Standard Operating Procedure

**Ethidium Bromide (EtBr)**

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and   
3) SOP has been signed and dated by the PI and relevant lab personnel.*

Print a copy and insert into your   
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.   
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:**  Process Hazardous Chemical  Hazardous Class

**Purpose**

Ethidium bromide (EtBr) is a ‘Mutagen’. If not stored and handled properly, this can pose a serious threat to the health and safety of laboratory personnel, emergency responders and chemical waste handlers. Hence, it is important to follow safety protocols to handle this chemical.

Ethidium Bromide 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. Solutions of EtBr fluoresce 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 safe handling and disposal.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 1239-45-8

Class: Reproductive Toxin

Molecular Formula: C21H20BrN3

Form (physical state): powder

Color: Dark Red

Boiling point: Decomposes. (261°C or 501.8°F)

**Potential Hazards/Toxicity**

EtBr is a mutagen (may cause genetic damage) and is moderately toxic after an acute exposure.

* EtBr can be absorbed through skin, and will stain it purple.
* EtBr is an irritant to the skin, eyes, mouth, and upper respiratory tract.
* Some *alternative stains* are less mutagenic and less toxic than EtBr. If the toxicological data is lacking or unclear, handle the stain in the same way as EtBr.
* Some alternative stains are suspended in dimethyl sulfoxide (DMSO), which can increase skin absorption of organic compounds.

**Personal Protective Equipment (PPE)**

**Respiratory Protection**

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Handle with nitrile gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with ethidium bromide (EtBr).

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI approved safety glasses or chemical splash goggles at a minimum should be worn.

**Skin and Body Protection**

Lab Coat must be worn at all times. Full length pants. Closed toe shoes.

**Hygiene Measures**

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Engineering Controls**

Always handle ethidium bromide in a certified chemical fume hood. Use dry materials in a fume hood, or choose premixed solutions to avoid inhalation exposure.

**First Aid Procedures**

**If inhaled**

In the case of EtBr ingestion, obtain medical attention immediately. If EtBr dust is inhaled, move the victim to a source of fresh air.

**In case of skin contact**

In the event of skin exposure, remove contaminated clothing and immediately wash the affected area with soap and copious amounts of water for 15 minutes.

**In case of eye contact**

Immediately flush eyes with copious amounts of water for at least 15 minutes, preferably in an emergency eyewash.

**If swallowed**

In the case of EtBr ingestion, obtain medical attention immediately. If EtBr dust is inhaled, move the victim to a source of fresh air.

**Special Handling and Storage Requirements**

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. Persons operating gel system are to take added caution when using ultraviolet light to visualize 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.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Waste disposal procedures

1. All solid ethidium bromide contaminated waste shall be disposed of into waste containers specifically designated for ethidium bromide waste. Examples of solid ethidium bromide waste material include gloves, pipette tips, paper towels, and electrophoretic gels.
2. Once the waste container is full, dispose of according the hazardous waste guidelines.

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.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with ethidium bromide (EtBr), designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

I have read and understand the content of this SOP:

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| **Name** | **Signature** | **Date** |
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