Papaverine
sc-279951

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Papaverine

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 9873 3112

SYNONYMS
C20-H21-N-O4, "isoquinoline, 1-[(3, 4-dimethoxyphenyl)methyl]-6, 7-dimethoxy-", "1-[(3, 4-dimethoxyphenyl)methyl]-6, 7-dimethoxyisoquinoline", "6, 7-dimethoxy-1-veratrylisooquinoline", "isoquinoline, 6, 7-dimethoxy-1-veratryl-", papaverine, papaverina, "smooth muscle relaxant/ opium extract", alkaloid

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>3</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>Chronic</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

1 of 8
EMERGENCY OVERVIEW
RISK
Harmful if swallowed.

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.
- Limited evidence exists that the substance may cause irreversible but non-lethal mutagenic effects following a single exposure.
- Large doses of calcium channel blocking agents may produce nausea, weakness, dizziness, drowsiness, confusion, slurred speech, a decrease in blood pressure along with reduced cardiac output; death may ensue.
- The material may produce biochemical inhibition of the enzyme, phosphodiesterase. Several families of drug (including xanthines, papaverine, bipyridines, imidazolines, imidazolones, dihydropyridazinones, dihydroquinolones, pyrrolidinones) produce this effect. Synthetic inhibitors of these types, (PDEIs), may produce a wide range of adverse effects in a clinical setting. These include tachycardia (elevated pulse rate), decreased blood pressure (hypotension), central nervous system effects, altered colour perception (a blue-green haze persists), an increased sensitivity to light (photophobia), dizziness, light-headedness, fainting, nausea, vomiting and diarrhoea, dyspepsia (upset stomach), facial flushing, nasal congestion, urinary tract infection, skin rash, muscle aches in the pelvic area and, rarely, heart attack or even stroke. Other reported effects include hepatotoxicity, especially in long-term treatment, dose-dependent thrombocytopenia, cardiac arrhythmia, headache, fever, chest pain and hypersensitivity reactions.
- Side-effects of papaverine use may include gastrointestinal disturbance, drowsiness, headache, flushing of the face, skin rash and vertigo. Jaundice and eosinophilia have also been reported and may be due to hypersensitivity.

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.

SKIN
- The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures.
- Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
- 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 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.
- Inhalation of dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual.
- 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.
- Limited evidence exists that the substance may cause irreversible but non-lethal mutagenic effects following a single exposure.

CHRONIC HEALTH EFFECTS
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- 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 with similar materials using mammalian somatic cells in vivo. Such findings are often supported by positive results from in vitro mutagenicity studies.
- 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.
- Calcium channel blocking agents can cause heart irregular heart beat, high blood pressure, vomiting, diarrhea, headache, dermatitis, acne, itching and blood disorders such as anemia and loss of platelets. Widespread blood swellings and blood clots may occur.
- Exposure to small quantities may induce hypersensitivity reactions characterized by acute bronchospasm, hives (urticaria), deep dermal wheals (angioneurotic edema), running nose (rhinitis) and blurred vision. Anaphylactic shock and skin rash (non-thrombocytopenic purpura) may occur.
### 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: Immediately hold eyelids apart and flush the eye continuously with 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.
- The highly lipophilic characteristics, high protein binding and extensive volume of distribution of calcium channel blockers makes hemodialysis, diuresis, and hemoperfusion impractical. Calcium gluconate has been used successfully to reverse hypotension.

### Section 5 - FIRE FIGHTING MEASURES

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

**EXTINGUISHING MEDIA**
- Foam.
- Dry chemical powder.

**FIRE FIGHTING**
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 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), hydrogen chloride, phosgene, nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

**FIRE INCOMPATIBILITY**
- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

**PERSONAL PROTECTION**
- Glasses:
- Gloves:
- Respirator:
- Particulate

### Section 6 - ACCIDENTAL RELEASE MEASURES

**MINOR SPILLS**
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof
machines designed to be grounded during storage and use).

- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS
- Clear area of personnel and move upwind.
- 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
- Glass container.
- Lined metal can, Lined metal pail/drum
- Plastic pail.

For low viscosity materials
- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS
- NOTE: Special security requirements may be mandated under Federal/State Regulation(s).
- Store in original containers.
- Store in vault fitted with warning devices or detectors recommended by various Federal/State authorities.
- Store in vault used only for the purpose of storage of drugs of addiction.
- Vault must be locked at all times except when the materials stored therein are required.
- Keep storage area free from debris, wastes and combustibles.
- Keep dry.
- Keep containers securely sealed.
- Protect containers against physical damage.
- Check regularly for spills and leaks.

NOTE: Store in the dark.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS
The following materials had no OELs on our records

PERSONAL PROTECTION

RESPIRATOR
Particulate
Consult your EHS staff for recommendations

EYE
- Chemical protective goggles with full seal
- Shielded mask (gas-type)
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

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.
- Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.
- Double gloving should be considered.
- PVC gloves.
- Protective shoe covers.
- Head covering.

OTHER
- For quantities up to 500 grams a laboratory coat may be suitable.
- For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.
- For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.
- For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.
- Eye wash unit.
- Ensure there is ready access to an emergency shower.
- For Emergencies: Vinyl suit.

