

Lab-Specific Standard Operating Procedure (LSOP)- Bouin's Solution

Principal Investigator(PI):


Building:

Lab(s) Covered by LSOP:

Department:

Lab Phone Number(s):

SECTION 1. OSHA's GLOBALLY HARMONIZED SYSTEM (GHS)-SDS INFORMATION

Chemical	GHS Pictogram	Definition
		Bouin's is a fixing and preserving solution consisting of picric acid, formaldehyde, and glacial acetic.
Signal Word		
Danger		
GHS Hazard Classification		
Note: Under the GHS System (1-4); (1 is the most and 4 is the least)		
Corrosive to metals (Category 1)		
Acute toxicity, Oral (Category 4)		
Skin corrosion (Category 1A)		
Serious eye damage (Category 1)		
Skin sensitization (Category 1)		
Germ cell mutagenicity (Category 2)		
Carcinogenicity (Category 1A)		
GHS Hazard Statements		
May be corrosive to metals		
Harmful if swallowed		
Causes severe skin burns and eye damage		
May cause an allergic skin reaction		
Suspected of causing genetic defects		

May cause cancer
GHS Precautionary Statements
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep only in original container and store locked up and in corrosive resistant container with a resistant inner liner
Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
Wash skin thoroughly after handling
Do not eat, drink or smoke when using this product
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves/ protective clothing/ eye protection/ face protection
If skin irritation or rash occurs: Get medical advice/ attention

SECTION 2. LIST BOUINS CHEMICALS USED IN THE LAB (Attach or insert more lines as necessary)

Chemical Name	Additional Hazards
Bouin's Solution	Formaldehyde at (5 - 10 %), Acetic acid at (5 - 10 %), Picric Acid at (0.1 - 1 %)
	Formaldehyde is Flammable Liquid 4/ Acute Toxic 3/ Skin Corrosion 1B/ Eye Damage 1/ Skin Sensitization 1/ Mutagen 2/ Carcinogen 1A/ Aquatic Acute 3
	Acetic Acid is Flammable Liquid. 3/ Metal Corrosive 1 Skin/ Corrosive 1A/ Eye Damage 1
	Picric Acid is Explosive 1.1 / Acute Toxicity 3
	An OSHA Class A Explosive (1910.109) and has a potential for dermal absorption
	OSHA specifically regulated carcinogen and the standard applies to all occupational exposures to formaldehyde, (i.e.) from formaldehyde gas, its solutions, and materials that release formaldehyde
	Has a Short Term Exposure Limit (STEL) of 2.0 ppm and Permissible Exposure Limit (PEL) of 0.75 ppm
	Note: Formalin is an aqueous solution that is 37% formaldehyde by weight; inhibited solutions usually contain 6-12% methyl alcohol. Also see specific listings for Formaldehyde and Methyl alcohol

SECTION 3. ADMINISTRATIVE CONTROLS

2a.	Lab-specific safety training must be provided by the principal investigator (PI) or other qualified personnel to all researchers working with Bouin's Solution .
2b.	Documentation of training is required.
2c.	Read the Safety Data Sheet (SDS) for Bouin's Solution prior to use.
2d.	Whenever possible, find safer substitutes or reduce the quantities.
2e.	Experiments should be performed during normal business hours (e.g.) 8:00 am-5:00 pm Mon-Fri) if possible.
2f.	Multiple transfers of small volumes/quantities Bouin's Solution are preferred over a single transfer of larger volumes/quantities.

