk in the form of heritable spindle effects and is a hepatocarcinogen in mice.
Carbendazim is the major metabolite of benomyl and thiophanate-methyl (TM).
Carbendazim was administered by gavage for 5-days to mice showed no effect on body weight gain, but testes weight was reduced. Flow cytometric measurements on testicular and epididymal sperm cells showed that spermatogenesis was affected at high doses resulting in an altered ratio of testicular cell types. In addition abnormalities were seen in sperm head morphology and chromatin structure. Administration of carbendazim to rats was found to cause a dose related elevation in serum follicle stimulating hormone and pituitary luteinising hormone (route and duration unspecified).
Residue data on dog and rat tissues from a 2-year chronic feeding study show that benomyl or its metabolites do not accumulate in animal tissues. Benomyl was not embryotoxic or teratogenic to rats at dietary levels of 5000 ppm (373 mg/kg/day). Rabbits fed 500 ppm (20 mg/kg/day) showed no evidence of teratogenicity. However gavage administration did produce teratogenic responses at dose levels of 62.5 mg/kg/day.
Experimental evidence suggests that benomyl is not a heritable gene mutagen. It does not interact with DNA, induce point or germ cell mutations and is not clastogenic. Benomyl does however produce numerical chromosome aberration or aneuploidy (this is the mechanism by which benomyl exerts its fungicidal effect).
Maternal and paternal reproductive effects were reported in rats following repeated administration of TM prior to mating. It is reported that a metabolite of TM, methyl 2-benzimidazole carbamate (MBC) may cause mutagenic risk in the form of heritable spindle effects and is a hepatocarcinogen in mice.
A number of benzimidazoles have been shown to also inhibit mammalian tubulin polymerisation and to be aneugenic in vivo. Aneugens affect cell division and the mitotic spindle apparatus resulting in loss or gain of whole chromosomes, thereby inducing an "aneuploidy". Mitotic aneuploidy is a characteristic of many types of tumorigenesis (in cancer). Several benzimidazoles have been shown to be genotoxic. Genotoxicity may arise as aneugens may also be clastogens, or may produce clastogenic metabolites. Clastogens increase the rate of genetic mutation by interfering with the function of nucleic acids. A clastogen is a specific mutagen that causes breaks in chromosomes.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
thiophanate-methyl	23564-05-8	>98

Section 4 - FIRST AID MEASURES

SWALLOWED
· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE
■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN
■ Treat symptomatically.
Following oral administration in rats 61% was excreted in the urine and 35% in the faeces within 90 minutes of the last dose. Metabolism involves cyclisation to carbendazim. The principle metabolite in rats is methyl 5-hydroxybenzimidazol-2-carbamate

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	0.071 mPa 25 C
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA
· Foam.
· Dry chemical powder.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.
When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 100 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides (NOx), sulfur oxides (SOx), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Remove all ignition sources.
· Clean up all spills immediately.
· Avoid contact with skin and eyes.
· Control personal contact by using protective equipment.
· Use dry clean up procedures and avoid generating dust.
· Place in a suitable, labelled container for waste disposal.
Environmental hazard - contain spillage.
MAJOR SPILLS
■ Environmental hazard - contain spillage.
Moderate hazard.
· CAUTION: Advise personnel in area.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.
Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
· Do NOT cut, drill, grind or weld such containers.
· In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

· Polyethylene or polypropylene container.
· Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

■ Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m³	Notes
US - Oregon Permissible Exposure Limits (Z-3)	thiophanate-methyl (Inert or Nuisance Dust: Total dust)	10	(d)
US OSHA Permissible Exposure Levels (PELs) - Table Z3	thiophanate-methyl (Inert or Nuisance Dust: (d) Respirable fraction)	5	
US OSHA Permissible Exposure Levels (PELs) - Table Z3	thiophanate-methyl (Inert or Nuisance Dust: (d) Total dust)	15	
US - Hawaii Air Contaminant Limits	thiophanate-methyl (Particulates not other wise regulated - Total dust)	10	

