**Standard Operating Procedure for Hazardous Chemicals Use**

**Chemical name: Dimethyl Sulfoxide**

**Synonyms: DMSO**

**CAS Number: 67-68-5**

**Principal Investigator(s)       PI e-mail     @uwm.edu**

For chemical processes, return completed form sections 1-8 and Appendix to the Chemical Safety Committee (CSC) / US&A ([sop-approval@uwm.edu](mailto:sop-approval@uwm.edu))

If this is for IACUC Hazardous Chemical procedure, return completed sections 1-9 and Appendix to the Animal Care program ([acp@uwm.edu](mailto:acp@uwm.edu))

**Information on Chemical Purchasing Procedures are located on our website:** [**University Safety and Assurances Chemical Purchasing Procedure**](https://uwm.edu/safety-health/chemical-purchasing-process/)

1. **Submit a copy of the Safety Data Sheet(s) [SDS] with this form.**

**The SDS is stored in the room at this location:**

1. **Chemical Concentration (as purchased)** **and Health and Physical Hazards:**

|  |  |
| --- | --- |
| **Concentration. As purchased** | **100%** |
| **List all health and Physical Hazards** | **Found on the SDS section 2**  **Warning! DMSO readily penetrates skin and may carry other dissolved chemicals into the body. May cause eye, skin, and respiratory tract irritation. Hygroscopic (absorbs moisture from the air).**  **Target Organs: Central nervous system, eyes, skin.**  **Eye: May cause mild eye irritation. Two drops of >50% DMSO in the rabbit eye caused a temporary burning sensation and vasodilatation, but concentrations of <50% exhibited no effect. DMSO produced slight erythema of the conjunctiva over the first 3 days of the study, and a low level of key scoring was also recorded for chemosis, iritis and corneal opacity. The degree of eye injury described by these key scores would not result in DMSO being labelled as an eye irritant according to EEC classification. (ECB - Elf Aquitaine)**  **Skin: DMSO readily penetrates skin and may significantly enhance the absorption of numerous chemicals. Increased absorption of these other chemicals could lead to their increased toxicity. Skin sensitization was not observed with DMSO in human volunteers or in guinea pigs. Non-immunological whealing and flaring have been observed in animals and humans following short-term contact. Skin absorption of DMSO may result in a garlic-like breath and body odor, and CNS effects such as headache, nausea and dizziness. Undiluted DMSO applied topically to mice twice a week for 30 weeks failed to produce dermal injury. (EBC - Elf Aquitaine) Skin sensitization has not been reported in hundreds of human volunteers participating in a DMSO clinical trial. DMSO's ability to increase the absorption of other chemicals is its most significant occupational hazard.**  **Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system effects. May cause garlic smell on the breath and body.**  **Inhalation: Material has a very low vapor pressure at room temperature, so inhalation exposures are not expected unless material is heated or misted.**  **Chronic: Long-term skin application of 80-90% DMSO has produced CNS effects (such as fatigue, nausea, vomiting, sedation, dizziness and headache), and dermatitis (such as redness, dryness and scaling) in volunteers. A garlic-like breath odor has been noted.** |
| **Known Incompatibilities** | **Strong oxidizing agents, strong acids, strong bases, acid chlorides.** |
| **Hazardous Decomposition Products** | **Carbon monoxide, oxides of sulfur, carbon dioxide, formaldehyde, dimethyl sulfide.** |

1. **Authorized Use:**

|  |
| --- |
| Principal Investigator  Laboratory Manager  Post Doc  Employees  Graduate Students  Technical Staff  Undergraduate Student  Adult Volunteer  Other |

1. **Storage Information:**

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| --- | --- | --- |
| **Chemical Storage Location** | Where will the chemical be used (building and room number) | **Storage**  **Requirement** |
| Area inspected regularly by **US&A and IACUC** |  | Refrigerator  Explosion Proof  Non-Explosion Proof  Flammable storage  Corrosive storage  Shelf  Locked cabinet  Locked Facility  Secondary containment  Closed, & labeled container  Other |

1. **Personal Protective Equipment [PPE]**

|  |  |
| --- | --- |
| **Personal Protective Equipment Use** | **During Chemical Preparation** |
| Gloves  \*Check integrity of gloves before each use. | **Type** (Specify): **Neoprene** |
| Safety glasses (impact) |  |
| Safety goggles (splash) |  |
| Lab Coat |  |
| Apron |  |
| Dust Mask | Specify: N95  N100  Other |
| Respirator |  |
| Hearing Protection: |  |
| Other: (i.e. double glove, barrier cream) | Specify **Double Glove** |
| Describe how you will employ PPE, Engineering and Administrative controls |  |

1. **Engineering Controls**

|  |
| --- |
| Fume Hood  Laminar Flow Hood  Biosafety Cabinet  Snorkel/ Elephant Trunk  Glove Box  Vented Gas Cabinet  Other (includes but is not limited to; pressure relief valves, intrinsically safe hot plates. Automatic shut -offs) |

1. **Chemical Spill Procedure**

**Describe the spill cleanup protocol for the maximum volume of the chemical that would be in use at any one time. Refer to the SDS or guidance from University Safety and Assurances for procedures.** [**http://uwm.edu/safety-health/emergency/**](http://uwm.edu/safety-health/emergency/)