2g.	Picric acid is explosive when Bouin's solution becomes dry and forms crystals in the rim of the cap, and friction from turning the cap may cause the reaction/explosion. Never allow Bouin's solution to dry or leave open to evaporate.
SECTION 4. ENGINEERING CONTROLS	
3a.	Chemical fume hoods must be running at over 90 linear feet/minute and tested by EHS within the last year.
3b.	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
3c.	Ensure that eyewash stations and safety showers are proximal to the workstation location and tested accordingly.
3d.	EH&S certifies flow rates of fume hoods for UCONN Health, contact EH&S at 860-679-2723 for re-test.
3e.	If the hood is not working properly, contact Facilities to repair the hood at 860-679-2125.
SECTION 5. WORK PRACTICES	
4a.	Only chemicals involved in the experiment should be present in the fume hood or glovebox. All non-essential chemicals and materials must be removed. Note -chemicals and wastes may not store permanently in the Fume Hoods.
4b.	Precautions for safe handling are to avoid contact with Bouin's Solution.
4c.	Precautions for safe handling are to use in fume chemical fume hoods only, and with the correct PPE being worn.
4d.	Bouin's Solution must never be drain disposed or left to dry so crystals can form in bottle or within the cap.
4e.	Containers which are opened must be carefully resealed and kept upright to prevent leakage
SECTION 6. PERSONAL PROTECTIVE EQUIPMENT	
5a.	The PI must perform a Workplace Hazard Assessment (WHA) form for Laboratories at, http://research.uchc.edu/wp-content/uploads/sites/1137/2015/09/workplace_hazard_assessment.pdf
5b.	The Occupational Safety and Health Administration (OSHA) requires employers to conduct inspections of all workplaces or tasks to determine if hazards are present that would require the use of Personal Protective Equipment (PPE). The Workplace Hazard Assessment Form (WHA) has been designed to help UConn supervisory personnel choose appropriate PPE for their employees and provide the written certification required to comply with the OSHA regulation (29 CFR 1910.132 Subpart I).
5c.	Eye/face protection, face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or ANSI .
5d.	For skin, protection handle with gloves as per the recommendation of the chemical manufacturer and listed on the SDS. NIOSH also provides recommended protection based on material and thickness and protection rates of degradation and permeability.
5e.	Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product Wash and dry hands.
5f.	Full contact Material: Nitrile rubber Minimum layer thickness: 0.11 mm Break through time: 480 min Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)
5g.	Splash contact Material: Nitrile rubber Minimum layer thickness: 0.11 mm Break through time: 480 min Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)
5h.	Closed-toed footwear, which covers the entire foot, must be worn when working with Bouin's Solution .

5i.	The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
5j.	An eyewash and safety shower must be in the immediate work area where Bouin's Solution is used.
5k.	Respirators are not approved for wearing unless medical clearance, fit test, respirator selection and training is provided and at no cost to the employee. EH&S recommends only performing work in fume hoods.
SECTION 6. STORAGE	
6a.	Conditions for safe storage, including any incompatibilities are to keep container tightly closed in a dry and well-ventilated place.
6b.	Bouin's Solution is incompatible with the following materials: Strong bases, Oxidizing agents, Strong oxidizing agents, Metals, Amines, Strong acids, Acid anhydrides, Alcohols, Peroxides, permanganates, e.g. potassium permanganate, Isocyanates, Phenol, Soluble carbonates and phosphates, Hydroxides, Aniline
6c.	Store Bouin's Solution per SDS and Manufacturer safe recommendations.
SECTION 7. SPILLS, ACCIDENTS & EMERGENCY PROCEDURES	
1.	Call 911 or 7777 from landline if Life Threatening and call EH&S at 860-679-2723 for Non-Life Threatening Spill Coordination efforts.
2.	Evacuate the laboratory and inform others in the immediate area to leave the work area. Evacuate the laboratory calmly yet safely, and rally at the Emergency Assembly Area (EAA) as designated by the Fire Department
3.	The (EAA) is a pre-determined safe zone for employees to meet during an emergency.
4.	Upon evacuation, also try to minimize damage; isolate/contain if able. (e.g.) open hoods to accelerate dissipation in air, hit HVAC purge button to increase laboratory air changes, disconnect electrical sources etc.
5.	Upon Evacuation, close door(s) to lab and post a "NO ENTRY" sign(s) or other warning information on the door.
6.	The Emergency Evacuation Attendants (EEA) are those who have been assigned take roll call of employees and report to the Emergency Evacuation Coordinator (EEC)
7.	No one shall be permitted to leave the Emergency Assembly Area (EAA) until the scene has been determined safe for re-entry by the On-Scene Emergency Coordinator (EC) -Senior Fire Department Official.
8.	Do not re-enter the lab/area until instructed to do so by the On-Scene Emergency Coordinator (EC) -Senior Fire Department Official.
9.	Should the Emergency Assembly Area (EAA) be compromised, evacuees will be instructed by Emergency Evacuation Attendants (EEA's) or the Emergency Evacuation Coordinator (EEC) to re-locate to a secondary Emergency Assembly Area (SEAA)
10.	EH&S recommends that individual labs discuss emergency response and readiness at their laboratory meetings and practice drill. EH&S can aid in this effort along with Public Safety.
11.	Report Spills, accidents which are also deemed non-life threatening or non-emergency situations to your respective PI/Supervisor and EH&S.
SECTION 8. FIRST AID PROCEDURES	
First Aid- Eyes	<ol style="list-style-type: none"> 1. Remove contact lenses (if applicable) 2. Forcibly hold eyelids open and flush eyes under eyewash for 15 minutes 3. If pain persists after 15 minutes, dial 911 4. Keep flushing eyes until emergency personnel arrives 5. Report incident to PI/Supervisor and EHS.
First Aid- Skin	<ol style="list-style-type: none"> 1. Remove contaminated clothing (if applicable) 2. Flush affected area(s) under safety shower for 15 minutes 3. If pain persists after 15 minutes, dial 911 4. Keep rinsing affected area until emergency personnel arrives 5. Report incident to PI/Supervisor and EHS.

