

Poison Facts:

High Chemicals: Arsine

Properties of the Chemical

Arsine is a very toxic, colorless, non-irritating gas with a disagreeable garlic odor. On exposure to light, moist arsine decomposes quickly, depositing shiny black arsenic. It is slightly soluble in water, and aqueous solutions are neutral.

Sources of the Chemical

Arsine is produced when water comes into contact with metallic arsenide or when acids come into contact with metallic arsenic or arsenical compounds.

- **Accidental production (industry):** Exposures may result from any operation where a reducing acid or water acts on metals or other arsenic-containing substances. Circumstances common to industry that can result in exposure include: smelting and refining of metals, galvanizing, soldering, lead plating, etching and spraying water on metal slag.
- **Accidental production (consumers):** Arsine may be accidentally generated by using acidic solutions to clear drains that have had arsenic compounds poured down them, using acid to clean containers that have held sodium arsenate-based weed killers, exposing aluminum ladders to pools of sodium arsenite, or reusing containers of incompatible insecticides.
- **Commercial use:** Arsine is produced for use in organic synthesis and in the electronics industry. It is used in the semiconductor industry to etch gallium arsenide.

Absorption, Distribution, Metabolism and Excretion (ADME)

Arsine is well-absorbed by inhalation. It is well-distributed through the body, including red blood cells, liver, bone, skin, hair and nails. Arsenic is excreted in the urine and feces in small amounts over a long period of time.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Red staining of the conjunctiva may be an early sign of arsine poisoning.
- **Dermal exposures:** An abnormal pigmentation of the skin may be seen.
- **Inhalation exposures:** The signs and symptoms of acute poisoning are consistent with acute and massive hemolysis. Initially, there is painless hemoglobinuria, dizziness, weakness, nausea, vomiting, abdominal cramping and tenderness. There may be a garlicky odor of the breath. After a latent period – usually 2 to 24 hours – jaundice accompanied by anuria and oliguria may occur. Acute high-dose exposure to arsine is associated with rapid hemolysis of red blood cells and subsequent renal failure.

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

- **Inhalation exposures:** Treatment consists of immediate removal of the individual from the exposure.

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.
- Keep unauthorized personnel away. Stay upwind.

Treatment of Exposures in a Health Care Facility

Ensure adequate hydration by starting intravenous fluids. Oxygenation should be checked and supplemental oxygen given if needed. Because of possible severe hemolysis, adequate hydration with alkaline solutions to keep a brisk urine flow is essential. Low-dose dopamine may help preserve renal blood flow. Monitor serial CBC, BUN, creatinine, electrolytes and urinalysis including onsite dipstick of urine for hemoglobin. Administer blood in patients with hemolysis. If major hemolysis has occurred, exchange transfusion may be performed to remove the plasma hemoglobin, in conjunction with hemodialysis to preserve renal function. Recovery is dependent on the supportive care provided, the extent of the exposure and the resulting effects of hemolysis.

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

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