

STANDARD OPERATING PROCEDURE 30-50% HYDROGEN PEROXIDE SOLUTION

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I have read and understand the SOP:

Name:

Signature:

Date:

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10/10/19

Before working with 30-50% Hydrogen Peroxide, the lab worker must have the approval of the PI who shall provide specific training according to this SOP and in understanding the MSDS provided by the manufacturer. The lab worker must complete UH lab safety training and JABSOM Kaka'ako hazardous waste generator training prior to working with any chemicals. The lab worker should sign this SOP as documentation that he/she understands the hazards and has been trained in how to work with high concentrations of hydrogen peroxide safely.

1. INFORMATION ABOUT HYDROGEN PEROXIDE AND PROCEDURES USING HYDROGEN PEROXIDE

CAS#7722-84-1

30-50% Hydrogen Peroxide is a clear, colorless liquid that is classified as a strong oxidizer and a corrosive liquid. It is commonly used as a laboratory reagent and also in its vapor form as a sterilizer, a popular alternative to ethylene oxide and formaldehyde, as a safer and more efficient decontamination method for isolated rooms and biosafety cabinets.

2. HAZARDOUS PROPERTIES, POTENTIAL ROUTES OF EXPOSURE, SYMPTOMS OF EXPOSURE

30-50% Hydrogen peroxide is an irritant of the eyes, mucous membranes, and skin.

Routes of Exposure

Skin or eye contact, ingestion or inhalation of the vapor or mist.

Acute Effects:

The signs and symptoms of acute exposure to hydrogen peroxide include irritation of the eyes, nose, throat and lungs, ranging from mild bronchitis to pulmonary edema. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corneal ulceration, redness and blisters on the skin, and bleaching of hair might occur after contact of the eyes or skin with the liquid or vapor.

Ingestion of large doses may cause symptoms of abdominal pain, vomiting, and diarrhea as well as blistering or tissue destruction. Stomach distention (due to rapid liberation of oxygen), and risk of stomach perforation, convulsions, pulmonary edema, coma, possible cerebral edema (fluid on the brain), and death are possible.

Chronic Effects:

No signs or symptoms of chronic exposure to hydrogen peroxide have been reported in humans.

Cancer Hazard:

Information not available.

Reproductive Hazard:

Information not available.

Exposure Limits:

The current OSHA permissible exposure limit (PEL) for hydrogen peroxide is 1 ppm (1.4 mg/m³) as an 8-hour time-weighted average (TWA) concentration. The NIOSH recommended exposure limits (RELs) for hydrogen peroxide is 1 ppm (1.4 mg/m³) as a TWA for up to a 10-hour workday and a 40-hour workweek. The American Conference of Governmental Industrial Hygienists (ACGIH) assigned hydrogen peroxide a threshold limit value (TLV) of 1 ppm (1.4 mg/m³) as a TWA for a normal 8-hour workday and a 40-hour workweek. The NIOSH limit is based on the risk of eye, mucous membrane and skin irritation. The ACGIH limit is based on the risk of irritation.

3. PERSONAL PROTECTIVE EQUIPMENT

- Use of nitrile, PVC, neoprene or Viton gloves are recommended when handling hydrogen peroxide (confirm glove type and use limitations by referring to the JABSOM Glove Compatibility and Use Guide - contact JABSOM EHSO).
- Safety glasses with side shields, face shield, or chemical splash goggles shall be worn.
- A chemical-resistant laboratory coat should be worn when working with hydrogen peroxide.
- Closed toe shoes are required when working in the laboratory.
- Use NIOSH/MSHA approved respirators when vapors or mist concentrations exceed PEL or if chemical fume hood is not available or accessible.
- Do not wear or use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide.

4. ENGINEERING/VENTILATION CONTROLS

- Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Safety shower and eye wash stations should be easily accessible where 30-50% hydrogen peroxide is used.

5. SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

- Store 30-50% hydrogen peroxide in a cool, dark, dry, well-ventilated area in tightly sealed and light-resistant containers.
- Containers of hydrogen peroxide should be protected from physical damage. Glass, polyethylene, stainless steel and aluminum are recommended materials for storage containers.
- Store separately from combustible materials such as wood, paper, oil, etc., organic materials such as alcohols, acetone, and other ketones; Aldehydes, and their anhydrides; glycerol, cotton (cellulose), metals including iron, copper, chromium, lead, silver, manganese, sodium, potassium, magnesium, nickel, gold, platinum; metal alloys such as brass or bronze; metal oxides such as lead oxides, mercury oxides, or manganese dioxide; and many metal salts, like potassium permanganate or sodium iodate. Tremendous explosion can be caused by unstable mixtures with concentrated mineral acids.
- Wash hands thoroughly after handling hydrogen peroxide (even if gloves were used).
- Remove contaminated clothing/PPE and wash before reuse.
- Transport chemicals in closed containers, in the smallest amounts possible, and use aids such as carts, chemical transport carriers, etc.