First Aid- Inhalation	<ol style="list-style-type: none">1. Move to fresh air2. Dial 9113. Report incident to PI/Supervisor and EHS.
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SECTION 9A. BOUIN’S SOLUTION WASTE MANAGEMENT (SPECIFIC)

1.	Is an EPA Hazardous Characteristic Waste upon disposal and designated with waste code D002 for the Characteristic of Corrosivity and D003 for the Chararcteristic of Reactivity when in concentrated or technical grade solutions that have not been further diluted.
2.	Bouin’s Solution that is expired and or contaminated and/or cannot be used for its intended purpose, or any unused or unwanted must be disposed of as Hazardous Waste.
3.	Bouin’s Solution must never be allowed to evaporate in the fume hood as empty or filled containers , as this is a form of treatment that requires a permit. Containers with residues of Bouin’s Solution must never be left open to the atmosphere.
4.	A Hazardous Waste tag must be adhered to the waste Bouin’s Solution and properly filled out. Please ensure that the Bouin’s Solution container and SAA tray are void of exterior residues, are compatible with the collection container, that the contents themselves are compatible, is under the control of the generator of Bouin’s Solution and it is maintained in the appropriate SAA-(not the fume hood).

SECTION 9B. HAZARDOUS WASTE MANAGEMENT (GENERAL)

1.	All hazardous wastes must be labeled with “Hazardous Waste” stickers or tags, use full chemical names to describe the waste (i.e. no chemical abbreviations or symbols), have 100% of the constituents by volume identified and be stored in containers with tight-fitting caps or lids, and be segregated by chemical compatibility.
2.	Hazardous wastes must be stored at or near a green “Satellite Accumulation Area” sign prior to disposal by EHS.
3.	Hazardous wastes must accumulate under the control of the generator, with a container maintained in good condition, free of exterior residues on container or in the spill tray. All spills and residues must be immediately cleaned up.
4.	Hazardous wastes must be transferred within a chemical fume hood but then be removed for temporary storage with the generator’s respective (SAA). When chemical waste is being transferred is the only time that it may remain open. Closed, means that no liquid will spill from a waste collection container, should the container be knocked over/inverted.
5.	EPA (P-Listed) Hazardous wastes regardless of being RCRA empty or not must be collected as Hazardous wastes.

SECTION 10. SPECIFIC PROCEDURE (*left blank intentionally; please see & follow instructions*)

(Document the Experiment Information with regard to use of Bouin’s Solution, too include the procedures for disposal of the waste and the selection and application of the correct PPE)

Instructions As Follows: _____

SECTION 11. APPROVAL

I have reviewed, understand and agree to follow this LSOP regarding Bouin's Solution liquids and solids. Failure to follow the LSOP and lab-specific training guidelines for research with Bouin's Solution 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 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 12B. PRINCIPAL INVESTIGATOR CERTIFICATION

I approve the contents of the lab-specific standard operating procedure listed above:

PI Signature:

Date:

**A HARD OR ELECTRONIC COPY OF EACH LAB-SPECIFIC STANDARD OPERATING PROCEDURE
MUST BE READILY AVAILABLE IN THE LAB FOR COMPLIANCE PURPOSES.**