Ethidium bromide

Ethidium Bromide (EtBr), commonly used in research laboratories as a stain for the visualization of nucleic acids in electrophoresis gels, is a toxic chemical and a potent mutagen. When used in nucleic acid staining, ethidium bromide fluoresces a red-orange to pink color under ultraviolet light and with increased fluorescence when bound to double-stranded DNA. While it is not specifically regulated as a hazardous waste, the mutagenic properties may present health hazards and disposal concerns if it is not managed properly in the laboratory.
Preparing Agarose solution

Ethidium Bromide + Agarose soln.

Setting the gel

Gel (after half an hour)

The Equipment

The Gel, after electrophoresing
Solutions with a concentration of AT LEAST (>=) 0.1%

Any waste solution of 0.1% (e.g. 1mg/ml) or higher is Special Waste (including: unwanted 5mg/ml or 10mg/ml stock solutions).

Solutions with a concentration of less than (<) 0.1%

Waste solutions of less than 1mg/ml (including: e.g. working solutions of 5µg/ml or 10µg/ml or staining solutions of 20µg/ml) are not Special Waste however, they are potentially still a Health & Safety risk. This type of waste solution must be decontaminated prior to disposal to drain.

Gels with a concentration of less than (<) 0.1%

Normal gels contain far less than 0.1% (1mg/ml) Ethidium Bromide and are therefore not Special Waste. Due to a small but potential Health & Safety risk, these gels must be disposed of via the Clinical Waste stream.
Gels...
Liquids

Fisher Scientific, Schleicher and Schuell, or VWR.
Ethidium Bromide Destaining Tea Bags

1. Green Bag
2. EtBr waste solution
3. Stir overnight at room temperature
4. Hazardous waste disposal
5. Decant clear liquid
Transporting Biological Materials

Use secondary containers when moving biological materials from one room or building to another.

A secondary container must be leak-proof, lidded, and labeled with biohazard stickers.
GUIDE TO INFECTION PREVENTION FOR OUTPATIENT SETTINGS:
Minimum Expectations for Safe Care

Infection control standard precautions in health care

Background

Standard precautions are meant to reduce the risk of transmission of bloodborne and other pathogens from both recognized and unrecognized sources. They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients.

Hand hygiene is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with healthcare. In addition to hand hygiene, the use of personal protective equipment should be guided by risk assessment and the extent of contact anticipated with blood and body fluids, or pathogens.

In addition to practices carried out by health workers when providing care, all individuals (including patients and visitors) should comply with infection control practices in health-care settings. The control of spread of pathogens from the source is key to avoid transmission. Among source control measures, respiratory hygiene/cough etiquette, developed during the severe acute respiratory syndrome (SARS) outbreak, is now considered as part of standard precautions.

Worldwide escalation of the use of standard precautions would reduce unnecessary risks associated with health care. Promotion of an institutional safety climate helps to improve conformity with recommended measures and thus subsequent risk reduction. Provision of adequate staff and supplies, together with leadership and education of health workers, patients, and visitors, is critical for an enhanced safety climate in health-care settings.

Checklist

Health policy

- Promote a safety climate.
- Develop policies which facilitate the implementation of infection control measures.

Hand hygiene

- Perform hand hygiene by means of hand rubbing or hand washing (see overleaf for detailed indications).
- Hands should always be washed with soap and water if hands are visibly soiled, or exposure to spore-forming organisms is proven or strongly suspected, or after using the restroom. For other indications, if resources permit, perform hand rubbing with an alcohol-based preparation.
- Ensure availability of hand-washing facilities with clean running water.
- Ensure availability of hand hygiene products (clean water, soap, single use clean towels, alcohol-based hand rub). Alcohol-based hand rub should ideally be available at the point of care.

Personal protective equipment (PPE)

- ASSESS THE RISK of exposure to body substances or contaminated surfaces BEFORE any health-care activity. Make this a routine!
- Select PPE based on the assessment of risk:
  - clean non-sterile gloves.
  - clean, non-sterile fluid-resistant gown.
  - mask and eye protection or a face shield.