- It is highly recommended that all chemicals be stored below eye level so cracking or leaking containers are immediately visible and there is less potential for chemicals falling onto lab workers when pulling from shelves.

6. PROCEDURES

- **Handling 30-50% Hydrogen Peroxide**
 - Wear appropriate PPE (gloves, eye protection, lab coats).
 - Work in a well ventilated area.
 - Change gloves after handling 30-50% Hydrogen Peroxide.
- **Sterilizing FACS Aria Sorter (3% Hydrogen Peroxide solution)**
 - Prepare a 3% solution of Hydrogen Peroxide by diluting 100ml 30% H₂O₂ with 900ml DI water.
 - Carefully pour 3% solution into stainless steel 3 liter Aria tank with appropriate fittings.
 - Connect tank to the fluid and air lines on the wet cart.
 - Perform Fluidics Startup 2 times and let the solution sit in the FACS Aria Sorter for 30 minutes.
 - Reconnect the sheath tank to the wet cart and perform fluidics startup 3 times.
- **SPILL AND ACCIDENT PROCEDURES**
- Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operators.
- In the event of skin contact, immediately wash with mild soap and copious amounts of water and seek medical attention. Remove contaminated clothing and shoes. Completely submerge hydrogen peroxide contaminated clothing in water prior to drying; if allowed to dry on clothing, evaporation leads to concentration and increased possibility of ignition.
- In case of contact with eyes, immediately flush eyes with copious amounts of water for at least 15 minutes (lifting upper and lower eyelids occasionally) and obtain medical attention.
- If inhaled, move to fresh air immediately and seek medical attention. If victim is not breathing, perform CPR.
- In the event of ingestion, obtain medical attention immediately. Do not induce vomiting. Give the victim large quantities of water to drink. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Keep victim warm and quiet until medical help arrives.
- Note to Physician: Pulmonary edema may be delayed for 24-72 hours; keep under observation. Gastic lavage may be necessary if swallowed. Analysis of body fluids (particularly gastric aspirates) using the titanium chloride reaction, if done immediately, will reveal peroxides.
- Report all incidents or near misses to JABSOM EHSO and complete the appropriate Incident Forms.

Small spills:

Don appropriate PPE (respiratory protection, skin/eye protection). Remove all sources of heat and ignition; keep combustibles (wood, paper, oil etc) away from spilled material. Evacuate all unprotected personnel and ventilate area. Water spray may be used to reduce vapors, but the spray may not prevent ignition in closed spaces. Absorb with an inert dry material or flood the area with large amounts of water. Collect contaminated water for disposal; do not let it enter sewer system. May be neutralized with sodium metabisulfite or sodium sulfite after diluting to 5-10% peroxide.

Large spills:

Notify others in room of spill. Evacuate room/immediate area. Call Security and JABSOM EHSO. Keep away from heat or sources of ignition. Stop leak if without risk. Flood the area with large amounts of water and dike far ahead of the spill to contain the hydrogen peroxide for later reclamation and disposal. Post warning signs at entrances/exits notifying others of spill. Prevent unnecessary entry into area. Provide assistance and information to spill responders.

Report all spills (minor and major) and any near misses to JABSOM EHSO.

8. WASTE DISPOSAL PROCEDURES

30-50% Hydrogen Peroxide Aqueous Solution is classified as a 5.1 oxidizer and 8A Corrosive Liquid. Hydrogen Peroxide waste should be properly disposed of through JABSOM EHSO.

9. MSDS LOCATION **Where is this located, as an attachment to the SOP, in the MSDS folder, etc? Must have an MSDS, preferably manufacturer specific, percentage of hydrogen peroxide, and specific for each type of hydrogen peroxide used (per CAS#).**

References: Information contained in this SOP was gathered from the following sources: JT Baker MSDS, OSHA (<http://www.osha.gov/SLTC/healthguidelines/hydrogenperoxide/recognition.html>), Science Lab.com MSDS.