CHEMICAL SAFETY

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Introduction

- The hazards associated with these chemicals vary depending on their properties and mode of handling and usage.
- Inherent hazards are also associated with the reactions that are carried out with these chemicals and the equipment being used. The risks involved include serious injuries and adverse health effects.
- This calls for utmost care in handling of chemicals from the time of receipt to disposal.
- Prevention of mishaps requires a proactive approach in identifying hazards and putting control measures in place.
- Everyone is responsible for safe laboratory practices and is expected to exercise all due caution, consideration and prudence when working in the chemical laboratories. Those who violate safety laboratory guidelines will be prohibited from using the laboratory.
- **STUDENTS ARE NEVER ALLOWED TO WORK ALONE IN A CHEMICAL LABORATORY AND MUST BE UNDER THE DIRECT, PERSONAL SUPERVISION OF THEIR FACULTY ADVISOR (MENTOR) OR THE LABORATORY TECHNICIANS WHO MUST BE PHYSICALLY PRESENT IN THAT LABORATORY SPACE.**

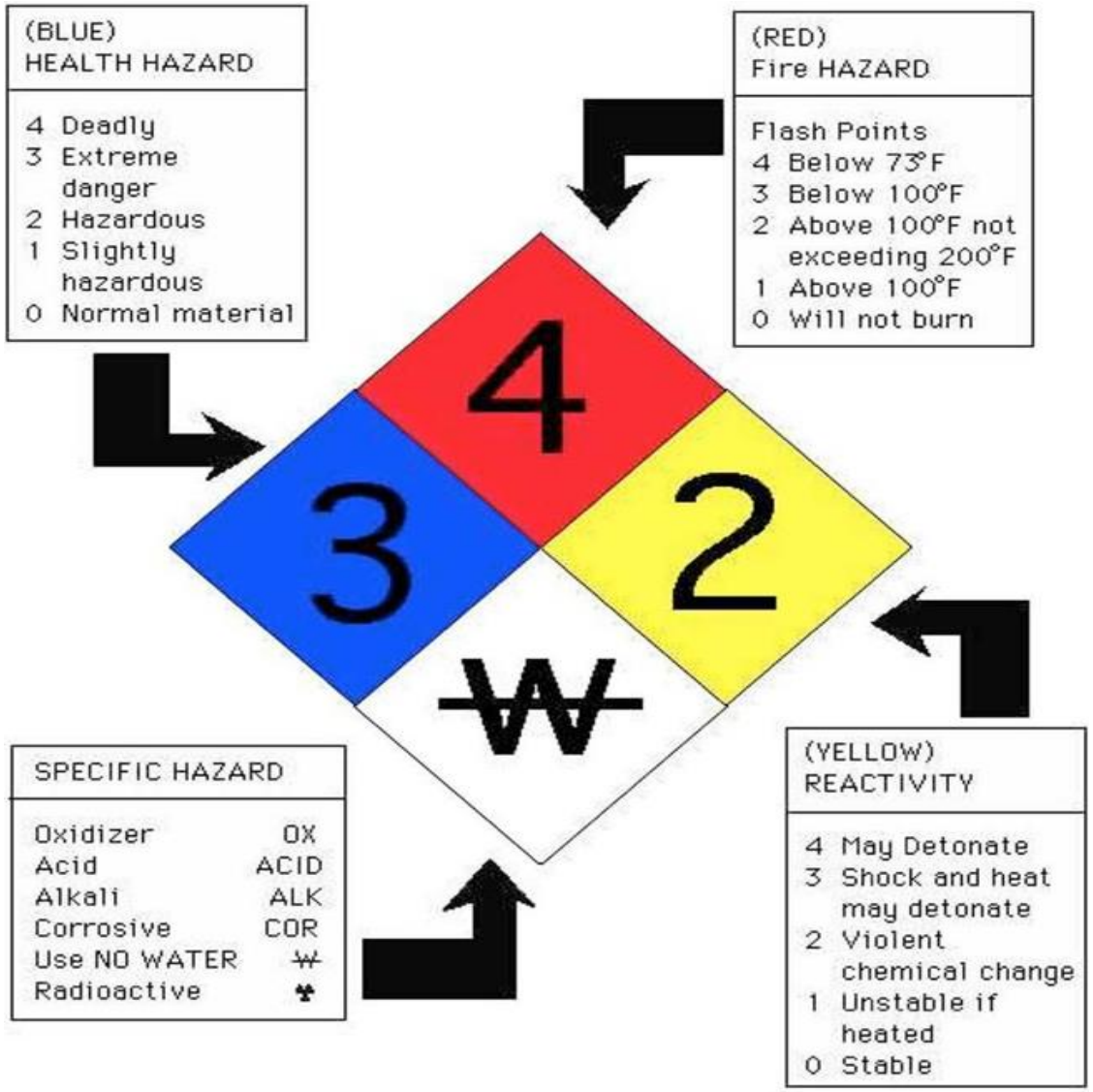
Types of Hazardous chemicals

- **Corrosives** Nitric acid, Sulphuric acid, Calcium hydroxide, Hydrofluoric acid, Sodium hydroxide, Bromine
- **Oxidizers** Nitric acid, Perchloric Acid, Permanganates, Nitrates, Perchlorates
- **Flammables:** Acetone, Toluene, Methyl alcohol
- **Water soluble:** Sodium, Lithium, Potassium
- **Pyrophoric:** Butyl lithium, Diisobutylaluminium hydride
- **Toxics:**
- **Peroxide forming chemicals:** Diethyl ether, Tetrahydrofuran, Isopropyl ether, Butadiene

