

Appendix D: Bleach Disinfection of Biosafety Level 1 and 2 Liquid Waste for Drain Disposal

Bleach Disinfection of Biosafety Level 1 and 2 Liquid Waste for Drain Disposal

Effectiveness: 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)
- Non-enveloped viruses (e.g., Adenovirus and Parvovirus)

Personal Protective Equipment (PPE) (Refer to the disinfectants Safety Data Sheet (SDS) for additional PPE and safe handling and use information)

- Laboratory coat
- Nitrile gloves
- Safety Goggles

Concentration

- The appropriate concentration of sodium hypochlorite for disinfecting liquid BSL1 and BSL2 waste 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.

Contact Time

- An appropriate contact time of sodium hypochlorite with liquid waste is 30 minutes.

Drain Disposal Assessment

- Assess and verify chemical constituents meet drain disposal requirements. Refer to specific Drain Disposal Procedure for additional information (See Below).
 - **Acceptable:** If acceptable for drain disposal and after 30 minutes of contact time, disinfected liquid waste is poured down the sink and flushed with copious amounts of water.
 - **Not Acceptable:** If not acceptable, collect and manage waste as chemical waste and provide to EHS for disposal.

Stability and Storage

- Bleach must be stored between 50°F 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 this time, bleach degrades at a rate of 20% each year, until completely degraded to salt and water. A 1:10 bleach solution has a shelf life of 1 month. Some manufacturer-prepared 1:10 bleach solutions, e.g., Bleach-Rite, contain a stabilizer that increases the shelf life to approximately 18 months. Discount brands of bleach may have lower concentrations of sodium hypochlorite and "colour safe" bleach contains NO sodium hypochlorite (hydrogen peroxide), these products should NOT be used for the disinfection of biological waste.

Procedure for disinfecting and disposing of liquid waste down the drain

1. Work in a well-ventilated area.
2. Label an appropriate container with the type of liquid (Cell Culture, Bacterial, Fungal, Viral, etc.) to be disinfected, your initials, and the date
 - e.g. "Cell Culture Liquid with 10% Bleach - JP - 11/06/2019"
3. Collect the liquid waste so that does not exceed $\frac{3}{4}$ of the container's volume.
4. Add enough bleach to create a 10% solution (1:10v/v).
5. Let waste sit for 30 minutes. An open container of waste **may not** be left unattended.
6. Dispose of all liquid in the container down the sink drain and flush with a volume of water that is 15-20 times the amount of the liquid waste.
7. If the container will be used to collect additional waste, the labeled container must be secured with a cap and stored under a Biological Safety hood.

DRAIN DISPOSAL REQUIREMENTS

Disinfected biological liquid to be disposed via a drain must:

1. Meet the following characteristics:

- Contains no radioactive materials.
- Contains no biological hazards
- Contains no hazardous waste ([Hazardous Waste Reference Guide](#))
- Liquid not exceeding 5 gallons (19 liters)
- Contains less than 10% solids or viscous substances which are insoluble in water
- Contains less than 50 mg/L (ppm) oils and greases
- Have a pH greater than 5.0 and less than 11.0 or not have any other corrosive property likely to cause damage to structures or equipment of the sewerage

2. Discharge to the sewer via a laboratory sink drain only

3. Flush with copious amounts of water (15-20 times the original volume)

4. Allow the previous disinfected biological liquid to be completely flushed prior to discharging the next disinfected biological waste container.