US - Hawaii Air Contaminant Limits	thiophanate-methyl (Particulates not other wise regulated - Respirable fraction)	5	
US - Oregon Permissible Exposure Limits (Z-3)	thiophanate-methyl (Inert or Nuisance Dust: Respirable fraction)	5	(d)
US ACGIH Threshold Limit Values (TLV)	thiophanate-methyl (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book
US - California Permissible Exposure Limits for Chemical Contaminants	thiophanate-methyl (Particulates not otherwise regulated Respirable fraction)	5	(n)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	thiophanate-methyl (Particulates not otherwise regulated Respirable fraction)	5	
US - Michigan Exposure Limits for Air Contaminants	thiophanate-methyl (Particulates not otherwise regulated, Respirable dust)	5	
Canada - Prince Edward Island Occupational Exposure Limits	thiophanate-methyl (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	thiophanate-methyl (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction)	5	

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

Particulate
Consult your EHS staff for recommendations

EYE

· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.
NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

· Overalls.
· P.V.C. apron.
· Barrier cream.
· Skin cleansing cream.
· Eye wash unit.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Does not mix with water.

State	Divided solid	Molecular Weight	342.42
Melting Range (°F)	350.6- 354.2 (decomp)	Viscosity	Not available
Boiling Range (°F)	Not applicable	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	Not available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	0.071 mPa 25 C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not available
Volatile Component (%vol)	Negligible	Evaporation Rate	Not available

APPEARANCE

Colourless crystalline solid; does not mix well with water (3.5 ppm). Soluble in acetone (58.1 g/kg), cyclohexanone (43 g/kg), methanol (29.2 g/kg), chloroform (26.2 g/kg), acetonitrile (24.4 g/kg), ethyl acetate (11.9 g/kg). Stable in neutral, aqueous solution and acidic solutions at room temperature. Unstable in alkaline solutions and copper containing solutions. Stable to air and sunlight. pKa 7.28

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY

· Carbamates are incompatible with strong acids and bases, and especially incompatible with strong reducing agents such as hydrides.
· Flammable gaseous hydrogen is produced by the combination of active metals or nitrides with carbamates.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

THIOPHANATE-METHYL

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 6640 mg/kg	Nil Reported
Dermal (rat) LD50: >10000 mg/kg	
Inhalation (rat) LC50: 1.7 mg/l/4h *	
Dermal (rabbit) LD50: >10000 mg/kg	

■ [* The Pesticides Manual, Incorporating The Agrochemicals Handbook, 10th Edition, Editor Clive Tomlin, 1994, British Crop Protection Council].
NOEL (2y) for rats and mice 160 mg/kg, for dogs 50 mg/kg
ADI 0.08 mg/kg *
Toxicity class WHO Table 5; EPA IV *
Reproductive effector in mice and rats

CARCINOGEN

THIOPHANATE-METHYL	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	OPP-CAN

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
thiophanate-methyl	HIGH		LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers
When thiophanate-methyl is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U409 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: G Hazard class or Division: 9
Identification Numbers: UN3077 PG: III
Label Codes: 9 Special provisions: 8, 146,
335, B54,
IB8, IP3,
N20, T1,
TP33
Packaging: Exceptions: 155 Packaging: Non- bulk: 213
Packaging: Exceptions: 155 Quantity limitations: No limit
Passenger aircraft/rail:
Quantity Limitations: Cargo No limit Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Environmentally hazardous substance, solid, n.o.s

Air Transport IATA:

ICAO/IATA Class: 9 ICAO/IATA Subrisk: None
UN/ID Number: 3077 Packing Group: III
Special provisions: A97
Cargo Only
Packing Instructions: 911 Maximum Qty/Pack: 400 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 911 Maximum Qty/Pack: 400 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y911 Maximum Qty/Pack: 30 kg G
Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,
N.O.S. *(CONTAINS THIOPHANATE-METHYL)

Maritime Transport IMDG:

IMDG Class: 9 IMDG Subrisk: None
UN Number: 3077 Packing Group: III
EMS Number: F-A , S-F Special provisions: 179 274 335 909
Limited Quantities: 5 kg Marine Pollutant: Yes
Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(contains thiophanate-methyl)

Section 15 - REGULATORY INFORMATION

REGULATIONS

thiophanate-methyl (CAS: 23564-05-8) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity","US - California Proposition 65 - Reproductive Toxicity","US - Maine Chemicals of High Concern List","US - Vermont Hazardous Constituents","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","US - Washington Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Ingestion may produce health damage*.
■ Limited evidence of a carcinogenic effect*.
■ May possibly be harmful to the foetus/ embryo*.
* (limited evidence).

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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