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**McMaster University**  
**Department of Biology**  
**Standard Operating Procedures for Ethidium Bromide**

**Revised: January 28, 2008**  
**Reviewed by EOHSS May 2008**  
**Effective: Immediately**

**Applicable Legislation:**

Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 27 (2) (a), 27 (2) (c) & 28 (1) (a), 28 (1) (b), 28(1).

**Intent:** To outline safe handling procedures of ethidium bromide, including any equipment that is used in conjunction with ethidium bromide, and to outline potential hazards and first aid measures should incidences occur.

**Definitions:**

**Ethidium bromide:** A chemical used for the visualization of nucleic acids. Appearance is dark red to purple.

**Gel documentation:** system composed of a camera and ultra violet light source system used for photo documentation of electrophoretic gels which contain ethidium bromide.

**Ultra violet (UV) light:** light used for the visualization of ethidium bromide

**Qualified person:** A person who, in respect of a specific duty, is qualified by knowledge, training and experienced to perform the duty safely and properly.

**Requirements of OHSA, Section 27 (2) a, c and Section 28(1) a, b, c**

27. (2) (a) A supervisor shall advise a worker of the existence of any potential or actual danger to the health or safety of the worker of which the supervisor is aware.

27. (2) (c) Take every precaution reasonable in the circumstances for the protection of a worker.

**Duties of workers**

28. (1) A worker shall,

- (a) work in compliance with the provisions of this Act and the regulations;
- (b) use or wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn;
- (c) report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker

**Potential Hazards**

**Inhalation:** The dust is very toxic by inhalation. Inhalation of dust irritates the respiratory tract.

**Ingestion:** No information found, but compound should be handled as a potential health hazard.

**Skin Contact:** Inflammation and discoloration of the skin may occur after contact. Contact will stain the skin purple.

**Eye Contact:** Causes irritation, redness, and pain.

**Chronic Exposure:** May cause heritable genetic damage.

**Aggravation of Pre-existing Conditions:** No information found.

## Standard Operating Procedures for Ethidium Bromide

### Description of Procedures

1. All persons shall consult the Material Safety Data Sheet and SOP on ethidium bromide and electrophoresis power supply before using the chemical.
2. All users will have WHMIS, Chemical handling and Spills training.
3. All persons shall wear personal protective equipment when handling ethidium bromide. This includes wearing a lab coat, gloves, chemical splash goggles and closed toe shoes when working with ethidium bromide. Leave lab coats, gloves, and other personal protective equipment in the lab once your work is complete to prevent the spread of this or other chemicals outside of the lab.
4. All persons shall know Life Sciences Building Emergency Procedures including the location of Fire pull stations, eye wash stations and safety showers.
5. All work with ethidium bromide is to be done in an "ethidium bromide" designated area in order to keep ethidium bromide contamination to a minimum. Any persons in this area are required to wear personal protective equipment. Safety shower and eye wash stations should be easily accessible where ethidium bromide is used.
6. All laboratory equipment (such as beakers, pipettes, gel electrophoresis systems etc) used in the "ethidium bromide" designated area are to be labeled as "ethidium bromide contaminated" and are not to be removed from the area without first being decontaminated. An exception to this are gel trays which are used to transport electrophoretic gels to the gel documentation system.
7. Only qualified persons shall operate the gel documentation system. All persons shall wear gloves and lab coats when carrying gels to the gel documentation system. Once at the gel documentation system all ethidium bromide contaminated items are to be placed on a tray designated for ethidium bromide contaminated material.
8. **When operating the gel documentation system, no person is to touch the system with contaminated gloves.**
9. Persons operating gel system are to take added caution when using ultraviolet light to visualise gels. Persons are to make sure the UV light is off before they open the UV box and that the UV light is turned off when they are finished. Avoid exposing unprotected skin and eyes to intense UV sources. If the UV light is aimed upwards, wear a UV protective face shield when you are standing near the source. For prolonged work close to UV light boxes or other intense sources it may be useful to wrap the end of the lab coat sleeves loosely with masking tape to prevent gaps where the wrist could be exposed.

### Waste Management and Environmental Responsibility Waste disposal procedures

All solid ethidium bromide contaminated waste shall be disposed of into waste bins specifically designated for ethidium bromide waste. Examples of solid ethidium bromide waste material include gloves, pipette tips, paper towels, and electrophoretic gels.

Once the waste bin is full, the workplace supervisor is to dispose of the ethidium bromide contaminated waste via the university hazardous waste disposal system.

### Decontamination of Equipment

Equipment that needs to be decontaminated (for repair or change of location etc) must be placed in a mixture of one part bleach, one part soap and one part water. Let the equipment soak for a couple of hours and then wash and rinse equipment with copious amounts of water.

### Handling and Storage Requirements (refer to MSDS)

Store in a cool, dry place away from strong oxidizing agents.

Keep containers tightly closed when not in use.

Use with adequate ventilation.

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Avoid contact with eyes and skin.

Wash hands thoroughly after handling.

**Contingency Plan and Reporting**

All accidents and spills will require persons involved to fill out an "incident report" after the situation has been contained. **In case of critical injury or major spill Dial 88 and EOHSS ext 24352.**

**Accident response**

**General advice** Consult a physician. Present a copy of the MSDS with the patient to the doctor in attendance. Move out of dangerous area.

**If inhaled** If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

**In case of skin contact** Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed** Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**Spill clean up**

Wear PPEs required for EtBr.

Spills of ethidium bromide solutions should be absorbed and decontaminated with soap, bleach and water mixture (or by use of a EtBr spill kit). Avoid raising dust when cleaning up solid spills by mixing with water and then absorbing the solution.

All spill cleanup materials and absorbents should be disposed of in designated ethidium bromide waste bins. Removal of waste will be done via McMaster University Hazardous waste disposal system (see SOP on Hazardous waste disposal).

**References:**

Material Safety Data Sheets: Sigma Aldrich  
Risk Management Manual (RMM) McMaster University  
Occupational Health and Safety Act (OHSA)  
University of Guelph SOP on Ethidium Bromide  
Cameron Lab Protocols (2008)