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DuPont
Material Safety Data Sheet

Page 1

 "MANKOCIDE" FUNGICIDE/BACTERICIDE
 M0000548 Revised 27-OCT-2005

 CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Tradenames and Synonyms

MANKOCIDE
 COPPER HYDROXIDE
 MANCOZEB

Tradenames and Synonyms (Remarks)

"MANKOCIDE" is a registered trademark of E. I. du Pont de Nemours and Company and its affiliates.

Company Identification

MANUFACTURER/DISTRIBUTOR
 Griffin L.L.C. (USA)
 2509 Rocky Ford Road
 P.O. Box 1847
 Valdosta
 GA.
 USA
 31603-1847

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside U.S. 302-774-1000)
 Transport Emergency : CHEMTREC:1-800-424-9300(outside US
 703-527-3887)
 Medical Emergency : 1-800-441-3637 (outside U.S.
 302-774-1000)

 COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
COPPER HYDROXIDE (Metallic Copper Equivalent - 30%)	20427-59-2	46.1
MANCOZEB*	8018-01-7	15
INERT INGREDIENTS		38.9

Components (Remarks)

*MANCOZEB, a coordination product of zinc ion and manganese ethylenebisdithiocarbamate in which the ingredients are
 Manganese 3.0%
 Zinc 0.4%
 Ethylenebisdithiocarbamate ion 11.6%

HAZARDS IDENTIFICATION

Emergency Overview

DANGER. CORROSIVE. Causes irreversible eye damage. Harmful if swallowed, or inhaled. Do not get in eyes or clothing. Avoid inhaling dust or spray mist. Prolonged and repeated dermal contact may cause allergic reactions in some individuals.

Potential Health Effects

Skin contact may cause slight irritation with itching, redness, or swelling.

Eye contact may cause severe irritation with tearing, pain or blurred vision, eye corrosion or ulceration; blindness may result.

Ingestion may cause nonspecific discomfort, such as nausea or weakness, central nervous system depression, which if severe enough, may lead to death.

Inhalation may be irritating to the respiratory system. Excessive exposure may cause cough, mucous production, shortness of breath, reflecting metal fume fever.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

(FIRST AID MEASURES - Continued)

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For medical emergencies involving this product, call toll free 1-800-441-3637. See Label for Additional Precautions and Directions for Use.

Notes to Physicians

Probable mucosal damage may contraindicate use of gastric lavage.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point & Method : Not determined
Flammable Limits : Not determined
Autoignition Temperature : Not determined

FIRE FIGHTING HAZARDS & PROCEDURES

General Hazard : Negligible fire hazard when exposed to heat or flame. Prevent human exposure to fire, smoke, fumes or products of combustion.

Extinguishing Media : Use dry chemical, carbon dioxide, or foam.

Fire Fighting Instructions: Use standard organic chemical fire fighting techniques in extinguishing fires involving this material.

Fire Fighting Equipment : Wear protective clothing and self-contained breathing apparatus.

Hazardous Combustion Products : Not determined

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

(ACCIDENTAL RELEASE MEASURES - Continued)

Spill Clean Up

Land Spill: Sweep up and place in suitable (fiberboard) containers for later disposal.

Water Spill: If feasible, copper may be precipitated/- ultrafiltrated with caustics or other chemicals and resulting sludge disposed of in a chemical landfill.

HANDLING AND STORAGE

Handling (Personnel)

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Storage

Do not contaminate water, food or feed by storage.

Store in a cool, dry place.

Do not store near feed, food or within the reach of children.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protective Equipment

Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistant category selection chart.

Applicators and other handlers must wear:

- Coveralls over long-sleeved shirt and long pants.
- Chemical-resistant apron during mixing and loading.
- Chemical-resistant gloves made of any waterproof material.
- Shoes plus socks.
- Protective eyewear.

