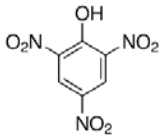
Lab-Specific Standard Operating Procedure (LSOP)- Picric Acid (2,4,6-Trinitrophenol) and Solutions Containing Picric Acid

Principal Investigator(PI):	
Building:	Lab(s) Covered by LSOP:
Department:	Lab Phone Number(s):

Chemical	GHS Pictograms	Definitions
Picric Acid **2,4,6-Trinitrophenol** **$(O_2N)_3C_6H_2OH$** 		***Acute toxicity*** refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours. ***Flammable*** refers to any of the following substances: flammables, pyrophorics, self-heating, emits flammable gas, self-reactives, and organic peroxides

Hazard Awareness

Aqueous solutions of picric acid are considered non-hazardous. However, extreme caution should be taken to ensure that no solid picric acid precipitates in the solution and all aqueous solutions should be stored according to standard operating procedures and in a glass or plastic bottle. Dry picric acid is considered a highly shock sensitive chemical. Formation of picrate salts on metal surfaces (such as metal caps and lids) are more sensitive than picric acid. Any dry crystals on the inside of the container or cap threads may be enough to detonate the container when removing the cap. Any visible solid material in a solution of picric acid is considered explosive. The bottle should not be opened at this point and EH&S should be contacted immediately for stabilization and disposal. Strict adherence to standard operating procedures must be followed to ensure health and safety.

SECTION 1. ADMINISTRATIVE CONTROLS

1a.	Lab-specific safety training must be provided by the principal investigator (PI) or other qualified personnel to all researchers working with solution containing picric acid. Documentation of training is required.
1b.	Read the **safety data sheet (SDS)** for picric acid and picric acid solutions prior to use.
1c.	Whenever possible, find safer substitutes or reduce the quantity of picric acid being used.
1d.	Researchers must not work alone with picric acid solutions.
1e.	Experiments should be performed during normal business hours (i.e., 8:00 am-5:00 pm Mon-Fri) if possible.
1f.	A **DESIGNATED AREA** must be established where limited access, special procedures and work practices using picric acid solutions are taking place. The designated area must be a fume hood recognized by authorized personnel working in the lab. The designated area must be clearly marked with a sign that identifies the chemical hazard and include an appropriate warning (i.e., **DANGER- PICRIC ACID - AUTHORIZED PERSONNEL ONLY)**.

1g.	An eyewash and safety shower must be in the immediate work area where hydrofluoric acid is used.

SECTION 2. ENGINEERING CONTROLS	
2a.	All research with picric acid solutions must be conducted in a chemical fume hood, over a spill tray if possible, with the sash at the lowest working height and with sliding sash panels (if applicable) aligned to form a barrier between the researcher and the experiment.
2b.	Chemical fume hoods must be running between 80-120 linear feet/minute and tested by EHS within the last year. If the hood is not working properly, contact Facilities (486-3113) to repair the hood or EHS to retest (486-3613).
2c.	PIs must determine if glove boxes or other types of local exhaust ventilation can be used as a substitute for chemical fume hoods. Use of picric acid solutions outside of chemical fume hoods must be reported to EHS for evaluation prior to research.
SECTION 3. WORK PRACTICES	
3a.	Picric acid solutions must be handled and stored in chemically-compatible containers made of glass or plastic. **METAL CONTAINERS MUST NEVER BE USED TO STORE OR TRANSFER PICRIC ACID SOLUTIONS.**
3b.	All containers of picric acid solutions must be clearly labeled with the chemical name and hazard classes and kept tightly-sealed.
3c.	All work with picric acid solutions must be performed on a chemically-compatible secondary containment tray.
3d.	Empty containers of picric acid solutions must be handled carefully since product residues (vapors, liquid) are still harmful. Adding additional distilled water to the container will help ensure that any remaining residue does not form solid picric acid crystals.
3e.	After each use, wet the bottleneck and cap threads with distilled water before closing the container containing picric acid.
3f.	Do not touch, move, or open a container with dry or crystallized picric acid. Minor disturbances or the friction of opening the bottle with a crystallized lid is enough to cause an explosion.
SECTION 4. PERSONAL PROTECTIVE EQUIPMENT	
4a.	At a minimum, chemical splash goggles or safety glasses that meet *American National Standards Institute* (ANSI) standard Z-87.1 must be worn when handling picric acid solutions.
4b.	PIs must determine when or if full-face shields are required when working with picric acid solutions.
4c.	Gloves indicated in the safety data sheet (SDS) must be worn while handling small quantities of picric acid solutions. PIs must determine if additional protection for the hands (e.g., heavy-duty gloves, wearing two pairs of gloves, using longer gloves that cover the hands, wrists, and forearms, etc.) is required.
4d.	A lab coat must be worn when working with picric acid solutions. Lab coats must be buttoned and fit properly to cover as much skin as possible.
4e.	Long pants must be worn while using picric acid solutions. Shorts, skirts or other clothing that expose the skin of the legs is not allowed.
4f.	Closed-toed footwear, which covers the entire foot, must be worn when working with picric acid solutions.
4g.	Hair must be pulled back away from the face when working with picric acid solutions.
SECTION 5. STORAGE	
5a.	Store picric acid solutions as indicated in safety data sheets (SDSs).
5b.	Ensure labels on original bottles remain legible and prominently displayed to identify contents.
5c.	Ensure both original and secondary containers remain intact and are stored with tight-fitting caps or lids.
5d.	Store picric acid solutions away from metal.