**Check all that apply and explain below:**

|  |
| --- |
| A spill kit or cleanup materials are present in each lab.  Specify special materials required for the chemical cleanup. **Inert material for absorbing.**  Personnel are trained on spill cleanup procedure of each chemical and emergency contacts.  Proper personal protective equipment (PPE) available for spill cleanup. See #6 for PPE.  Emergency eyewash and/or safety shower located nearby (within 10 seconds) and unobstructed.  Personnel trained on eyewash/ shower location and operation  Eyewash/ shower inspected annually and activated weekly to verify operability.  Explain spill procedure: **Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container for disposal as noted below. Remove all sources of ignition. Provide ventilation.** |

1. **Chemical Use Process**

**List each step of the procedure including the hazards associated with the step and controls that will be used to ensure safety. Be as specific as possible.**

**NOTE: Identify potential methods of human exposure to the chemicals during sample preparation. Also identify health hazard or routes(s) of entry into the body and explain how they affect the body.**

|  |  |  |
| --- | --- | --- |
| **Process Step** | **Hazards** | **Safety Controls** |
| *ex.) Transfer 5 ml of hydrofluoric acid to a plastic 50 ml beaker.* | *Corrosive, splash, fluoride ion*  *readily penetrates skin and bonds to calcium ions* | *Lab coat, splash goggles, face*  *shield, nitrile gloves- initial thin glove inside gauntlet glove* |
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1. **Animal Care and Use of Chemicals**

**Fill out section 9 *only* if you have an accompanying IACUC Procedure.**

1. **IACUC Procedure**

**Protocol Title      Protocol Number(s):**

1. **Describe any Special Chemical and Carcass Disposal Requirement**

**Refer to the Waste Disposal Guidelines** [**http://uwm.edu/environmental-protection/disposal-guide/**](http://uwm.edu/environmental-protection/disposal-guide/) **or contact Environmental Protection (**[**hazwaste@uwm.edu**](mailto:hazwaste@uwm.edu)**) for guidance. (Check all that apply)**

|  |  |
| --- | --- |
| **Chemical Disposal** | **Hazardous Chemical** |
| **Routine scheduled hazardous waste pickup**  **No special disposal requirements** |  |
| **Neutralization** |  |
| **Sanitary Sewer** |  |
| **Other disposal: (Specify):** |  |
|  |  |
| **Carcass** |  |
| **Animal facility freezer and disposal service** |  |
| **Scheduled Hazardous waste pickup** |  |
| **Other disposal (Specify):** |  |
|  |  |
| **Excretion-contaminated Materials**  **(hazardous)** |  |
| **Disinfection (Specify):** |  |
| **Autoclave** |  |
| **Sanitary Sewer** |  |
| **Other Decontamination Method (Specify)** |  |

**Explain disposal methods: Dispose of in sealed container through Hazardous Waste program.**

1. **IACUC Training**

**List personnel and indicate the type of training the person has received related to the use of the chemical. Also specify the date the person was trained and by whom, as well as the experience that person has with the chemical or procedure.**

|  |  |  |
| --- | --- | --- |
| **Personnel\*\*** | **Type of Training**  [NOTE: See the US&A Website for available training sessions.](https://uwm.edu/safety-and-assurances/) | **Experience**  (Yrs., Type work) |
|  | **CHP and Lab Safety**. Date trained      **Conducted By**  [Lab Specific CHP](https://uwm.edu/safety-health/chem-hygiene/)  Date trained     **Conducted By**  **Hazardous Waste**. Date trained      **Conducted By**  **Other(Specify)** Date trained     **Conducted By** |  |
|  | **CHP and Lab Safety**. Date trained      **Conducted By**  Lab Specific CHP Date trained     **Conducted By**  **Hazardous Waste**. Date trained      **Conducted By**  **Other(Specify)** Date trained     **Conducted By** |  |
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\*\*For approved IACUC procedures notify US&A to update this information when new individuals not listed above will be working with the hazardous chemicals

1. **IACUC SOP Reviewed and Approved (initialed) by:**

|  |
| --- |
| **Animal Care Program:**  **Laboratory Safety:**  **Environmental Protection:** |

**University Safety & Assurances Web Guidance for**

**Hazardous Chemical SOPs**

**Use the following links to go to web page.**

* + Laboratory Safety <http://wwwdev.uwm.edu/safety-health/lab-safety/>
  + Biosafety <http://wwwdev.uwm.edu/safety-health/biosafety/>
  + Carcinogens <http://wwwdev.uwm.edu/safety-health/rtk-health-hazards/>
  + Eyewash/ Safety Shower <http://wwwdev.uwm.edu/safety-health/laboratory-equipment/>
  + Flammable Liquid Storage <http://wwwdev.uwm.edu/safety-health/chem-safety/>
  + Fume Hood Procedures <http://wwwdev.uwm.edu/safety-health/laboratory-equipment/#General>
  + Hazardous Communication <http://wwwdev.uwm.edu/safety-health/chemrtk/>
    - Material Safety Data Sheets (source) <http://uwm.edu/safety-health/chemrtk/>
  + On-Line Safety Training <http://uwm.edu/safety-health/laboratory-training/>

Including:

* + - Laboratory Safety
    - Bloodborne Pathogens
    - Hazard Communication
    - Hazardous Waste Orientation
    - Mercury Spill Clean-up Procedures
  + Personal Protective Equipment <http://uwm.edu/safety-health/general-ppe/>
  + Sharps Disposal <http://uwm.edu/environmental-rotection/non-hazardous-waste/#a7>

**Appendix**

**Documentation of Training**

The individuals listed below have read and fully understand this Standard Operating Procedure. The individuals have received training from their Supervisor, Group Safety Representative (GSR) or Laboratory Manager/Graduate Student and are aware of all potential hazards and countermeasures related to this Standard Operating Procedure.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Signature | E-Mail | Date | Trainer Initials |
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