Discard clothing and other absorbent materials that have been heavily contaminated with this product's concentrate.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls over long-sleeved shirt and long pants.
- Chemical-resistant gloves made of any waterproof material.
- Shoes plus socks.
- Protective eyewear.

Exposure Guidelines

Applicable Exposure Limits

COPPER HYDROXIDE

PEL (OSHA)	: 1 mg/m ³ , dusts and mists, as Cu, 8 Hr. TWA
TLV (ACGIH)	: 1 mg/m ³ , dusts and mists, as Cu, 8 Hr. TWA
AEL * (DuPont)	: 1.5 mg/m ³ , 8 & 12 Hr. TWA (approximately 1 mg/m ³ , as Cu)

MANCOZEB*

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
WEEL (AIHA)	: 1 mg/m ³ , 8 Hr. TWA, SEN

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Vapor Pressure	: Negligible vapor pressure
Density	: 0.5485 g/mL
Solubility in Water	: Technical copper hydroxide has a solubility of 0.1 - 5 ppm.
pH	: 9.63
Boiling Point	: Not determined
Melting Point	: Not determined
Odor	: Not determined
Color	: Dark green
Physical State	: Granule

STABILITY AND REACTIVITY

Chemical Stability

General : This material is stable under normal conditions.
Incompatible Materials : Not determined
Hazardous Decomposition : Not determined
Hazardous Polymerization : Material is not known to polymerize.

TOXICOLOGICAL INFORMATION

Animal Data

ManKocide

Inhalation 4 Hour LC50: > 1.266 mg/L in rats
Dermal LD50: > 5000 mg/kg in rabbits
Oral LD50: 2535 mg/kg in rats

ManKocide was severely irritating to corrosive to rabbit eyes.
ManKocide was not a skin irritant or skin sensitizer.

Repeated ingestion of ManKocide for 28 days produced no adverse effects in rats at 1000 mg/kg.

MANCOZEB

The effects in animals from repeated high inhalation doses of mancozeb (dust) equivalent to 150-250 times the AEL include reduced body weight, inflammation of the lungs, and abnormal thyroid function.

Toxic effects in animals from repeated ingestion of high doses of Mancozeb include reduced body weight and thyroid effects. In a different study, repeated dosing caused toxic and neuropathological effects in male and female rats which included compound-related mortality, decreased body weight, impaired hind limb motor activity and histopathological evidence of nerve damage. The no-observable-effect level was 125 ppm.

Increased incidences of thyroid tumors and ocular lesions (retinopathy) were observed in rats administered 750 ppm (equivalent to approximately 35 mg/kg/day) of mancozeb in their diet for two years. Mancozeb is considered to show weak carcinogenic activity. Tests in some animals indicate that Mancozeb may produce embryo and fetal toxicity, but only at maternally toxic doses. Multi-generation studies in animals demonstrate no reproductive toxicity.

Mancozeb is in the ethylene-bis-dithiocarbamate (EBDC) class of fungicides. EBDCs including mancozeb, which are metabolized to ethylene thiourea (ETU), have produced thyroid tumors in animal studies.

(TOXICOLOGICAL INFORMATION - Continued)

Mancozeb does not produce genetic damage in bacterial or most mammalian cell culture systems. It has been reported to produce genetic damage in some, but not all, animal tests. It has not been tested adequately for heritable genetic damage.

COPPER HYDROXIDE

Repeated oral ingestion of copper hydroxide via gavage produced reduced body weights and food consumption at 15 mg/kg/day and mortality at 30 mg/kg/day in rabbits.

