Just the Facts
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U.S. Army Center for Health Promotion and Preventive Medicine

Glutaraldehyde - Just How Hazardous Is It?

- **Healthcare Personnel**
- **Workplace Hazards**
- **Potential Risks**

NOTE: As of 15 March 1992, all Army activities were required to perform a 100 percent inspection and suspend from issue and use all disinfectant labeled "Sporicidin® Cold Sterilizing Solution." This action was initiated after the manufacturers of Sporicidin failed to heed repeated warnings by the Food and Drug Administration (FDA) that products require clearance prior to marketing. Subsequent investigations revealed the sterilizing solution failed effectiveness tests, lacked FDA clearance for labeling claims, and was a danger to health.

What is Glutaraldehyde?

Glutaraldehyde is an antimicrobial compound that is highly effective against most microorganisms, including viruses. Also known as Cidex®, glutaraldehyde is commonly used in medical facilities as a cold disinfecting agent for medical equipment, such as fiberoptic endoscopes. Glutaraldehyde is also used in embalming fluid; electron microscopy; preparation of allergy and collagen extracts for injection; radiograph development; and medical treatment of warts, hyperhidrosis, onychomycosis, epidermolysis bullosa, and herpes simplex.

An alkaline solution that turns green when activated and has a sharp odor, glutaraldehyde remains stable for only 1-2 weeks. Although it is generally harmless to most medical and dental equipment, prolonged contact with glutaraldehyde may cause some damage to delicate instruments. When used as a 2 percent buffered aqueous solution, glutaraldehyde is an adequate disinfectant. However, immersion of equipment for up to 3 hours is necessary, and this type of sterilization is less reliable than sterilization by heat.

What are the Potential Health Effects?

Glutaraldehyde is a potent irritant to the eyes, skin, mucous membranes, and the upper respiratory tract in exposed medical facility employees. Chronic exposure to glutaraldehyde may result in sensitization in certain individuals.

If inhaled, the vapors can irritate the upper respiratory tract, causing headache, chest discomfort, and symptoms of bronchitis. If ingested, glutaraldehyde may cause nausea, vomiting, and general systemic illness. At chronic high levels of exposure, glutaraldehyde can produce liver toxicity and possible mutagenic and reproductive effects.

What Type of Monitoring is Necessary?

In order to reduce the risk of serious health impairment, the Occupational Safety and Health Administration (OSHA) regulates personal exposure to glutaraldehyde vapor in the workplace. The OSHA requires that the concentration never exceed 0.2 parts per million (ppm) during a work period. The OSHA specifically requires measurement of a time-weighted average (TWA) concentration over a 15-minute period since instantaneous monitoring of personal exposure is not feasible. Passive monitors, badges, or charcoal tubes can determine the concentration. If measurement of employee exposure shows that concentrations are consistently below 0.2 ppm, engineering controls, such as improved ventilation and protective equipment, are not necessary.

All personnel who use glutaraldehyde-containing products and/or equipment that has been sterilized with glutaraldehyde must be trained according to the hazard communication standard.

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Nationally Recognized as the Center of Matrixed Occupational and Environmental Health Excellence
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What Type of Medical Surveillance is Needed?

Medical personnel who come into contact with glutaraldehyde on a regular basis should be included in a medical surveillance program.

What are the Precautions for Safe Handling and Use?

Store glutaraldehyde in a covered container, and only use it with standard room ventilation (air-conditioning) with a natural draft. If ventilation and vapor control measures are inadequate, ambient concentrations of glutaraldehyde can be particularly irritating in areas such as endoscopy suites.

Use ammonium carbonate to "neutralize" glutaraldehyde vapors if a large quantity is spilled. Collect and discard the liquid. For small spills, wipe the area with a disposable, absorbent cloth, or mop down the area with an equal mixture of household ammonia and water; then flush with large quantities of water. Also, remember to avoid contamination of food with glutaraldehyde, and never use this chemical as a spray cleaner.

Have employees wear long-sleeve gowns with cuffs and gloves tucked under the gown cuffs to minimize potential skin contact. All gloves do not protect against dermatitis because of the tendency of some rubber and plastic materials to absorb glutaraldehyde. For short-term exposure, polyvinyl chloride (PVC) gloves seem more protective than latex gloves. For prolonged exposure, neoprene or butyl rubber gloves seem the best choice. Have employees wear appropriate eye protection and avoid wearing contact lenses to prevent eye irritation from glutaraldehyde vapor. Respiratory protection is not required.

What Emergency and First-Aid Procedures are Recommended?

Flush eyes thoroughly with water, and get medical attention if glutaraldehyde gets into the eyes. Flush skin thoroughly with water if skin is exposed. Get medical attention if irritation persists. Get to fresh air if glutaraldehyde is inhaled, and get medical attention if symptoms persist. Do not induce vomiting if ingestion occurs, but drink copious amounts of milk and get medical attention.

What are the Proper Disposal Methods for Spent Glutaraldehyde?

A 2 percent aqueous glutaraldehyde solution can be disposed of in the sanitary sewer with large quantities of water. If the container is nondisposable, triple rinse the container to remove any residue. If the container is disposable, triple rinse the container and dispose of it in an incinerator or landfill approved for pesticide containers.

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