STANDARD OPERATING PROCEDURE

Use this form to document the Health and Safety information associated with the procedure.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Procedure Title** | | Freeze Dryer Sample Preparation | | | | | | |
|  | |  | | | | | | |
| **Dept** | ABE | |  | **Bldg/Rm** | 4210 Sukup |  | **Supervisor** | Adina Howe |

**Procedure Overview** (brief description of the project)

To guide in the preferred method of sample preparation before freeze drying.

**Health and safety information for materials used (**briefly describe the hazards associated with the materials and/or equipment **OR** document your hazard assessment in Section I)

Working with objects at extremely cold temperatures carries the risk of frostbite.

**Hazard Control Measures**

Please select which type of lab coat, eye protection, and hand protection will be used (Lab coat, eye and hand protection, and closed toe/heel shoes must be selected as required by Section D of the ISU Laboratory Safety Manual.)

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|  | Latex gloves |  | Insulated gloves |  | Face shield |  | Respirator |
|  | Nitrile gloves |  | Safety glasses |  | Lab coat |  | Fume hood |
|  | Neoprene gloves |  | Vented goggles |  | Apron |  | Biosafety cabinet |
|  | Vinyl gloves |  | Splash goggles |  | Dust mask |  | Glove box |
|  | Fully enclosed shoes | | |  | Flame resistant lab coat | | |

***Other Control Measures***

**Methods** (Include step by step instructions detailing the process or attach this document to an existing method.)

1. Talk to the operator about your samples and schedule a run.

a. Be prepared to talk about:

i. The contents of the sample,

ii. The total number to be lyophilized,

iii. The volume of the aliquots,

iv. Downstream applications of your lyophilized sample.

b. This information is helpful to the operator.

2. Add your sample to the tube to be used while freeze drying.

a. Conical (aka centrifuge/Falcon) tubes are the most popular but other types may be alright, check with the operator.

b. Put no more than 7.5 mL liquid in a 15 mL conical tube or 25 mL liquid in a 50 mL conical tube.

i. Sample volume as 1/3 – 1/2 of container volume is recommended.

ii. Less than 1/3 is okay but do not exceed 1/2 of container volume.

3. Freeze samples on a slant.

a. Cap and put in the -20°C freezer at the most extreme slant possible to maximize surface area while maintaining the opening.

i. It is okay if part of it touches the lid, but it is best to maintain as much of the opening as possible.

ii. It is difficult to open the tube it too much has frozen to the lid.

b. Once the samples have frozen, place upright at -80°C on the center shelf of freezer C.

c. The two-step freezing process produces larger ice crystals which make the drying process more efficient.

4. Notify the operator when the samples are moved to the -80°C freezer.

5. Wait patiently, the process can take a several days depending on the volume of your samples and operator or machine availability.

6. Collect your samples when told they are done.

**Waste Disposal Procedures**

N/A

**First Aid Procedures**

**For frostbite**: Gently rewarm frostbitten areas: Soak frostbitten fingers, toes, or other extremities in warm water — 105 to 110 F (about 40 to 43 C). If a thermometer isn't available, test the water by placing an uninjured hand or elbow in it — it should feel very warm, not hot. Soak for 20 to 30 minutes or until the skin becomes its normal color or loses its numbness. For the face or ears, apply a warm, wet washcloth. Don't rewarm frostbitten skin with direct heat, such as a stove, heat lamp, fireplace, or heating pad. This can cause burns. (Source: Mayo Clinic)

**Spill/Release Containment, Decontamination, and Clean Up Procedures**

N/A

**Using Substances Requiring Special Procedures?** No  Yes

(If Yes; identify authorized personnel, designate a use area and specify specialized safety precautions here. Refer to Section B in the ISU Laboratory Safety Manual for details.)

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| **Written By** |  |  | **Date** |  |
|  |  |  |  |  |
| **Approved By** |  |  | **Date** |  |

(PI or Lab Supervisor)

1. **HAZARD ASSESSMENT**

Use the hierarchy of controls to document the hazards and the corresponding control measure(s) involved in each step of the procedure.

Consider *elimination or substitution* of hazards, if possible.

***Engineering Control(s):*** items used to isolate the hazard from the user (i.e. fume hood, biosafety cabinet).

***Administrative Control(s****):* policies/programs to limit the exposure to the hazard (i.e. authorizations, designated areas, time restrictions, training).

***Required PPE***: indicate PPE including specific material requirements if applicable (i.e. flame resistant lab coat, type of respirator or cartridge).

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| **Task** | **Hazard** | **Engineering Control(s)** | **Administrative Control(s)** | **Required PPE** |
| Working with frozen samples | Frostbite from contact with frozen samples or flask | Thermal gloves | Training | Insulated gloves |
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1. **TRAINING RECORD**

Use the following table to record the training associated with this Standard Operating Procedure.

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| --- | --- | --- | --- |
| **Print Name** | **Signature** | **Trained By** | **Date** |
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