5e	Store picric acid solutions away from sources of ignition (spark or flame), oxidizing materials, and other organic materials. Keep the container in a cool and well-ventilated area. Do not allow the material to dry out (minimum of 30% water). **Check safety data sheet for further incompatibilities.**

SECTION 6. SPILLS AND ACCIDENTS PROCEDURES

1.	Evacuate the laboratory.
2.	Close door(s) to lab and post a "**NO ENTRY**" sign(s) or other warning information on the door.
3.	Call **911**.
4.	Do not re-enter area until instructed to do so by UCFD or other emergency personnel.
5.	Report accident to PI/Supervisor and EHS.

SECTION 7. FIRST AID PROCEDURES

First Aid- Eyes	1. Immediately move to the eyewash station, hold eyelids open and flush with water. Remove contact lenses while flushing (if applicable). 2. Have another person from the lab dial **911** and specifically mention picric acid exposure. 3. Continue flushing the eyes until emergency personnel arrives. 4. Report incident to PI/Supervisor and EHS.
First Aid- Skin	1. Immediately move to safety shower or other water source and begin rinsing affected area(s). Remove contaminated clothing (if applicable) while flushing. 2. Have another person from the lab dial **911** and specifically mention picric acid exposure. 3. Flush affected area(s) under safety shower until emergency personnel arrives 4. Report incident to PI/Supervisor and EHS.
First Aid- Ingestion	1. Immediately rinse the mouth with cold water. **Do NOT induce vomiting. Do NOT give emetics or baking soda.** 2. Have another person from the lab dial **911** and specifically mention picric acid exposure. 3. Keep drinking water until emergency personnel arrives. 4. Report incident to PI/Supervisor and EHS.
First Aid- Inhalation	1. Move to fresh air. 2. Dial **911.** 3. Inform emergency responders that the accident involved picric acid. 4. Report incident to PI/Supervisor and EHS.

SECTION 8. HAZARDOUS WASTE MANAGEMENT

1.	All picric acid waste must be labeled with "Hazardous Waste" stickers or tags, use full chemical names to describe the waste (i.e., no chemical abbreviations or symbols), be stored in sturdy, plastic or glass containers with tight-fitting caps or lids, and be stored alone or with other compatible chemicals.
2.	Hazardous wastes must be stored at or near a green "Satellite Accumulation Area" sign prior to disposal by EHS.

SECTION 9. DECONTAMINATION PROCEDURES

Equipment	All glassware or lab equipment that comes should be rinsed thoroughly with distilled water after each use.
Work Area	Any spills should be cleaned up immediately with plenty of water. All work surfaces should be wiped down with distilled water after using picric acid solutions.

Personal Hygiene	Researchers should wash hands with soap and water after working with picric acid solutions.

SECTION 10. SPECIFIC PROCEDURE

Picric acid solutions will be used for Picrosirius Red staining of intervertebral disc (IVD) tissue for histological evaluation. Dissolve 3 grams of Direct Red 80 (Sigma) into 500 mL of saturated aqueous picric acid (1.2% picric acid w/v in water, Fisher Scientific). The resulting solution will be called the "Picrosirius red solution."

Stain IVD sections on glass slides with Weigert's Iron hematoxylin for 8 min and then wash with tap water. Incubate slides in Picrosirius red solution for a minimum of 1 hour. Wash two times in 1% aqueous acetic acid. Vigorously shake off any water droplets and then wash three times in 100% ethanol and once in xylene. Apply a mounting medium and a coverslip.

SECTION 11A. APPROVAL

I have reviewed, understand and agree to follow this lab-specific standard operating procedure (LSOP) regarding picric acid and solutions containing picric acid. Failure to follow the LSOP and lab-specific training guidelines for research with picric acid is a violation of the *University Health & Safety Policy* and *University Code of Conduct*. Further approval from the PI is required if any of the following events occur:

- A change in amount or substitution of the chemicals in the procedure is planned
- A change in the agreed-upon experimental set-up is planned
- Signs of a failure in safety design or equipment are observed
- Signs or symptoms of a chemical exposure to any personnel are observed
- Unexpected and/or potentially dangerous experimental results occur (e.g., fire, uncontrolled buildup of heat and/or pressure, etc.)

Researcher Signature	Date	Trainer Signature	Training Date

SECTION 11B. PRINCIPAL INVESTIGATOR CERTIFICATION

I approve the contents of the lab-specific standard operating procedure listed above regarding the use of picric acid and solutions containing picric acid.

PI Signature:	**Date:**

A HARD OR ELECTRONIC COPY OF EACH LAB-SPECIFIC STANDARD OPERATING PROCEDURE MUST BE READILY AVAILBALE IN THE LAB.