

Policy on Suitable Methods of Liquid Decontamination and Disposal

I. Purpose

To satisfy a Massachusetts regulation on the proper disposal of biologically contaminated liquid waste.

II. Applicability

In July 2008 the Massachusetts Department of Public Health required certain changes in the disposal of biological waste. One aspect of the new regulations was the requirement that the local Institutional Biosafety Committee approve the method of liquid effluent disinfection. This policy applies to all institutions that generate biological waste and use the Committee on Microbiological Safety (COMS) as their IBC of record.

III. Definitions

Medical or Biological Waste: Waste that because of its characteristics may pose a potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. CRM as identified in Section XX and defined as medical or biological waste, and have been adapted from the requirements of 105 CMR 480.000:

IV. Implementation Procedures

A. General Information

- 1) An EPA-approved disinfectant must be used, with demonstrated efficacy for the CRM in use, according to the manufacturer's label.
- 2) . The autoclave should be tested using biological and chemical indicators used periodically and approved by the Biosafety Officer.
- 3) An on-site treatment log is not required for liquid waste for drain disposal given that the COMS approves the liquid waste policy and an EPA-approved disinfectant with demonstrated efficacy for the CRM is used. Alternative methods for disinfection of liquid waste should be approved by COMS prior to instituting the method in the laboratory.

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B. Procedure

Two Options are provided for Disinfection of Liquid Waste As Follows:

Option 1: Bleach disinfection

1) Effectiveness and EPA Approval: Bleach, a sodium hypochlorite solution (NaOCl), is a broad-spectrum disinfectant that is an effective disinfectant for enveloped viruses (e.g. HIV, HBV, HSV), vegetative bacteria (e.g. Pseudomonas, Staphylococcus, and Salmonella), fungi (e.g. Candida), mycobacterium (e.g. M. tuberculosis and M. bovis), and non-enveloped viruses (e.g. Adenovirus and Parvovirus). E.g. Austin A1 mercury-free bleach and Clorox bleach EPA registration numbers are 1672-20004 and 5813-50, respectively.

2) Recommended Personal Protective Equipment:

- a. Lab coat
- b. Latex or nitrile gloves
- c. Safety glasses

3) Concentration: The appropriate concentration of sodium hypochlorite for disinfecting liquid BL1 and BL2 waste, e.g. supernatants from cell culture, is 5000 ppm, approximately 0.5%. Household bleach is 5.2 - 6.1 % sodium hypochlorite; therefore a 1:10 (v/v) dilution of bleach to liquid biological waste is appropriate.

4) Procedure: All liquid waste should be collected in a final concentration of 10% bleach with a contact time of at least 20 minutes prior to disposal.

After 20 minutes of contact, disinfected liquid waste is disposed of per institutional policy.

5) Stability and Storage: Bleach should be stored according to manufacturer instructions, to maintain stability, typically between 50 and 70°F. According to Clorox, undiluted household bleach has a shelf life of six months to one year from the date of manufacture, after which bleach degrades at a rate of 20% each year until totally degraded to salt and water. Some manufacturer-prepared 1:10 bleach solutions, COMS Policy Manual- Use of Sharps 70 e.g., Bleach-Rite, contain a stabilizer that increases the shelf life to approximately 18 months.

6) Documentation:

An on-site treatment log and validation is not required for chemical disinfection of BL1 and BL2 liquid waste for drain disposal.

Option 2: Autoclave

1) Effectiveness: Autoclaving is an effective means of sterilizing BL1 and BL2 liquid waste. Sterilization refers to the complete killing of all living organisms, including spores. The methods which rely on heat must be evaluated for each load or cycle by using a recording thermometer, thermocouple, parametric monitoring device, thermal indicator strip or by an equivalent method approved in writing by MA DPH. The method must be qualitatively validated quarterly using a method of 1×10^4 minimum challenge population of a bacterial organism that is most resistant to any aspect of the treatment technology guidelines established by MA DPH (MA DPH 105 CMR 480.150).

2) Recommended Personal Protective Equipment:

- Lab coat
- Latex or nitrile gloves
- Heat resistant gloves
- Safety glasses

3) Procedure:

- Collect BL1 and BL2 liquid waste in autoclavable, leak proof containers that are never more than $\frac{3}{4}$ full.
- Place containers in an autoclavable tray in the autoclave. LOOSEN each container top and place indicator tape on each top.
- Adequate cycle time varies depending on load, type of autoclave, and secondary containment. Every autoclave facility needs to determine optimal conditions (Time, Temperature, and Pressure) for their autoclave for waste. Typical cycle times for sterilizing liquid waste range from 45 to 90 minutes at 250°F (121°C) and 15 psi.
- If allowed, pour sterilized liquid waste down the sink and flush the drain with water, or follow institutional policy.

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4) Documentation: An on-site treatment log and validation must record the autoclave cycles as well as quarterly validation of the waste. Records must be retained for 3 years.

5) Laboratory/Containment

V. Policy Authority

The Office of Biological Safety of the Harvard Medical School is responsible for supporting the Committee on Microbiological Safety. This includes preparation and revising of the COMS Policy Manual for committee review and approval. The Committee on Microbiological Safety (COMS) authorizes this policy.

VI. Related Policies

Suitable Methods of Solid Biowaste Decontamination and Disposal

Suitable Methods for Use of Sharps

VII. References

[105 CMR 480.000 Minimum Requirements for the Management of Medical or Biological Waste \(State Sanitary Code Chapter VIII\), effective July 11, 2008.](#)