ENGINEERING CONTROLS
- Unless written procedures, specific to the workplace are available, the following is intended as a guide:
  - For Laboratory-scale handling of Substances assessed to be toxic by inhalation. Quantities of up to 25 grams may be handled in Class II biological safety cabinets; Quantities of 25 grams to 1 kilogram may be handled in Class II biological safety cabinets or equivalent containment systems; Quantities exceeding 1 kg may be handled either using specific containment, a hood or Class II biological safety cabinet;
  - HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapors.
For potent pharmacological agents:
Powders
To prevent contamination and overexposure, no open handling of powder should be allowed.
- Powder handling operations are to be done in a powders weighing hood, a glove box, or other equivalent ventilated containment system.
- In situations where these ventilated containment hoods have not been installed, a non-ventilated enclosed containment hood should be used.
- Pending changes resulting from additional air monitoring data, up to 300 mg can be handled outside of an enclosure provided that no grinding, crushing or other dust-generating process occurs.
- An air-purifying respirator should be worn by all personnel in the immediate area in cases where non-ventilated containment is used, where significant amounts of material (e.g., more than 2 grams) are used, or where the material may become airborne (as through grinding, etc.).
- Powder should be put into solution or a closed or covered container after handling.
- If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.
Solutions Handling:
- Solutions can be handled outside a containment system or without local exhaust ventilation during procedures with no potential for aerosolisation. If the procedures have a potential for aerosolisation, an air-purifying respirator is to be worn by all personnel in the immediate area.
- Solutions used for procedures where aerosolisation may occur (e.g., vortexing, pumping) are to be handled within a containment system or with local exhaust ventilation.
- In situations where this is not feasible (may include animal dosing), an air-purifying respirator is to be worn by all personnel in the immediate area. If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.
- Ensure gloves are protective against solvents in use.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Solid</td>
</tr>
<tr>
<td>Does not mix with water</td>
<td></td>
</tr>
<tr>
<td>Melting Range (°F)</td>
<td>296.6</td>
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<tr>
<td>Boiling Range (°F)</td>
<td>Not available</td>
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<tr>
<td>Flash Point (°F)</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not Available</td>
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<tr>
<td>Molecular Weight</td>
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<tr>
<td>Viscosity</td>
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<tr>
<td>Solubility in water (g/L)</td>
<td>Partly miscible</td>
</tr>
<tr>
<td>pH (1% solution)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Autoignition Temp (°F) Not available Vapour Pressure (mmHG) Negligible
Upper Explosive Limit (%) Not available Specific Gravity (water=1) Not available
Lower Explosive Limit (%) Not available Relative Vapor Density (air=1) Not applicable
Volatile Component (%vol) Negligible Evaporation Rate Not applicable

APPEARANCE
Triboluminescent, crystalline solid; does not mix well with water. Soluble in hot benzene, glacial acetic acid, acetone. Optimal pH for storage of papaverine solutions is 2-2.8.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY
Avoid reaction with oxidizing agents.
Incompatible with bromides, iodides and iodine, alkalies and tannins.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

PAPAVERINE

TOXICITY AND IRRITATION
PAPAVERINE:
unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
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<tbody>
<tr>
<td>Oral (rat) LD50: 325 mg/kg</td>
<td>Nil Reported</td>
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<tr>
<td>Intraperitoneal (rat) LD50: 59.6 mg/kg</td>
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<tr>
<td>Subcutaneous (rat) LD50: 151 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Intravenous (rat) LD50: 13.3 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Oral (mouse) LD50: 162 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Intraperitoneal (mouse) LD50: 91 mg/kg</td>
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<tr>
<td>Subcutaneous (mouse) LD50: 170 mg/kg</td>
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</tr>
<tr>
<td>Intravenous (mouse) LD50: 25 mg/kg</td>
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</tr>
<tr>
<td>Intramuscular (mouse) LD50: 175 mg/kg</td>
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</tr>
<tr>
<td>Intradermal (mouse) LD50: 150 mg/kg</td>
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</table>

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
Excitement, ataxia, dyspnea recorded.

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>papaverine</td>
<td>HIGH</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
</tr>
</tbody>
</table>

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.

Valuable substance, hold all residues for recovery. Disposal of the material must be carried out in accordance with the requirements of the relevant Federal/State Act(s) or Code(s) regulating the disposal of Drugs of Addiction.

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: None
Hazard class or Division: 6.1
Identification Numbers: UN1544 PG: II
Label Codes: 6.1 Special provisions: IB8, IP2, IP4, T3, TP33
Packaging: Exceptions: 153 Packaging: Non-bulk: 212
Packaging: Exceptions: 153 Quantity limitations: 25 kg
Passenger aircraft/aircraft trail:
Quantity Limitations: Cargo 100 kg Vessel stowage: Location: A aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Alkaloids, solid, n.o.s. or Alkaloid salts, solid, n.o.s. poisonous

Air Transport IATA:
ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None
UN/ID Number: 1544 Packing Group: II
Special provisions: A3
Cargo Only
Packing Instructions: 615 Maximum Qty/Pack: 100 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 613 Maximum Qty/Pack: 25 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y613 Maximum Qty/Pack: 1 kg
Shipping Name: ALKALOID SALTS, SOLID, N.O.S. *(CONTAINS PAPAVERINE)

Maritime Transport IMDG:
IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 1544 Packing Group: II
EMS Number: F-A, S-A Special provisions: 43 274
Limited Quantities: 500 g
Shipping Name: ALKALOIDS, SOLID, N.O.S. or ALKALOIDS SALTS, SOLID, N.O.S.

Section 15 - REGULATORY INFORMATION

papaverine (CAS: 58-74-2) is found on the following regulatory lists;
"Canada Controlled Drugs and Substances Act Schedule I","US Drug Enforcement Administration (DEA) Controlled Substances Schedule V"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
- Skin contact may produce health damage*.
- Inhalation may produce serious health damage*.
- Cumulative effects may result following exposure*.
- Exposure may produce irreversible effects*.
* (limited evidence).

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For additional technical information please call our toxicology department on +800 CHEMCALL.

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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