

Poison Facts:

High Chemicals: Sulfuric Acid

Properties of the Chemical

Sulfuric acid is a clear, colorless, odorless, oily liquid. Although sulfuric acid is odorless, it has a choking odor when heated. Impure sulfuric acid may take on a brownish color. It has a great affinity for water. It is miscible with both water and alcohol, and generates heat and contracts with both of these substances.

Uses of the Chemical

Sulfuric acid is the most widely used and produced industrial chemical in the United States. It is used in the manufacture of many items, including fertilizers, explosives, dyestuffs, other acids, parchment paper and glue, as well as in the purification of petroleum and the pickling of metals.

Absorption, Distribution, Metabolism and Excretion (ADME)

Metabolic acidosis in patients ingesting sulfuric acid suggests that there is some oral absorption. Absorption through other routes such as skin, eyes or lungs has not been fully explored. Sulfuric acid is a strong mineral acid and would be completely dissociated into hydronium (H^+) and sulfate (SO_4^{2-}) ions in the body.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Irritation, lacrimation and conjunctivitis occur with the lower-concentration sulfuric acids. The higher-concentrated acids cause corneal burns, visual loss and the possibility of perforation of the globe.
- **Dermal exposures:** Severe necrotic/scarring burns may occur. Fatalities have been reported.
- **Inhalation exposures:** Exposure can cause symptoms of tickling in the nose and throat, coughing, sneezing, reflex bronchospasm, dyspnea and pulmonary edema. Death has been reported and is usually due to sudden circulatory collapse, glottic or esophageal edema.
- **Ingestion exposures:** Ingestion may cause hemorrhaging, necrosis and perforation in the GI tract, typically more severe in the stomach and intestinal tract than in the esophagus. Delayed effects have been noted, including perforation, GI hemorrhage, fistula formation or delayed stricture.

In-Field Treatment Prior to Arrival at a Health Care Facility

- **Ocular exposures:** Irrigate with copious amounts of water for 15 to 30 minutes.
- **Dermal exposures:** Irrigate with copious amounts of water. Remove exposed clothing and jewelry.
- **Inhalation exposures:** Move patient to fresh air and away from the toxic environment.

- **Ingestion exposures:** Give the patient small amounts of water. Do not give more than 8 ounces (120 to 240 ml) for adults or 4 ounces (120 ml) for children. Emesis is contraindicated.

Special note to first responders:

- Wear a positive-pressure Self-Contained Breathing Apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer.

Treatment of Exposures in a Health Care Facility

- **Ocular exposures:** Initiate or continue eye irrigation using 0.9 percent saline solution until eyes have reached a neutral pH. Instilling a local anesthetic into the eye may help with patient discomfort. Because of the potential for severe eye injury, prolonged initial flushing and early ophthalmologic consultation are advisable. It may take 48 to 72 hours after the burn to assess the degree of ocular damage.
- **Dermal exposures:** Initiate or continue eye irrigation using copious amounts of water. Treat dermal irritations or burns with standard topical therapy.
- **Inhalation exposures:** Administer 100 percent humidified oxygen, perform endotracheal intubation and provide assisted ventilation as required. Administer inhaled beta-adrenergic agonists if bronchospasm develops. Respiratory tract irritation, if severe, can progress to noncardiogenic pulmonary edema, which may be delayed for up to 72 hours.
- **Ingestion exposures:** The patient should be given small amounts of fluids. Obtain consultation concerning endoscopy as soon as possible, and perform endoscopy within the first 24 hours when indicated. In severe cases of GI necrosis or perforation, emergent surgical consultation should be obtained.

For more poison prevention and first aid information, call the

Poison Control Center

Serving the Residents of Kansas

Toll-free Hotline

1-800-222-1222

THE UNIVERSITY OF KANSAS HOSPITAL

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