



# Ethidium Bromide

## Chemical and Physical Properties

Ethidium bromide (EtBr) is a dark red, crystalline, odorless, non-volatile solid that is moderately soluble in water. It is a powerful mutagen widely used in biochemical research laboratories for visualizing nucleic acids. The compound forms fluorescent complexes by intercalation and these compounds are readily visible under ultraviolet (UV) light.

## Health Hazards

EtBr is a powerful mutagen and is considered highly toxic. Exposure routes of EtBr are inhalation, ingestion, and skin absorption.

**Acute effects:** primarily irritation of the mouth, upper respiratory tract, skin, and eyes. Ingestion can cause nausea, vomiting, and diarrhea. It may also cause methemoglobinemia, which is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis, rapid heart rate, unconsciousness, and possible death.

**Chronic effects:** ethidium bromide is strongly mutagenic and is regarded as a possible carcinogen and reproductive toxin.

## Exposure Limits

There is no exposure limit established for ethidium bromide. However, if airborne exposure is suspected, stop work and contact DEHS at (612) 626-6002 for assistance in conducting a work hazard assessment and hazard mitigation and monitoring protocol.

## Safe Work Practices

- Whenever possible, replace EtBr with a less hazardous product such as:
  - [SYBR Safe](#)
  - [GelRed and GelGreen](#)
  - [Midori Green](#)
- Always purchase the smallest amount needed.
- Use tablets or pre-made solutions to avoid using powdered EtBr. If EtBr powder must be used, it should always be handled in a chemical fume hood.
- Wear personal protective equipment (PPE) when handling any amount of EtBr. Equipment includes nitrile gloves, goggles, close-toed shoes, and a lab coat.
- Keep container tightly closed in a cool, dry area that is away from strong oxidizers.

## Accidental Exposure

**Inhalation:** Remove person to fresh air and seek immediate medical attention.

**Eyes:** Rinse eyes for 15 minutes in the eyewash. Seek medical attention.

**Skin contact:** If the chemical contacts exposed skin, flush with water continuously for at least 15 minutes. If the chemical contacts the clothed portion of the body, remove the contaminated clothes as quickly as possible. Bag contaminated clothing for appropriate disposal. Seek medical attention.

**Accidental Ingestion:** Do not induce vomiting. Seek emergency medical attention.

## Spill Response

Please review the [Chemical Spills Fact Sheet](#) for details regarding emergency and non-emergency spill cleanup. Review this fact sheet prior to work with chemicals in the lab and annually thereafter.

## Waste Disposal

Aqueous solutions of less than 10 mg/L EtBr may be disposed of in the sanitary sewer. Acrylamide and agarose gels containing less than 10 mg/L EtBr can be disposed of in the trash. Gels that are put in the trash should be put in double-lined trash bags and labeled as non-hazardous.

For solutions and gels containing higher concentrations, and for all other guidelines on ethidium bromide disposal, follow the directions in the [Hazardous Waste Guidelines](#).

## Additional Information

For general information regarding the safe use of ethidium bromide, please contact your Research Safety Partner, or call HSRM at (612) 626-6002.

If you have any concerns regarding the stability or testing of a chemical, contact the Hazardous Waste Program at (612) 624-1604.

## References

[Prudent Practices in the Laboratory](#)