Material Safety Data Sheet

Hazard Alert Code Key:  EXTREME  HIGH  MODERATE  LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Triphenyl phosphite

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
C18-H15-O3-P, "phosphorous acid triphenyl ester", EFED, TPP, "Doverphos 10"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th>Hazard</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>Chronic</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Harmful if swallowed.
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.
- At sufficiently high doses the material may be neurotoxic.

EYE
- Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals.
- Prolonged eye contact may cause inflammation characterized by a temporary redness of the conjunctiva (similar to windburn).

SKIN
- The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time.
- Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
- 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.

CHRONIC HEALTH EFFECTS
- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>triphenyl phosphate</td>
<td>101-02-0</td>
<td>&gt; 99</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
- All persons handling organic phosphorus ester materials regularly should undergo regular medical examination with special stress on the central nervous systems. Whilst atropine or pyridine-2-aldoxime methiodide (PAM) are beneficial antidotes for acute phosphate ester poisonings, they are of little value in reversing acute or chronic neurological damage due to phosphites and some types of aryl phosphate.

Section 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Pressure (mmHg)</td>
<td>0.998</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>1.18 @ 15.5</td>
</tr>
</tbody>
</table>
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 full body protective clothing with breathing apparatus.

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.
- Slight fire hazard when exposed to heat or flame.

Combustion products include: carbon dioxide (CO2), phosphorus oxides (POx), 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: Type A-P Filter of sufficient capacity

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**Section 6 - ACCIDENTAL RELEASE MEASURES**

**MINOR SPILLS**
- Environmental hazard - contain spillage.
  - Clean up all spills immediately.
  - Avoid breathing vapors and contact with skin and eyes.

**MAJOR SPILLS**
- Environmental hazard - contain spillage.
- Moderate hazard.
  - Clear area of personnel and move upwind.
  - Alert Emergency Responders and tell them location and nature of hazard.

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**Section 7 - HANDLING AND STORAGE**

**PROCEDURE FOR HANDLING**
- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

**RECOMMENDED STORAGE METHODS**
- Metal can or drum
- Packing as recommended by manufacturer.

**STORAGE REQUIREMENTS**
- Store in original containers.
- Keep containers securely sealed.

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**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EXPOSURE CONTROLS**

The following materials had no OELs on our records
- triphenyl phosphite: CAS:101-02-0

**PERSONAL PROTECTION**

- **RESPIRATOR**
  - type a-p filter of sufficient capacity.
  - Consult your EHS staff for recommendations
EYE
· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET
- Wear chemical protective gloves, eg. PVC.
- 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 usually required. If risk of overexposure exists, wear an approved respirator.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL PROPERTIES**

<table>
<thead>
<tr>
<th>State</th>
<th>Liquid</th>
<th>Molecular Weight</th>
<th>310.30 Pure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>72- 77</td>
<td>Viscosity</td>
<td>Not Available</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>680</td>
<td>Solubility in water (g/L)</td>
<td>Partly Miscible</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>376</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>Vapor Pressure (mmHg)</td>
<td>0.998</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not available</td>
<td>Specific Gravity (water=1)</td>
<td>1.18 @ 15.5</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not available</td>
<td>Relative Vapor Density (air=1)</td>
<td>10.7</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>&lt;0.1</td>
<td>Evaporation Rate</td>
<td>Non Volatile</td>
</tr>
</tbody>
</table>

**APPEARANCE**
Pale straw oily liquid; does not mix with water. Mild typical odour. Solidifies on a cold day. Warm gently to remelt. Flammability Color Physical State Odor Miscibility with water - Clear Yellow Liquid Partly Miscible Colourless

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Section 10 - CHEMICAL STABILITY

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

**STORAGE INCOMPATIBILITY**
- Avoid reaction with oxidizing agents.

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

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Section 11 - TOXICOLOGICAL INFORMATION

**triphényl phosphite**

**TOXICITY AND IRRITATION**

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

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50: 1600 mg/kg</td>
<td>Skin (human): 125 mg/24h - SEVERE</td>
</tr>
</tbody>
</table>
Intraperitoneal (rat) LD50: 1490 mg/kg  
Skin (rabbit): 500 mg - SEVERE  

Oral (mouse) LD50: 1080 mg/kg  
Skin (rabbit): 20 mg/24h - Moderate  

Intraperitoneal (mouse) LD50: 266 mg/kg  
Eye (rabbit): 500 mg/24h - Mild  

- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic 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 due 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.

The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

Brain degenerative changes, flaccid paralysis, somnolence, tremor, convulsions, changes in motor activity, muscle weakness, ataxia and cardiac changes recorded.

**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**

<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>triphenyl phosphate</td>
<td>HIGH</td>
<td>No Data Available</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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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 or consult manufacturer for recycling options.
* Consult Waste Management Authority for disposal.

**Section 14 - TRANSPORTATION INFORMATION**

DOT:
Symbols: G Hazard class or Division: 9  
Identification Numbers: UN3082 PG: III  
Label Codes: 9 Special provisions: 8, 146, 335, IB3, T4, TP1, TP29  
Packaging: Exceptions: 155 Packaging: Non-bulk: 203  
Packaging: Exceptions: 155 Quantity limitations: No limit  
Passenger aircraft/rail:
Quantity Limitations: Cargo No limit Vessel stowage: Location: A
Section 15 - REGULATORY INFORMATION

triphenyl phosphite (CAS: 101-02-0) is found on the following regulatory lists;
"Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - California Air Toxics "Hot Spots" List (Assembly Bill 2588) Substances for which emissions must be quantified","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Inhalation and/or skin contact may produce health damage*.
■ Cumulative effects may result following exposure*.
* (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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