

Safe Handling Guide

Ethidium bromide

(3,8-Diamino-1-ethyl-6-phenylphenanthridinium bromide)
[1239-45-8]

Ethidium bromide (EtBr) is commonly used as a non-radioactive DNA stain to identify and visualize nucleic acid bands in electrophoresis and perform other methods of nucleic acid separation. EtBr is a dark red, crystalline, non-volatile powder that is moderately soluble in water. Solutions of EtBr fluoresces readily with a reddish-brown color when exposed to ultraviolet (UV) light. Although it is an effective tool for genomic research, its hazardous properties require special handling and disposal.

EtBr is a potent mutagen, highly toxic by inhalation and toxic after an acute ingestion. 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.

Some alternative stains have been found to be less mutagenic and less toxic than EtBr. If the toxicological data is lacking or unclear, alternative stains should be handled in the same way as EtBr. Some alternative stains are dissolved in dimethyl sulfoxide (DMSO). DMSO can readily penetrate skin along with organic compounds dissolved in it.

SIGNAL WORD: DANGER

HAZARD SIGNS



- Toxic if inhaled, swallowed or absorbed through skin
 - May cause carcinogenic or teratogenic effects
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PRECAUTIONS

Before starting work:

- Review manufacturer's [Safety Data Sheet](#) and additional chemical information.
- Ensure that a written experimental protocol including safety information is available.
- Be familiar with the [Western Emergency Response Guide](#) and the [Exposure Response and Spill Response Posters](#).
- Identify the location of the nearest eyewash and shower and verify that they are accessible.
- Clearly delineate and restrict use in EtBr-use areas.

During work:

- AVOID INHALATION! Perform all operations in a certified chemical fume hood, wet bench or other approved ventilated enclosure. When possible, work with premixed solutions or tablets to avoid inhalation exposure.
- AVOID CONTACT! Wear appropriate PPE including:
 - Lab coat worn over long pants covering to the ankles and closed-toed non-woven footwear
 - Chemical protective goggles
 - Wear a UV-protective face shield when viewing EtBr-stained material under UV light.
 - Doubled nitrile gloves are recommended and change outer gloves whenever contamination is suspected.
- EtBr should be added to molten agarose solutions only after the agarose has been allowed to cool to below 50°C (122°F) to prevent the possible release of EtBr in vapor.
- Use proper glove removal technique (without touching the outer glove surface) to avoid skin contact. Avoid cross-contamination of common items (door handles, light switches, hood sashes, keyboards, phones, keys, etc) with EtBr-contaminated gloves.

After completing the work:

- After removing gloves and any other PPE, wash hands and forearms thoroughly with soap and water before leaving the lab.
- Keep all containers tightly closed when not in use and during transport.
- Store EtBr solutions in the dark and the cold in a secondary container.
- Store away from strong oxidizing agents (e.g. nitric acid).
- Dispose of EtBr waste following WWU Hazardous Waste Procedures
 - Hazardous Waste Classification: Carcinogen/Toxic
 - Release of EtBr solutions into a sanitary sewer or sink drains is NOT permitted, however solutions may be treated, and the treated waste may be disposed of to the sewer
 - Collect solid EtBr-contaminated material in a plastic jar, bucket lined with a plastic bag or a thick double bag.
 - EtBr-containing solutions are disposed as follows:
 - Pass the solution through an activated charcoal filter into a vessel.
 - Add a Biotium Activated Charcoal Decontamination bag to the vessel and let stand for at least four hours with stirring or overnight without stirring.
 - Remove the pouch and charcoal filter and dispose of as hazardous waste.
 - The decontaminated liquid may be released to a sanitary sewer.
 - Clearly mark the container/bags with EHS Hazardous Waste Label.



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EMERGENCY PROCEDURES

FIRST AID

SKIN CONTACT

- In the event of skin exposure, remove contaminated clothing and immediately wash the affected area with soap and copious amounts of cool water for 15 minutes.
- Call 360-650-3911 or 911 for emergency assistance and provide SDS sheet to responders/physicians.

EYE CONTACT

- Using eyewash, flush eyes for 15 minutes while hold eyelid open and away from exposed eye. Remove contacts lenses.
- Call 360-650-3911 or 911 for emergency assistance.

INHALATION

- If dust or vapors are inhaled, immediately move to fresh air.
- Call 360-650-3911 or 911 for emergency assistance.

INGESTION

- Do not induce vomiting.
- Call 360-650-3911 or 911 for emergency assistance.

SPILL RESPONSE

- Alert others of the spill.
- Small spills can be cleaned by laboratory personnel who are aware of the hazards, trained in proper cleanup procedures and have access to proper PPE and cleanup equipment.
- Always wear appropriate PPE when cleaning up small spills.
- If the spill is powder, carefully collect the dry powder and then quickly wipe up residue with wet paper towels. Avoid raising dusts.
 - Decontaminate surfaces with soap and water.
- If the spill is liquid, absorb freestanding liquid with dry paper towels.
 - Decontaminate surfaces with soap and water.
- Contain and label the cleanup materials (e.g., "Laboratory debris contaminated with ethidium bromide"), and follow the EHS Hazardous Waste disposal process.
- Use a hand-held UV light in a darkened room to locate any remaining solution or stains, then clean area with strong detergent (e.g., tri-sodium phosphate). Repeat decontamination as necessary.
 - Users of the hand held lamps should be aware that their ability to detect small spills is not guaranteed. The ease of detection depends upon a variety of factors including the chemical composition of the sample, the wavelength of the UV lamp, and the intensity of the lamp. Use of a hand held UV lamp to detect traces of ethidium bromide may serve as an occasional check of laboratory practices, but it cannot substitute for good cleanliness and careful contamination control.

Contact EHS at 360-650-3064 during business hours or emergency services at either 360-650-3911 or 911 outside of business hours if you need Ethidium bromide spill assistance.