Ethidium Bromide

Ethidium bromide, or EtBr, is commonly used as a non-radioactive marker for identifying and visualizing nucleic acid bands in electrophoresis and in other methods of gel-based nucleic acid separation. EtBr is a dark red, crystalline, non-volatile solid, moderately soluble in water, which fluoresces readily when exposed to ultraviolet light (UV). Its formula is 2,7-Diamino-10-ethyl-9-phenyl¬phenanthridium bromide, CAS# 1239-45-8. Although it is an effective analytical tool, its hazardous properties require special safe handling and disposal procedures.

Handling

EtBr is a potent mutagen and is moderately toxic after an acute exposure. EtBr can be absorbed through skin, so it is important to avoid any direct contact with the chemical. EtBr is an irritant to the skin, eyes, mouth and upper respiratory tract. It should be stored away from strong oxidizing agents in a cool, dry place and the container must be kept undamaged and tightly closed. Individuals using EtBr should follow these safety procedures:

- EtBr users should receive lab-specific safety training on its hazards.
- When handling EtBr, always wear a laboratory coat, nitrile gloves and chemical splash goggles.
- When working with an ultraviolet (UV) light source, be sure to wear proper skin and eye protection. Avoid exposing unprotected skin and eyes to intense UV sources. Wear a face shield if UV source is pointing upwards. When working with a UV source for a long period of time, wrap up lab coat sleeves with tape or other means where the wrist could be exposed.
- Perform work with EtBr on plastic backed benchtop paper…discard after experiment.

EtBr must appear on the laboratory's chemical inventory.

Pure EtBr (stock) should only be handled in a fume hood, with the user wearing protective equipment that includes a lab coat, closed-toe shoes, nitrile gloves and safety goggles (not just safety glasses). If possible, purchase EtBr stock solutions to avoid handling of the solid stock or consider an alternative stain. Minimize waste creation by reusing solutions containing EtBr, if possible.

To check for EtBr contamination of equipment or the work area, contact the Laboratory Safety Officer at 644-8916 or the Chemical Safety Officer at 644-7682.

Disposal

EtBr wastes are not regulated by the State of Florida or the U.S. EPA. The wastes are prudently managed by laboratory staff and EH&S to minimize human and environmental exposure. To that end, they are collected as hazardous waste in the laboratory and picked up by EH&S staff. Please follow the instructions listed in the following table when handling EtBr.

Ethidium Bromide Waste Disposal Procedures		
Waste Stream	**Description**	**Waste Disposal Procedure**
Aqueous Solutions	Typically contains very small concentrations of ethidium bromide. Normally <0.5 mg/L.	Dispose as hazardous waste. If filtration systems are used, the spent filter must be disposed as hazardous waste. (Containers provided by EH&S)

Stock Solutions	Typically contains higher concentrations of ethidium bromide. ≥ 10 mg/mL.	Dispose as hazardous waste in the original container.
Gels	Typically contains 3-5 mg/L of ethidium bromide.	Dispose in 2 -5-gallon plastic pails (provided by EHS).
Contaminated Debris	Material contaminated with ethidium bromide (e.g. waste from spills, filters, gloves, etc.)	Dispose in 2 -5-gallon plastic pails (provided by EHS).
Crystals and Powders	Concentrated or pure ethidium bromide.	Dispose as hazardous waste. Place in secondary container and call EHS for waste pickup.
Contact the Chemical Safety Office for additional information at 644-7682 or The Laboratory Safety Office at 644-8916.		

Additional Information and Resources

1. Hazards of UV light from transilluminators in the Biomedical laboratory