

Poison Facts:

Medium Chemicals: Methyl Mercaptan

Properties of the Chemical

Methyl mercaptan (methanethiol) is a colorless, flammable gas with the odor of rotten cabbage. It liquefies at 6 degrees C and is shipped as a liquefied gas (98 percent pure) under its vapor pressure.

Uses of the Chemical

Methyl mercaptan is a sulfhydryl compound produced from methanol and hydrogen sulfide. It is found as an emission from paper and pulp mills. Methyl mercaptan occurs naturally in a wide variety of vegetables (e.g., onions and garlic), in "sour" gas in West Texas oil fields, in coal tar and petroleum distillates, and it is a major contributor to normal mouth odor. It is used as an intermediate in the production of pesticides, fungicides, jet fuel and plastics and in the synthesis of methionine. It is also used as a gas odorant for natural gas, propane and butane.

Absorption, Distribution, Metabolism and Excretion (ADME)

Methyl mercaptan is absorbed rapidly through inhalation and minimally through skin and eye exposure. The gas is absorbed rapidly through the respiratory system and ultimately reaches the vascular system. Methyl mercaptan binds to protein and erythrocytes and is extremely effective in stabilizing erythrocyte membranes against hypotonic hemolysis. The compound reacts directly with collagen. Methyl mercaptan can be metabolized by serving as a methyl, sulfur or methionine donor for synthesizing amino acids and proteins. The compound is readily oxidized to carbon dioxide and inorganic sulfates. It interferes with cytochrome C oxidase, sodium-potassium ATPase and catalase activities in animal cells.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Methyl mercaptan is an eye and mucous membrane irritant. It may cause moderate conjunctivitis and diplopia.
- **Dermal exposures:** Exposure may result in redness, irritation and swelling. Frostbite injury can occur from dermal exposure to liquid methyl mercaptan.
- **Inhalation exposures:** Symptoms may include fever, cough, dyspnea, tightness and burning in the chest, dizziness, headache, loss of sense of smell, nausea, vomiting and diarrhea. Inhalation may cause CNS depression, respiratory irritation, respiratory paralysis, pulmonary edema, tremors and seizures. It may also cause liver and kidney damage, tachycardia and hypertension. Methemoglobinemia and severe hemolytic anemia with hematuria and proteinuria have been reported in a patient with G-6-PD deficiency.
- **Ingestion exposures:** Ingestion is unlikely, but irritation of the mouth, throat and esophagus are possible effects.

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

- **Ocular exposures:** Remove contact lenses, and irrigate exposed eyes with copious amounts of room-temperature 0.9 percent saline or water for at least 15 minutes.
- **Dermal exposures:** Immediately flush affected areas with water for at least 15 minutes while removing contaminated clothing. Discard clothing and shoes.
- **Inhalation exposures:** Move the patient from the toxic environment to fresh air at once. Monitor for respiratory distress. If breathing is difficult, give oxygen.
- **Ingestion exposures:** Ingestion is unlikely, since the product is a gas at room temperature.

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. It may provide little or no thermal protection.

Treatment of Exposures in a Health Care Facility

- **Ocular exposures:** Remove contact lenses, and irrigate exposed eyes with copious amounts of room-temperature water or saline for at least 15 minutes.
- **Dermal exposures:** Remove contaminated clothing, and wash exposed area thoroughly with soap and water. For frostbite, place affected area in a water bath with a temperature of 40 to 42 degrees C for 15 to 30 minutes until thawing is complete.
- **Inhalation exposures:** Monitor patient for respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis or pneumonitis. Administer oxygen, and assist ventilation as required. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. The onset of acute lung injury may be delayed 24 to 72 hours after exposure. Care should be taken to support respiration, prevent or treat pulmonary edema, and to control seizures and hypertension.
- **Ingestion exposures:** Ingestion is unlikely. Treatment should include the recommendations listed under “inhalation exposures” when appropriate.

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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