

Cytotoxic Substances – Waste Management

1. SCOPE

This document describes the procedures to be followed to safely dispose of cytotoxic waste.

2. PURPOSE

Any spillage of a cytotoxic substance must be immediately and effectively managed in order to minimize the contamination of the environment and reduce the health risks to personnel. A small spill is defined as involving less than 5 ml or 5 g of a cytotoxic substance; a large spill involves more than 5 ml or 5 g of a cytotoxic substance.

3. RESPONSIBILITY

Managing the cytotoxic waste is a shared responsibility between the generators of the waste, the UBC Environmental Services Facility (ESF) or local waste management department if at an off UBC campus location.

4. TRAINING REQUIRED

The following courses and/or resources should be used for training purposes:

[Chemical Safety Training](#)

[Hazardous Waste Management Training](#)

[Exposure Control Plan for Cytotoxic Substances](#)

Hazardous Waste Disposal [Guide](#) and [Procedures](#)

5. MATERIALS/EQUIPMENT

Adequate, leak-proof waste disposal containers, including sharps and solids containers, and distinctive plastic waste bags must be available in every area where cytotoxic drugs are prepared, administered or stored, and all cytotoxic drug-related waste must be placed into these containers or bags.

6. HAZARDS

Cytotoxic substances are defined as any chemical substance confirmed or suspected of having a genotoxic, mutagenic or teratogenic effect in humans. This information can usually be obtained from the SDS of the chemical (sections 2 and 11).

Many chemical compounds can fall under the category of cytotoxic compounds; consult the specific [Exposure Control Plan](#) for hazard identification and more information regarding the health hazards associated with exposure to cytotoxic compounds.

Hazardous waste may include:

- Unused cytotoxic substances
- Contamination waste from preparation processes
- Used and contaminated sharps and syringes, ampoules and vials

- Packaging that has been in contact with cytotoxic substances
- Contaminated personal protective equipment (PPE)
- Animal bedding contaminated with animal excreta (during the precautionary period)

7. ANIMAL BEDDING

Animals treated with cytotoxic substances could excrete cytotoxic substances and/or metabolites during what is called “the precautionary period”. Depending on the actual substance, the precautionary period can be from 24 hours to several days.

Note: *The procedure below only applies to animal bedding waste disposed through UBC’s Environmental Services Facility (ESF). Off campus UBC locations might need to follow the protocol established by the local authority.*

According to the [Hazardous Waste Disposal Procedure](#) for bedding contaminated with toxic waste, the level of contamination must be first determined by following the steps below:

- Find the chemical’s LD₅₀ value in the (M)SDS
- Estimate the total weight of the chemicals in the bedding/chemical mixture
- Estimate the total weight of the bedding batch to be disposed
- Calculate the LD₅₀ value of the mixture using the following equation:

$$LD_{50}(\text{mixture}) = \frac{LD_{50}(\text{chemical})}{\text{mass fraction of chemical}}$$

- If the resulted LD₅₀ > 1000 mg/kg the mixture can be disposed as solid waste
- If the resulted LD₅₀ ≤ 1000 mg/kg the mixture should be treated for disposal as toxic chemical waste

The calculations above only consider disposal of animal bedding contaminated with toxic chemical substances. Different disposal procedures will apply for bedding contaminated with biological toxins and/or risk group 1 or 2 agents.

8. HANDLING OF CYTOTOXIC WASTE

The [Exposure Control Plan for Cytotoxic Substances](#) provides information on appropriate personal protective equipment (PPE) that must be used when handling cytotoxic substances, in addition to other control measures. The minimum PPE includes gloves, gown/lab coat and eye protection. Similar PPE is also recommended when handling cytotoxic waste. Remember that waste containers must be considered contaminated as well and only handled with gloves.

9. CYTOTOXIC WASTE CONTAINMENT

9.1. Sharps

Used and/or contaminated sharps, syringes, ampules and small vials must be placed in a sharp container. A cytotoxic sticker must be placed on the container, in addition to the biohazard symbol. At some off-campus locations, the use of red sharps containers for cytotoxic waste is mandatory. Always follow the requirements of the local authority. On campus, both yellow and red sharps containers can be used for disposing of cytotoxic sharps waste (see difference in tag information).



9.2. Contaminated solid waste (general)

Contaminated PPE (e.g. disposable gloves, gowns), contaminated adsorbent pads, materials used to clean spills and other solid waste from preparation processes must be placed in a red cytotoxic waste container. These containers (see pictures below) or similar ones are generally available at UBC off campus research locations (hospital sites). Where they are not available, a plastic garbage container can be used for this purpose. The container must be fitted with a thick clear garbage bag and be labelled “Cytotoxic waste”.



9.3. Contaminated solid waste (animal bedding) – see 7 above

Contaminated animal bedding (LD_{50} for mixture ≤ 1000 mg/kg) must be stored in the same manner as the general contaminated solid waste.

10. INTERNAL MOVEMENT OF CYTOTOXIC WASTE

Internal movement of cytotoxic waste is the movement of containerized cytotoxic waste from the point of generation to the designated storage, treatment or collection point. The following control measures should be implemented to ensure cytotoxic waste is appropriately moved within the facility.

- Do not overfill cytotoxic waste containers
- Locate cytotoxic waste collection bins as close practicable to the site of generation and to transport corridors
- Use dedicated, rigid-walled, puncture-resistant containers such as wheelie bins, handcarts and trolleys to move cytotoxic waste within the facility
- The above-mentioned equipment must be appropriately labeled
- Avoid movement of cytotoxic waste through public areas; schedule collection of waste outside peak activity hours
- Personnel transporting cytotoxic waste must be trained in handling cytotoxic substances, including managing a cytotoxic spill

11. EMERGENCY PROCEDURES

Spill clean-up procedures for spills inside or outside of a biological safety cabinet are covered in the document [Cytotoxic Spill Clean Up](#). The same document addresses steps that need to be followed in case of personal contamination with a cytotoxic substance

12. DOCUMENT INFORMATION

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