



STANDARD OPERATING PROCEDURE 602 FORMALDEHYDE

1. PURPOSE

This Standard Operating Procedure (SOP) intends to describe the safe use of formaldehyde.

2. RESPONSIBILITY

Principal investigator (PI) and their research staff.

3. GENERAL CONSIDERATIONS

- 3.1. Chemical - formaldehyde is a flammable liquid, irritant, sensitizer, and potential human carcinogen.
 - 3.2. Formaldehyde is commonly used as a fixative, a nucleic acid denaturant, and for tissue preservation.
 - 3.3. Paraformaldehyde solutions can emit formaldehyde gas.
 - 3.4. Acute exposure to formaldehyde may result in pulmonary edema (fluid in the lungs), central nervous system (CNS) depression, or pneumonitis (inflammation of the lung tissue)
 - 3.5. Chronic exposure may cause skin, mucous membranes, or respiratory tract irritation.
 - 3.6. It is also a potential carcinogen.
 - 3.7. Primary exposure routes are inhalation and skin absorption.
-

4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 4.1. Work only in the chemical fume hood or total exhaust hood in room 16, building M9.
- 4.2. Protective equipment, including chemical protection masks and PPE, are in cabinet 9A next to room 16.
- 4.3. Double pair of chemical-resistant gloves (e.g., Nitrile). Change gloves frequently and immediately replace them with new gloves when gloves become contaminated.
- 4.4. Lab coat.
- 4.5. Closed shoes (covering toes, non-absorbing material).

Note: Latex gloves are not recommended

5. ENVIRONMENTAL CONSIDERATION

- 5.1. All operations involving formaldehyde and dilutions should be carried out in a certified chemical fume

hood or a ducted Biosafety cabinet to keep the airborne level below recommended exposure limits

- 5.2. Routine use outside a fume hood is acceptable only when formaldehyde levels are monitored and below 0.5 ppm.
- 5.3. Vacuum lines are protected by HEPA (high-efficiency particulate air) filters.
- 5.4. If disposed of as hazardous waste, label it with a hazardous waste label, accumulate it according to requirements, and send in a chemical collection or routine pickup request.
- 5.5. Disposal of sample tissues or material soaked in formaldehyde:
 - 5.5.1 For animal samples stored in formaldehyde: separate and filter the sample from the solution in a fume hood.
 - 5.5.2 Dispose of the solution as chemical waste and the sample in the regular trash (after the solution has evaporated).

6. HANDLING PROCEDURES AND STORAGE REQUIREMENTS

- 6.1. Work with concentrated (>4% formaldehyde/paraformaldehyde) solutions only in a chemical fume hood.
- 6.2. Handle paraformaldehyde powder (preferably granules or flakes) only in a chemical fume hood.
- 6.3. Dilute solutions (<4% formaldehyde) may be used on the benchtop in small quantities if the process has been monitored and formaldehyde levels are at acceptable safe levels.
- 6.4. Store in a cool, dry well, ventilated, flammable liquid storage area or cabinet. Do not store with potent oxidizing or reducing agents, strong acids or bases, alkalis, alkali metals, amines, ammonia, or phenol.
- 6.5 Transport formaldehyde solutions in secondary containment, preferably polyethylene or other non-reactive acid/solvent bottle carrier

Note: The PI must approve any work conducted outside of a fume hood, and the PI must contact the safety unit and request air monitoring for formaldehyde. Air monitoring must be completed before using outside a fume hood.

7. ACCIDENT RESPONSE PROCEDURES

- 7.1. If the skin is exposed, wash immediately with soap and water. Flush mucous membranes with large amounts of water. Use a wet shower in case of extensive contamination.
 - 7.1.1. Report the incident to the supervisor.
 - 7.1.2. The supervisor reports the accident/injury to the Biosafety Unit.
 - 7.1.3. Remove all sources of ignition from the spill area.
 - 7.1.4. Spills in fume hood - use absorbent pads or vermiculite to clean up small fume hood spills.
 - 7.1.5. Clean the spill area with additional pads or paper towels and clean water.
 - 7.1.6. Spills in the room – Notify others of the spill and keep the spill confined.
- 7.2. Spills must be cleaned immediately by adequately protected and trained staff.
- 7.3. Respiratory protection is required to clean up formaldehyde spills outside an operating fume hood and a disposable lab coat, goggles, and two pairs of nitrile gloves.
- 7.4. Use the same procedure as “spill in the fume hood.”

8. REQUIRED AUTHORIZATION

- 8.1. The chemical safety officer must approve the suitability of the location and equipment to use urethane and have a startup meeting with the PI and research team before procurement.
- 8.2. The Principal Investigator (PI) must provide lab-specific training to all laboratory workers regarding the hazards (physical and health) involved in working with the substance, work area decontamination, and emergency procedures.
- 8.3. The PI must provide a copy of the MSDS and this SOP to lab personnel working with any materials covered.
- 8.4. The PI must ensure that all lab personnel has attended the required training and refresher training.

SOP 602 FORMALDEHYDE

Written on (dd,mm,yyyy) 01.11.2022

Revised on (dd,mm,yyyy) 13.03.2023

Approved by the BGU Animal Policy and Welfare Oversight Committee