No animal data are available to define carcinogenic, reproductive, or mutagenic hazards of copper hydroxide. Animal data show developmental effects only at exposure levels producing other toxic effects in the adult animal.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Mancozeb

AQUATIC TOXICITY:

96 hour LC50 - Rainbow trout: 0.073 mg/L
96 hour LC50 - Fathead minnow: 0.57 mg/L
96 hour LC50 - Bluegill sunfish: 0.84 mg/L

72 hour EC50 (growth inhibition) - freshwater algae: 0.43 mg/L

Cupric Hydroxide

AQUATIC TOXICITY:

48 hour EC50 - Daphnia magna: 70.16 ug/L

AVIAN TOXICITY:

8 day LC50 - Bobwhite quail: 3400 ppm
8 day LC50 - Mallard ducklings: > 5000 ppm

48 hour LD50 - Honeybee: 68.3 ug/bee

ENVIRONMENTAL FATE:

EC50 (respiration rate) - activated sludge:
71 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Do not contaminate water, food or feed by disposal.

PESTICIDE DISPOSAL:

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a

(DISPOSAL CONSIDERATIONS - Continued)

violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

ENVIRONMENTAL HAZARDS:

This pesticide is toxic to fish and aquatic organisms. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to fish and aquatic organisms in adjacent aquatic sites. Do not allow rinsate from cleaning of equipment or disposed material to enter surface or groundwater.

Container Disposal

Paper and Plastic Bags: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill, or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

TRANSPORTATION INFORMATION

Shipping Information

DOT:

Proper Shipping Name : Not Regulated by DOT unless shipped in bulk package or by water. See IMO/IMDG description.

IMO/IMDG:

Proper Shipping Name : Environmentally Hazardous Substances, Solid n.o.s., (mancozeb 15%)
Hazard Class : 9
UN/NA Number : UN 3077
Packaging Group : III
Marine Pollutant : Yes
Reportable Quantity : Yes - add RQ if 5,000 or more pounds mancozeb in a single package.

IATA/ICAO

: Not Regulated unless 5,000 or more pounds mancozeb in a single package.

REGULATORY INFORMATION

U.S. Federal Regulations

EPA Reg. No. 1812-360

In the United States this product is regulated by the US Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act. It is a violation of federal law to use this product in a manner inconsistent with its labeling.

OSHA:

This product is considered hazardous under the OSHA Hazardous Communication Standard (29 CFR §1910.1200).

TSCA:

All product components are on the TSCA Chemical Inventory.

CERCLA:

Releases of a component of this material (metallic copper) to air, land, or water are reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to the state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

RCRA:

When a decision is made to discard this material as supplied, it does not meet RCRA's characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40 CFR §261.33.

SARA TITLE III

311/312 Hazard Categories: This product has been reviewed according to the EPA "Hazard Categories" and is categorized as an acute health hazard (40 CFR §370.41).

313 Reportable Ingredients: This product contains a percentage of metallic copper (CAS No. 7440-50-8) that is listed in Section 313 above de minimis concentrations.

State Regulations (U.S.)

CALIFORNIA PROPOSITION 65

This product contains mancozeb and ethylene thiourea (ETU), chemicals known to the State of California to cause cancer in laboratory animals. ETU is also known to the State of California to cause birth defects or other reproductive harm in laboratory animals.

California:

(REGULATORY INFORMATION - Continued)

Listed under copper (CAS No. 7440-50-8) with footnotes referencing above federal standards.

New Jersey:

Footnotes reference above federal standards plus listing of copper on the New Jersey Environmental Hazardous Substances List (NJ Department of Environmental Protection, Title 7 New Jersey Administrative Code (NJAC) Chapter 1G).

Massachusetts:

Listed as copper (CAS No. 7440-50-8) and copper-based pesticide, solid, toxic (no CAS No. assigned).

Pennsylvania:

Listed as copper fume or dust (CAS No. 7440-50-8) as an environmental hazard.

OTHER INFORMATION

NFPA, NPCA-HMIS

HAZARDS CLASSIFICATION:

(0-minimal, 1-slight, 2-moderate, 3-serious, 4-severe)

HMIS: HEALTH-2 FIRE-1 REACTIVITY-0
NFPA: HEALTH-2 FIRE-1 REACTIVITY-0

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS: DuPont Crop Protection
Address : Wilmington, DE 19898
Telephone : 1-888-638-7668

Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS