Material Safety Data Sheet

Ricobendazole

sc-205838

Hazard Alert Code Key:

EXTREME   HIGH   MODERATE   LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Ricobendazole

STATEMENT OF HAZARDOUS NATURE

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

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Toxicity</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Body Contact</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chronicity</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

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

1 of 7
EMERGENCY OVERVIEW

RISK
Harmful if swallowed.
May cause harm to the unborn child.
Irritating to eyes, respiratory system and skin.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- 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
- This material can cause eye irritation and damage in some persons.

SKIN
- This material can cause inflammation of the skin on contact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- 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
- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- 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.

CHRONIC HEALTH EFFECTS
- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
- Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material.
- There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- 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.

In animal tests, toxic doses of albendazole have resulted in anorexia, lethargy, pulmonary hemorrhage and oedema; hepatic and epicardial hemorrhage.
Doses of 10 mg/kg/day albendazole for one month in humans receiving treatment for parasitic infestation has resulted in reversible abnormalities in liver function tests.
In animal tests, toxic doses have resulted in anorexia, lethargy, pulmonary hemorrhage and oedema; hepatic and epicardial hemorrhage.
In a chronic study in rats, doses of 20 mg/kg/day produced slightly reduced leukocyte and neutrophil counts. In mice degeneration of tubular epithelium of testes was observed following chronic dosing of 400 mg/kg/day.
WARNING: Albendazole may cause birth defects, avoid all exposure in pregnancy.
Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>albendazole sulfoxide</td>
<td>54029-12-8</td>
<td>&gt;98</td>
</tr>
</tbody>
</table>

Section 4 - FIRST AID MEASURES

SWALLOWED
- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not
immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

**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**
- for poisons (where specific treatment regime is absent):

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**Section 5 - FIRE FIGHTING MEASURES**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapour Pressure (mmHg)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**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
The following materials had no OELs on our records
- albendazole sulfoxide: CAS:54029-12-8

PERSONAL PROTECTION

RESPIRATOR
Particulate
Consult your EHS staff for recommendations

EYE
- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET
- 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.
- Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.
  - polychloroprene
  - nitrile rubber
  - butyl rubber
  - fluorocautchouc
  - polyvinyl chloride
- Gloves should be examined for wear and/or degradation constantly.

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.

<table>
<thead>
<tr>
<th>State</th>
<th>Divided solid</th>
<th>Molecular Weight</th>
<th>281.33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>438.8-442.4</td>
<td>Viscosity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>Not Available</td>
<td>Solubility in water (g/L)</td>
<td>Immiscible</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>Not Available</td>
<td>pH (1% solution)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not available</td>
<td>pH (as supplied)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not available.</td>
<td>Vapour Pressure (mmHG)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable</td>
<td>Specific Gravity (water=1)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable</td>
<td>Relative Vapor Density (air=1)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Not applicable</td>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**APPEARANCE**

Odourless white powder; insoluble in water.

### Section 10 - CHEMICAL STABILITY

**CONDITIONS CONTRIBUTING TO INSTABILITY**

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

**STORAGE INCOMPATIBILITY**

- Avoid reaction with oxidizing agents.
- Sulfoxide ion may react violently or explosively with acyl halides, non-metal halides, benzenesulfonyl halides, cyanuric halides, oxalyl phosphorus trihalides, phosphorus oxyhalides, sulfuryl halides and thionyl halides. These violent reactions may occur as a result of exothermic polymerization of formaldehyde produced by the interaction of the sulfoxide with reactive halides, and acidic or basic reagents.

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

### Section 11 - TOXICOLOGICAL INFORMATION

**ALBENDAZOLE SULFOXIDE**

**TOXICITY AND IRRITATION**

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

<table>
<thead>
<tr>
<th>Toxicity/Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50</td>
<td>2400 mg/kg</td>
</tr>
<tr>
<td>Oral (Human) TDL0</td>
<td>256 mg/kg</td>
</tr>
<tr>
<td>Intravenous (Rat) LD50</td>
<td>265 mg/kg **[SmithKline]</td>
</tr>
<tr>
<td>Oral (Mouse) LD50</td>
<td>1500 mg/kg</td>
</tr>
<tr>
<td>Oral (Rat) TDL0</td>
<td>20 mg/kg</td>
</tr>
</tbody>
</table>

- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure dose to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

- Effects on embryo or foetus.
  - ADI: 0.05 mg/kg/day
  - NOEL: 5 mg/kg/day
Data in this section for albendazole

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.

Section 13 - DISPOSAL CONSIDERATIONS

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:

- 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 ALBENDAZOLE SULFOXIDE)

Maritime Transport IMDG:

IMDG Class: 9 IMDG Subrisk: None
UN Number: 3077 Packing Group: III
Section 15 - REGULATORY INFORMATION

REGULATIONS

No data for albendazole sulfoxide (CAS: , 54029-12-8)

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
- Cumulative effects may result following exposure*.
- Limited evidence of a carcinogenic effect*.
* (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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Issue Date: Apr-2-2009
Print Date: Oct-20-2010