MATERIAL SAFETY DATA SHEET

Section I  Company and Material Identification

Product Identification: Theophylline Oral Solution

Active Ingredient: Theophylline 80mg/15mL

Chemical Name of Active Ingredient:
1H-Purine-2,6-dione, 3,7-dihydro-1,3-dimethyl hydrate

201 Delaware Street
Greenville, SC 29605

Emergency Contact: Poison Control Center
1-800-222-1222

The following MSDS applies to the formulated liquid product only (for patient administration). If handling theophylline, consult the MSDS for the active ingredient and take appropriate precautions.

Section II  Product Composition

<table>
<thead>
<tr>
<th>Substance</th>
<th>Chemical Abstract Service #</th>
<th>% (by wt.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theophylline</td>
<td>58-55-9</td>
<td>&lt;1%</td>
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<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>20%</td>
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</table>

All other ingredients are considered non-hazardous under US Hazard Communication regulations and EU Directives on labeling and packaging.
WARNING STATEMENT

CAUTION: Contains theophylline, a pharmaceutically active ingredient intended for clinical use only. This product may pose a health hazard only if exposure occurs to liquid contents, e.g., after spill or leak.

Usual Adult Dose
The usual oral adult initial dose of theophylline is 5 mg per kilogram of body weight; the usual maintenance dose is 300 to 600 mg per day.

Adverse Effects
Adverse effects may include heartburn, nausea, nervousness or restlessness, headache, increased urination, trouble in sleeping, fast heartbeat, trembling and vomiting. Possible allergic reaction to material if inhaled, ingested or in contact with skin.

Overdose Effects
Symptoms of toxicity include confusion, convulsions, dizziness, fast pounding or irregular heartbeat, severe or continuing abdominal pain, continued nervousness or restlessness; hyperglycemia, hypokalemia, metabolic acidosis, and vomiting.

NOTE: The less severe signs of toxicity do not always precede the more serious or life-threatening ones. Seizures can appear without warning.

Acute
Possible eye, skin, gastrointestinal and/or respiratory tract irritation.

Chronic
Possible hypersensitization.

Inhalation
May cause irritation. Remove to fresh air.

Eye
May cause irritation. Flush with copious quantities of water.

Skin
May cause irritation. Flush with copious quantities of water.

Ingestion
Overdose may cause irritation, bitter taste and toxicity. The material is rapidly and completely absorbed from the gastrointestinal tract.
Medical Conditions Aggravated by Exposure
Hypersensitivity to material, active alcoholism, liver disease, acute pulmonary edema, congestive heart failure, sepsis, hypothyroidism, hyperthyroidism, prolonged fever, cor-pulmonale, heart problems, hypertension, acute porphyria, gastritis or peptic ulcer, gastroesophageal reflux, and seizure disorders.

Cross Sensitivity
Persons hypersensitive to other xanthines (i.e. aminophylline, caffeine, dyphylline, oxtriphylline, and theobromine) or to ethylenediamine may be hypersensitive to this material also.

Pregnancy Comments
Although pregnancy studies in humans have not been done, high doses of theophylline in rats have caused toxic effects in the fetus. The therapeutic use of this material during pregnancy may result in potentially dangerous serum theophylline and caffeine concentrations in the newborn.

Pregnancy Category: C

Section IV First Aid Measures

General
Remove from exposure. Remove contaminated clothing. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention. If person is not breathing give artificial respiration. If breathing is difficult give oxygen. Obtain medical attention.

Overdose Treatment
Treatment for theophylline overdose should be symptomatic and supportive and may include the following:

1. Administer oral activated charcoal until the patient is asymptomatic and serum concentration is below 20 micrograms/mL.
2. Administer a single dose of sorbitol, if the charcoal was not pre-mixed with sorbitol.
3. DO NOT use ipecac syrup.
4. Gastric lavage may be useful if patient has not vomited and it is within one hour of a large ingestion.
5. Whole bowel irrigation with polyethylene glycol and electrolyte combination may be useful when theophylline serum concentrations rapidly increase or when high concentrations persist.
6. Hemoperfusion or hemodialysis may be used to enhance elimination.
7. Treat nausea or vomiting with antiemetics such as intravenous metoclopramide or ondansetron. DO NOT use phenothiazine antiemetics.
8. Control seizures with intravenous benzodiazepines, phenobarbital, thiopental, or a neuromuscular blocking agent. Use general anesthesia with caution.
9. Control ventricular tachyarrhythmias with therapy specific to the type of arrhythmia.
10. Use standard measures to treat hypotension and metabolic complications.
11. Monitor arterial blood gases, electrocardiograph, serum electrolytes and glucose, stool output, and vital signs as required. (USP DI 2002.)

Section V  Fire Protection

Flashpoint
110°F

Extinguishing Media
Use water fog or fire extinguishing media suitable for Class A fires (e.g., multipurpose dry chemical or foam) for the surrounding materials in the fire.

Special Fire Fighting Procedures
Wear full structural fire fighting protective clothing and NIOSH/MSHA-approved positive pressure, self-contained breathing apparatus. Decontaminate after use.

Section VI  Spill and Release Measures

If material is released or spilled, cordon off spill area. Take proper precautions to minimize exposure by using appropriate personal protective equipment. For small spills (such as in a laboratory), soak up material with absorbent, e.g., paper towels, and wash spill area thoroughly with soap and water. For large spills, use an absorbent to soak up the spill and an industrial vacuum cleaner equipped with a high efficiency particulate (HEPA) filter. Dispose of collected material in accordance with applicable waste disposal regulations.

Section VII  Handling and Storage

Avoid contact with skin, eyes or clothing. Store in a well-ventilated area. Wash thoroughly after handling.

Incompatibilities: Tannins and strong oxidizing agents.
Section VIII  Exposure Control/Personal Protection

Eye Protection
Not normally required unless there is a potential for spillage, breakage or release. Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face.

Respiratory Protection
Not normally required unless there is a potential for spillage, breakage or release. For procedures involving larger quantities (grams to kilograms) or aerosol-generating procedures such as spraying or vortexing, an air-purifying respirator with NIOSH/MSHA approval for dusts and mists may be needed.

Skin Protection
Not normally required unless there is a potential for spillage, breakage or release. Rubber gloves are recommended to minimize potential for skin contact when handling aqueous solutions. Wear lab coat or other protective overgarment. Base the choice of protection on the job activity and potential for skin contact.

Engineering Controls
Not normally required unless there is a potential for spillage, breakage or release. Handle in a laboratory hood, Biological Safety Cabinet or ventilated enclosure if procedures involve aerosolization.

Other
Wash hands, face and other potentially exposed areas immediately after handling material (especially before eating, drinking, or smoking). Decontaminate all protective equipment after use.

Section IX  Physical/Chemical Properties

Appearance/Color: Clear pink solution
pH: 3.0 — 4.0
Section X  Stability/Reactivity

Stability: Stable
Incompatibility: Not known
Hazardous Polymerization or Decomposition Products: Not known to occur

Section XI  Toxicological Information

Oral Rat: LD50 225 mg/kg
Oral Mouse: LD50 235 mg/kg

Irritancy Data: Not found

Target Organs: Central nervous system, heart and kidneys

Listed as carcinogen

NTP: No
IARC: No
OSHA: No

Section XII  Waste Disposal Methods

All wastes containing the material should be properly labeled. Dispose of any waste residues according to prescribed federal, state, and local guidelines, e.g., appropriately permitted chemical waste incinerator. Rinse waters resulting from spill cleanups should be discharged in an environmentally safe manner, e.g., appropriately permitted municipal or on-site wastewater treatment facility.