Respiratory hygiene and cough etiquette

- Education of health workers, patients and visitors.
- Use of source control measures.
- Hand hygiene after contact with respiratory secretions.
- Spatial separation of persons with acute febrile respiratory symptoms.

Important advice

- Promotion of a safety climate is a cornerstone of prevention of transmission of pathogens in health care.
- Standard precautions should be the minimum level of precautions used when providing care for all patients.
- Risk assessment is critical. Assess all health-care activities to determine the personal protection that is indicated.
- Implement source control measures for all persons with respiratory symptoms through promotion of respiratory hygiene and cough etiquette.

http://www.who.int/csr/resources/publications/4EPR_AM2.pdf
Health-care facility recommendations for standard precautions

KEY ELEMENTS AT A GLANCE

1. Hand hygiene
   - Summary technique:
     - Hand washing (40–60 sec): wet hands and apply soap; rub all surfaces; rinse hands and dry thoroughly with a single use towel; use towel to turn off faucet.
     - Hand rubbing (20–30 sec): apply enough product to cover all areas of the hands; rub hands until dry.
   - Summary indications:
     - Before and after any direct patient contact and between patients, whether or not gloves are worn.
     - Immediately after gloves are removed.
     - Before handling an invasive device.
     - After touching body fluids, secretions, excretions, non-intact skin, and contaminated items, even if gloves are worn.
     - During patient care, when moving from a contaminated to a clean body site of the patient.
     - After contact with innominate objects in the immediate vicinity of the patient.

2. Gloves
   - Wear when touching blood, body fluids, secretions, excretions, mucus membranes, or intact skin.
   - Change between tasks and procedures or on the same patient after contact with potentially infectious material.
   - Remove after use, before touching non-contaminated items and surfaces, and before going to another patient.
   - Perform hand hygiene immediately after removal.

3. Facial protection (eyes, nose, and mouth)
   - Wear a surgical or procedure mask and eye protection (goggles) to protect mucous membranes of the eyes, nose, and mouth.
   - During activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

4. Gown
   - Wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.
   - Remove soiled gown as soon as possible, and perform hand hygiene.

5. Prevention of needle stick injuries
   - Use care when:
     - Handling needles, scalpels, and other sharp instruments or devices.
     - Cleaning used instruments.
     - Disposing of used needles.

6. Respiratory hygiene and cough etiquette
   - Persons with respiratory symptoms should apply source control measures:
     - Cover their nose and mouth when coughing/sneezing with tissue or mask, dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.
   - Health care facilities should:
     - Place acute febrile respiratory symptomatic patients at least 1 meter (3 feet) away from others in common waiting areas if possible.
     - Post visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practice respiratory hygiene/cough etiquette.
     - Consider making hand hygiene resources, tissues, and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses.

7. Environmental cleaning
   - Use adequate procedures for the routine cleaning and disinfection of environmental and other frequently touched surfaces.

8. Linens
   - Handle, transport, and process used linen in a manner which:
     - Prevents skin and mucous membrane exposures and contamination of clothing.
     - Avoids transfer of pathogens to other patients or the environment.

9. Waste disposal
   - Ensure safe waste management.
   - Treat waste contaminated with blood, body fluids, secretions, and excretions as clinical waste, in accordance with local regulations.
   - Human and laboratory waste that is directly associated with specimen processing should also be treated as clinical waste.
   - Discard single use items properly.

10. Patient care equipment
    - Handle equipment soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of pathogens to other patients or the environment.
    - Clean, disinfect, and reprocess reusable equipment appropriately before use with another patient.

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1 For more details, see: WHO Guidelines on Hand Hygiene in Health Care (Advanced draft), at: http://www.who.int/patientsafety/informationหมวด/QIH/index.html.

2 The SIRI Alliance at: http://www.who.int/injection.safetyRegimens
If you are really interested in reading about fixatives and how they work there is a chapter devoted to this in the book by G. Griffiths. The ref. is "Fine Structure Immunocytochemistry" 1993 published by Springer Verlag, Heidel

Subject: Fixative Quality Control
To members interested in fixatives, formaldehyde solution in particular.
Here are some additional informations about storage of commercial formaldehyde.

