

Poison Facts:

Medium Chemicals: Acrolein

Properties of the Chemical

Acrolein is a three-carbon, unsaturated, highly reactive, highly volatile aldehyde at room temperature. It is a clear or yellow liquid with a piercing disagreeable odor which immediately causes the eyes to water. It dissolves in water very easily and quickly changes to a vapor when heated. It also burns easily. Small amounts of acrolein can be formed and can enter the air when trees, tobacco, other plants, gasoline or oil are burned. Acrolein is highly reactive due to its molecular structure, and is very irritating to skin and mucous membranes.

Uses of the Chemical

Acrolein is used as a liquid fuel, algacide, microbiocide, molluscicide and slimicide. It is used in making plastics, drugs and tear gas. Cigarette smoke and automobile exhaust contain acrolein. In addition, acrolein is considered to be one of the major components of smog.

Absorption, Distribution, Metabolism and Excretion (ADME)

Acrolein is absorbed primarily through inhalation exposure since it vaporizes with very little heat. It can, however, be absorbed through ingestion as well as through the skin. Studies indicate that it is metabolized in the lungs and liver by the microsomal enzymes.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Acrolein is irritating to the eyes at concentrations of 0.25 ppm or greater. Corneal burns have been reported after direct contact with acrolein in the liquid form.
- **Dermal exposures:** Acrolein is irritating to the skin. Splash contact from liquid acrolein can result in irritation, redness, swelling and even burns.
- **Inhalation exposures:** The lungs are the primary route of exposure to acrolein. Inhalation can result in dyspnea, bronchospasm, acute lung injury and a delayed onset of acute lung injury.
- **Oral exposures:** Ingestion causes severe irritation of the mouth, throat and GI tract, as well as nausea, vomiting and diarrhea. Acrolein can also cause mucosal burns.

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

- **Ocular exposures:** Irrigate the eyes with copious amounts of lukewarm water at low pressure for 15 minutes, prior to transport. Remove contact lenses.
- **Dermal exposures:** Remove exposed clothing immediately. Flood the exposed skin with water, and follow up with soap and water washes.

- **Inhalation exposures:** Remove the patient from the contaminated area. Provide oxygen if available.
- **Oral exposures:** If the patient is awake and alert, immediately give small amounts of milk or water (240 ml for adults or 120 ml for children).

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:** Irrigate eyes for 15 to 30 minutes with room-temperature normal saline. Eyes should be examined for corneal abrasions or burns.
- **Dermal exposures:** Remove the patient's clothing, and irrigate exposed skin with water, followed by soap and water washes. Examine the skin for burns, and treat with appropriate burn therapy.
- **Inhalation exposures:** Administer oxygen by non-rebreather mask at 10 to 15 L/min. If patient is presenting with bronchospasm or wheezing, treatment with inhaled sympathomimetic drugs may be beneficial. Consider orotracheal or nasotracheal intubations for airway control in the patient who is unconscious or in severe respiratory distress. Positive-pressure ventilation techniques with a bag valve mask device may be beneficial. Monitor for delayed onset pulmonary edema.
- **Oral exposures:** Severe irritation of the oral mucosa and GI tract may occur. Irrigate the mouth, and dilute with small amounts of liquids (240 ml for adults or 120 ml for children). Observe patient for 4 to 6 hours for signs and symptoms of esophageal or gastrointestinal tract irritation. If symptoms indicate a possibility of burns, the patient should receive an endoscopy to determine the extent of the damage.

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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