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INFO SHEET

Methods for the Destruction and Decontamination of Ethidium Bromide

◆ **Procedure** — Destruction of Aqueous Ethidium Bromide via Diazotization-Reduction.

- 1) Dilute the aqueous ethidium bromide solution^a such that the total concentration of ethidium bromide does not exceed 0.5 mg/mL.
- 2) For each 100 mL aliquot of thidium bromide solution, add 20 mL of freshly prepared 5.0% (vol/vol) aqueous hypophosphorous acid (H_3PO_2) and 12 mL of freshly prepared 0.5 M sodium nitrite ($NaNO_2$) solution. Stir the reaction mixture to homogeneity and allow to stand for 20 hours under ambient conditions.
- 3) Adjust the pH of the reaction mixture to ca. 7 with sodium bicarbonate.
- 4) Check the mixture for completeness of destruction^b and discard via sanitary sewer.

◆ **Procedure** — Destruction of Aqueous Ethidium Bromide via Oxidation.

- 1) Dilute the aqueous ethidium bromide solution^a such that the total concentration of ethidium bromide does not exceed 0.4 mg/mL.
- 2) Add hydrogen peroxide (H_2O_2) solution to the eithidium bromide solution such that the resultant ethidium bromide solution has a 1% (vol/vol) concentration of H_2O_2 .
- 3) Bubble air with 300-400 ppm ozone (O_3) as produced by an ozone generator through the reaction mixture at a rate of ca. 2 L/min for approximately 1 hour. The endpoint of the degradation process is indicated when the solution changes from red to faint yellow.
- 4) Check the mixture for completeness of destruction^b.
- 5) Quench residual ozone by adding enough aqueous sodium hydroxide (NaOH) to make the reaction mixture 1 M in NaOH.
- 6) Neutralize the subsequent reaction mixture with acid and discard via sanitary sewer.

◆ **Procedure** — Destruction of Ethidium Bromide in 2-Propanol Saturated with Cesium Chloride.

- 1) Dilute the ethidium bromide solution such that the total concentration of ethidium bromide does not exceed 1 mg/mL.
- 2) For each volume of ethidium bromide solution, add four volumes of a decontamination solution consisting of 4.2 grams of sodium nitrite ($NaNO_2$) and 20 mL of 50% strength hypophosphorous acid (H_3PO_2) in 300 mL of water.
- 3) Stir the mixture for 20 hours and subsequently neutralize with sodium bicarbonate.
- 4) Check the solution for completeness of destruction^b and discard via sanitary sewer.

(over)

◆ **Procedure** — Decontamination of Aqueous Ethidium Bromide Solutions.

- 1) Dilute the aqueous ethidium bromide solution^a such that the total concentration of ethidium bromide does not exceed 0.1 mg/mL.
- 2) For each 100 mL aliquot of ethidium bromide solution, add approximately 3.0 grams of Amberlite XAD-16 ion exchange resin* and stir the resulting mixture for 20 hours.
- 3) Filter the Amberlite resin from the aqueous solution and dispose of it per University chemical waste disposal procedures.
- 4) Check the aqueous solution for completeness of destruction^b and discard via sanitary sewer.

* Schleicher and Schuell has recently introduced S&S Extractor™ EtBr Waste Removal System, a one-step filtration method for the rapid decontamination of ethidium bromide solutions that is based on this decontamination procedure. For more information, call 1-800-245-4024.

◆ **Procedure** — Decontamination of Equipment Contaminated with Ethidium Bromide.

Wash the equipment once with a paper towel soaked in a decontamination solution consisting of 4.2 grams sodium nitrite (NaNO₂) and 20 mL of 50% strength hypophosphorous acid (H₃PO₂) in 300 mL of water. Then wash five times with wet paper towels, using a fresh towel each time. Soak all of the towels in the decontamination solution for 1 hour, check for completeness of decontamination, and discard accordingly. Neutralize the decontamination solution with sodium bicarbonate and discard via sanitary sewer. Note that the decontamination solution should be made just prior to application.

◆ **Procedure** — Decontamination of Ethidium Bromide in Isoamyl Alcohol (Isopentanol) and 1-Butanol

Waste ethidium bromide in these matrices should be collected and disposed of as hazardous waste through OEHS.

— **Notes** —

^a Actually, these methods apply if the ethidium bromide is dissolved in any of the following systems:

- ★ water
- ★ 4-morpholinepropanesulfonic acid (MOPS) buffer solution
- ★ tris (hydroxymethyl) aminomethane/borate/EDTA (TBE) buffer solution
- ★ 1 g/mL cesium chloride (CsCl) solution

^b Thin layer chromatography will provide a good estimate to the completeness of destruction and/or decontamination. A silica gel stationary phase with a (4:1:1) n-butanol:acetic acid:water mobile phase is suggested.

☞ If you have any questions concerning the procedures detailed here, feel free to contact Claire Palitza at 471-6399.

Procedures adapted from Destruction of Hazardous Chemicals in the Laboratory, 2nd Edition, by George Lunn and Eric B. Sansone.

For more information, call (512) 471-3511 or see our Web site at <http://www.utexas.edu/business/oehs>.

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