The principal changes which may take place in formaldehyde on storage are as follows (listed in their order of importance from a practical standpoint):
Formaldehyde/ Paraformaldehyde

(1) Polymerisation and precipitation of polymer.

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The changes are detrimental to product quality but may be avoided or kept at a minimum by maintenance of proper storage conditions. With optimum conditions of storage, commercial formaldehyde will remain unimpaired for long periods of time. In general, proper storage involves avoidance of temperature extremes and the use of storage in glass bottles, inert to corrosion by the mildly acidic solution. Low temperature favor polymer precipitation, high temperatures accelerate the reaction leading to chemical loss of formaldehyde. At improper storage temperatures, a formaldehyde solution gradually becomes cloudy and eventually solid hydrated polymer separates as a precipitate.

-- * Sverker Enestr*,
Training on Medical Waste Management

in Collaboration with
Al-Essa Medical & Scientific Equipment Co. W.L.L

Management of Medical Waste in the Facility

Kuwait University
Health Science Center
29 January – 1 February, 2012
### Categories of health-care waste

<table>
<thead>
<tr>
<th>Waste category</th>
<th>Description and examples</th>
</tr>
</thead>
</table>
| Infectious waste                     | Waste suspected to contain pathogens  
  e.g. laboratory cultures; waste from isolation wards; tissues (swabs), materials, or equipment that have been in contact with infected patients; excreta |
| Pathological waste                   | Human tissues or fluids  
  e.g. body parts; blood and other body fluids; fetuses                                                                                               |
| Sharps                               | Sharp waste  
  e.g. needles; infusion sets; scalpels; knives; blades; broken glass                                                                                     |
| Pharmaceutical waste                 | Waste containing pharmaceuticals  
  e.g. pharmaceuticals that are expired or no longer needed; items contaminated by or containing pharmaceuticals (bottles, boxes) |
| Genotoxic waste                      | Waste containing substances with genotoxic properties  
  e.g. waste containing cytostatic drugs (often used in cancer therapy); genotoxic chemicals                                                                        |
| Chemical waste                       | Waste containing chemical substances  
  e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents                                                                  |
| Wastes with high content of heavy metals | Batteries; broken thermometers; blood-pressure gauges; etc.                                                                                               |
| Pressurized containers               | Gas cylinders; gas cartridges; aerosol cans                                                                                                                |
| Radioactive waste                    | Waste containing radioactive substances  
  e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages, or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources |
## WHO Classification - Color Code

### Waste Type

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<th>Waste Type</th>
<th>WHO Color Code</th>
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<tr>
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<td>Contaminated Linen</td>
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<tr>
<td>Specimen Transport Bag (Self-sealing)</td>
<td>Clear</td>
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<tr>
<td>Specimen Transport Bag (Heat Sealable)</td>
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Is this what it really looks like???

It is all about Color Coding!!!!!
LAB COATS & SAFETY GLASSES REQUIRED

CAUTION BIOLOGICAL HAZARD

NO SMOKING, EATING OR DRINKING

AUTHORIZED PERSONNEL ONLY
Not always Perfect!!
Infectious Waste
Infectious Waste

Autoclave bag
Sharps Containers
Changes to ordering codes for sharps containers from Daniels Healthcare

Old ordering codes  Orange to orange, black to purple

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<th>NHS Supply Chain code</th>
<th>Daniels code</th>
<th>Product name</th>
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Safe Management of Healthcare Waste - Which option will you choose?
Pathological Waste
Cytotoxic / Genotoxic Waste
Chemical Waste - Organics
Chemical Waste - Flammables
Chemical Waste Inorganics
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-- * Sverker Enestr*,
Batteries
Glass/ Broken Glass
Amalgam Container
HAZARDOUS HEALTHCARE WASTE / MEDICAL WASTE FLOWCHART

- INFECTIONOUS WASTE
- SHARPS
- PATHOLOGICAL WASTE
- LANDFILL AREA
CHEMICAL WASTE FLOWCHART

CHEMICAL STREAM

ORGANIC WASTE

FLAMABLE

INORGANIC WASTE

LANDFILL AREA