Poison Facts:

Medium Chemicals: Methyl Bromide

Properties of the Chemical

Methyl bromide is a halogenated aliphatic hydrocarbon. It is a colorless, odorless, volatile liquid or gas with a burning taste. It is particularly hazardous because it has very little odor and causes no immediate irritation of the nose or respiratory tract, even at severely poisonous concentrations. At high concentrations, it does have a sweetish chloroform-like odor. Chloropicrin is typically added to commercial forms of methyl bromide to give it an intense odor. Because its vapor density is greater than that of air, it tends to accumulate near the ground.

Uses of the Chemical

Methyl bromide is used in ionization chambers, for degreasing wool, to extract oils from flowers, nuts and seeds, and as an insect fumigant for freight cars, mills, shops, soil, vaults and warehouses. It is commonly used in the food industry as a fumigant for insect control because it diffuses readily into all nooks and small spaces, is very effective at killing pests and leaves no residue on food products. It is supplied in cylinders of compressed gas and small bombs for the treatment of storage spaces.

Absorption, Distribution, Metabolism and Excretion (ADME)

At high concentrations, methyl bromide is an eye, skin and mucous membrane irritant. Absorption occurs readily through the lungs and to a lesser extent through the skin. Inhaled methyl bromide is rapidly distributed to all tissues and metabolized. The onset of toxicity may be delayed several hours.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Exposure may result in redness, pain, blurred vision and either temporary or permanent loss of vision. Optic nerve damage with optic neuropathy has been reported. Ophthalmologic changes may last weeks or become permanent. Liquid methyl bromide can cause severe corneal burns.
- **Dermal exposures:** Dermal contact can cause a stinging or burning sensation, itching, redness and swelling. Contact with large amounts may cause numbness, aching pain, blisters, papules, vesicles or chemical burns. Contact with liquid methyl bromide may cause frostbite. Methyl bromide may be absorbed through the skin.
- **Inhalation exposures:** Acute exposures to high concentrations produce narcosis and death from respiratory failure. If death does not result, the most consistent response is lung irritation with congestion and edema. Neurotoxicity is the principal concern, including symptoms of headache, nausea and vomiting, followed by tremors, twitching and seizures. The onset of neurological effects may be delayed as long as 36 hours. Central and peripheral neurologic sequelae

such as organic brain syndrome and extrapyramidal effects may occur. Permanent kidney damage may also be noted. If coma and seizures occur, few patients survive. Death may occur in a few days due to circulatory failure or pulmonary edema and multiple organ failure. In non-fatal cases, complete recovery may take months, and neurologic lesions may be permanent.

- **Ingestion exposures:** Methyl bromide is a gas at room temperature; however, solution preparations have been made, and toxic ingestions of these may occur.

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

- **Ocular exposures:** Remove contact lenses, and irrigate exposed eyes for 15 minutes with tepid saline or water.
- **Dermal exposures:** Remove all clothing, and wash affected areas twice with soap and water. Methyl bromide can penetrate ordinary rubber gloves.
- **Inhalation exposures:** Move victim to fresh air, and monitor for respiratory distress. Proceed with artificial respiration if indicated.
- **Ingestion exposures:** Immediately give the patient 4 to 8 ounces of water or milk.

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 jewelry, and wash skin, hair and nails vigorously and repeatedly. Discard all contaminated leather. Treatment should also include the recommendations listed under "inhalation exposures" when appropriate.
- **Inhalation exposures:** Administer supplemental oxygen, and treat bronchospasm with inhaled beta-adrenergic agonists. Monitor respiratory and cardiovascular function carefully. Monitor ECG for potential cardiac dysrhythmias. Monitor liver and kidney function. The onset of acute lung injury may be delayed and should be treated with adequate ventilation and oxygenation with frequent monitoring of arterial blood gases and/or pulse oximetry. Seizures should be treated initially with a benzodiazepine. If seizures persist or recur, administer phenobarbital. Intractable seizures usually predict a fatal outcome. Consider the induction of a barbiturate coma.
- **Ingestion exposures:** Dilute with 4 to 8 ounces of water or milk. 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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