# ETHIDIUM BROMIDE SOLUTIONS DETOXIFICATION
## SafetyNet #53

Ethidium bromide is a powerful mutagen commonly used in molecular biology research and generated in dilute aqueous solutions. In the Ames test, 90 µg of ethidium bromide is as mutagenic as the smoke from one cigarette. Due to ethidium bromide's mutagenic activity, EH&S recommends that a detoxification procedure for ethidium bromide be incorporated into experimental protocols. Spent or used ethidium bromide may be collected and detoxified in a batch, so long as the container is labeled "spent" or "used" ethidium bromide. One formerly recommended technique was oxidation of ethidium bromide by household bleach. Further research has shown that this treatment produces compounds that are more hazardous than the parent (Lunn and Sansone, 1987). **Oxidation with bleach is not an acceptable destruction technique and must not be used.**

There are numerous products and methods now available for the detoxification of ethidium bromide solutions. Methods include simple procedures such as destaining bags that are placed directly in the solution and dye removal cartridges that remove the dyes from the solutions. The following companies offer detoxification products:

| Company | Product | Phone |
|---|---|---|
| AMRESCO | Destaining Bags for Ethidium Bromide | 1-800-829-2805 (www.amresco-inc.com) |
| CLONTECH | BondEX Ethidium Detoxification System | 1-800-662-2566 (www.clontech.com/clontech) |

Because ethidium bromide is a powerful mutagen, the campus does not allow sewer disposal of any waste containing ethidium bromide at concentrations greater than 0.01mg/l. Solutions of ethidium bromide exceeding this concentration should either be treated using one of the above methods, or picked up by EH&S for disposal. Dried ethidium bromide gels and products used in decontamination must be disposed through EH&S. See SafetyNet #8, "Guidelines for Disposal of Chemical Waste" for more information.

Invitrogen has developed a substitute for ethidium bromide called SYBR Safe. It is a proprietary compound that some researchers have found works as well as ethidium bromide without the hazards and management requirements for ethidium bromide. SYBR Safe does not have to be disposed as hazardous waste. It has also been shown to be much less mutagenic than ethidium bromide. Contact Invitrogen at 1-800-955-6288 (http://probes.invitrogen.com).

For additional information, contact your EH&S Safety Advisor, EH&S at 752-1493 or ehsdesk@ucdavis.edu.

**References**

Joshua, H. 1986. Quantitative adsorption of ethidium bromide from aqueous solution by macroreticular resins. BioTechniques 4(3): 207-208. [Health Sciences Library]

Lunn, G., and E. Sansone. 1987. Ethidium bromide: destruction and decontamination of solutions. Analytical Biochemistry 162: 453-458. [Health Sciences Library]

Rev. 03/06
dmd