

Standard Operating Procedure (SOP)

Working with Phenol-Chloroform Extraction

BUILDING:

ROOM:

PREPARED BY:

REVISION DATE:

Experimental Process – Brief Description of the Operation/Experiment:

Specialized Training Instructions:

Chemical and Physical Hazards Associate with the Experiment – Before completing this section, please review the [UIC Chemicals of Concern](#) form to identify significant chemical hazards involved in this experiment.

<u>Chemical:</u>	<u>Hazard:</u>
Chloroform	<ul style="list-style-type: none"> • Carcinogen (Known to be a Human Carcinogen) • Sensitizer (skin and pulmonary) • Irritant (skin, eye, and respiratory tract) • Reproductive toxin
Phenol	<ul style="list-style-type: none"> • Corrosive • Irritant (skin, eye, and respiratory tract)
Ether	<ul style="list-style-type: none"> • Irritant (skin, eye, and respiratory tract) • Flammable
Ethanol	<ul style="list-style-type: none"> • Flammable • Irritant (skin, eye, and respiratory tract) • Reproductive toxin
Tris-Cl	<ul style="list-style-type: none"> • Corrosive • Irritant (skin, eye, and respiratory tract)

Hydroxyquinoline

- Corrosive
- Irritant (skin, eye, and respiratory tract)

B-mercaptoethanol

- Acutely Toxic
- Irritant (skin, eye, and respiratory tract)

Definitions:

Reproductive Toxins are chemicals that affect the reproductive capabilities including causing chromosomal damage (mutations) and adverse effects on fetal development (teratogenesis). A list of reproductive toxins is maintained at:

Acute Toxins are chemicals that pose a high level of immediate health risk to individuals.

Select Carcinogens are a category of chemicals where the available evidence strongly indicates that the substances cause human carcinogenicity.

DESIGNATED WORK AREA:

Sign Posting Requirements:

For chemicals classified as Select Carcinogens, Known Carcinogens, and Acute Toxins a designate sign needs to be place on the work area (fume hood, lab bench, etc.) and outside the laboratory door. Contact EHSO at labsafety@uic.edu to obtain a sign.

You should only work within the designated area with Carcinogens and Acute Toxins. This is to minimize over exposure and widespread contamination throughout a laboratory. It's recommend that a designated storage cabinet, fume hood, and lab prep bench be designated for this type of work.

ENGINEERING CONTROLS – The following safety equipment or device features must be available.

Fume Hood

Autoclave

Biological Safety Cabinet

Shielding

Glove Box

Laminar Flow Hood

Clean Bench

Toxic Gas Cabinet

Other (Please Explain below)

Further Instructions:

- All operations involving chloroform stock solutions and dilutions should be carried out in a chemical fume hood.

- The permissible exposure level (PEL) for Chloroform is 10 ppm.
- An Immediately Dangerous to Life and Health (IDLH) environment can occur for Chloroform at 500 ppm.

Before filling in this section, the [UIC Laboratory Hazard Assessment Tool](#) must be completed. Please refer to this document to select appropriate PPE for the experiment.

PROTECTIVE EQUIPMENT – Please list the required PPE for this particular Experiment

Safety Glasses

Chemical Apron

Flammable Resistant Lab Coat

Disposable Gowns

Lab Coat

Respirator

Safety Goggles

Cryogenic Gloves

Face Shield

Autoclave Gloves

Nitrile Glove

Wire Mesh Gloves

Butyl Gloves

Boot Covers

Further Instructions:

Double Glove when performing the extraction process to ensure you can discard the outer glove if you splash any of the chemical mixture on your hands.

- Phenol is highly corrosive and can cause severe burns when contacted with skin.
- Adding chloroform to phenol enhances the ability of phenol to be absorbed by the skin.

EMERGENCY EQUIPMENT – Required for handling these hazardous substances

Safety Shower

Chemical Antidote

Eyewash

Emergency Shut-off Switch/Valve

Fire Extinguisher

Oxygen Sensors/Alarms

DECONTAMINATION PROCEDURES:

Personnel:

Wash hands and arms with soap and water immediately after handling acutely toxic chemicals.

Area:

All surfaces should be wiped with the soap and water following dispensing or handling. Waste materials generated should be treated as a hazardous waste. Review your MSDS for decontamination instructions. If you need assistance contact EHSO at labsafety@uic.edu

Equipment:

Vacuum lines are to be protected by HEPA (high efficiency particulate air) filters or higher efficiency scrubbers.

Decontaminate vacuum pumps or other contaminated equipment (i.e. glassware) before removing them from the designated area.

WASTE DISPOSAL – Please follow [EHSO Waste Disposal Guidelines](#) to remove unwanted chemicals after the experiment:

SPECIAL EMERGENCY PROCEDURES – Outline any special emergency procedures unique to this experiment.

GENERAL EMERGENCY PROCEDURES

FIRE/EXPLOSION:

Use **R.A.C.E.** Rescue, Alarm, Contain, and Evacuate for all building fires.

CHEMICAL SPILL:

Large Spills (Greater than 1 L)

The contaminated area should be blocked off from other researchers and if necessary, the affected area should be evacuated as soon as an emergency is determined.

Call 5-5555 for UIC Police on a campus phone OR (312) 355-5555 from a cell phone as needed.

Report the spill to EHSO 6-SAFE (6-7233) or 312-996-7233 and complete an incident report.

Small Spills (Less than 1 L)

Employees in the area should be prepared to clean up minor spills, including most spills confined to the chemical fume hood. Wearing double nitrile gloves, splash goggles, face shield and lab coat (and impermeable apron, if available); use absorbent pads to absorb spilled material. Wipe down the contaminated area with soap and water solution. Lab personnel should avoid direct contact with any particularly hazardous chemical. If glove contact does occur, remove gloves and wash hands immediately. Contaminated PPE and clean-up materials must be placed in a compatible container.

Note: If there is respiratory irritation associated with the exposure, remove all persons from the contaminated area and contact 6-SAFE or 312-996-7233.

OTHER:

If over exposed to any particular hazardous substance to the skin, the worker shall be required to shower or flush the affected areas for a minimum of 15 minutes. If the emergency is not life threatening report to UIC Health Services for Medical Evaluation.

University Health Services (MC 684)
835 South Wolcott Avenue, Room E-144
Chicago, Illinois 60612-7338
T 312-996-7420
F 312-413-8485

Life Threatening Emergencies:

Report to University of Illinois Hospital & Health Sciences System
Emergency Room
1740 W Taylor Street
Chicago, IL 60612

Approval and Certification – I approve the use of this SOP for my lab group. I agree to modify this SOP to meet the safety needs of my researchers working in my lab.

PI Signature	Name (Print)	Date
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CERTIFICATION – I have read and understand the above SOP. I agree to contact my PI or Lab Manager if I plan to modify this procedure.

Signature	Name (Print)	Date
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References

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