Material Safety Data Sheets (MSDS/SDS)

- Material Safety Data Sheet (MSDS) is a document that contains information on the potential hazards of a chemical and how to work safely with the chemical product. Material safety data sheets/Safety data sheets of chemicals are provided by the manufacturer or supplier of the chemical. It gives the following information about the chemical:
- Physical properties
- Chemical properties
- Fire hazard
- Reactivity hazard
- Health hazard
- First Aid Measures
- Spill control measures
- Type of fire extinguishers to be used in case of fire
- Personal protective equipments required

Material Safety Data Sheets



ScienceLab.com
Chemicals & Laboratory Equipment

Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Eugenol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Eugenol

Catalog Codes: SLE1156

CAS#: 97-53-0

RTECS: SJ4375000

TSCA: TSCA 8(b) inventory: Eugenol

CI#: Not available.

Synonym: Hydroxy-1-methoxy-2-allyl-4-benzene

Chemical Formula: C10H12O2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Eugenol	97-53-0	100

Toxicological Data on Ingredients: Eugenol: ORAL (LD50): Acute: 1930 mg/kg [Rat]. 3000 mg/kg [Mouse]. 2130 mg/kg [Guinea pig].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Pictograms for Classification and Labeling of Chemicals

	• Oxidizers
	• Flammables/Emits • Flammable Gas • Self Reactives/Heating • Pyrophorics • Organic Peroxides
	• Explosives • Self Reactives • Organic Peroxides
	• Acute toxicity (Severe)

	• Corrosives
	• Carcinogen • Respiratory Sensitizer • Reproductive Toxicity • Target Organ Toxicity • Mutagenicity • Aspiration Toxicity
	• Environmental Toxicity
	• Irritant • Dermal Sensitizer • Acute toxicity (harmful) • Narcotic Effects • Respiratory Tract • Irritation

System for Disposal of Chemicals

- **Disposal of Chemicals**
- Chemical waste material that must be discarded by for appropriate methods approved by the Department.
- ***Under no circumstances*** are you to dispose of chemicals by pouring them down the sinks or drains in the laboratory.
- Chemical wastes should be placed in an appropriate container labelled specifically for disposal purposes. The label is to contain details about the chemical(s) to be disposed.

Hazard Control

- **Elimination**- Options which get rid of the hazard altogether.
- **Substitution-** Replacing a hazardous chemical with a less hazardous one wherever possible.
- **Engineering Controls**- Fume Hoods, local exhaust ventilation, etc.
- **Administrative control-** Standard Operating Procedures (SOP), caution signages, etc.
- **Personal protective equipments-** Lab coats, safety glasses, hand gloves, etc.

PERSONAL PROTECTION EQUIPMENTS

- Dust Mask
- Safety Glass
- Ear Protection
- Gloves
- Proper Footwear

REQUIRED CLOTHING

- Long pants.
- No neckties, no dangling clothes, parts of clothing, key fobs, or jewelry.
- Shoulders, upper arms, and the entire torso must be covered at all times.
- Buttoned long sleeve shirts are required for Polymer Extrusion, Shell and Tube Heat
- Exchanger, and when handling chemicals that can burn the skin or be absorbed through the skin.
- Precautions must be taken to prevent long hair from becoming entangled in moving machine parts. Hair that falls below shoulder length needs to be tucked underneath hardhat.

SAFETY EQUIPMENT

- Fire Extinguishe**Types**
  - **Class A** - Wood, cloth, paper, and/or rubber fires.
  - **Class B** - Gas, liquid, and grease fires.
  - **Class C** - Fires involving energized electrical systems.
- Fire Alarm
- Drain plug

Rules for personal protection(1)

- When necessary, protect the face, skin and eyes, at all times by wearing appropriate protective clothing and equipment to avoid direct contact with the chemical (i.e. chemical goggles, gloves, apron or lab coat, etc.). Remove these items before leaving the laboratory.
- Do not wear lab coats or other potentially contaminated protective equipment outside of the lab into elevators, etc., during restroom, lunch or dinner breaks.
- Safety goggles must be worn by all undergraduate students engaged in chemistry research or any research requiring the handling of any chemical reagents.
- Shoes, not sandals, must be worn at all times in the laboratory. You are advised to wear clothing (preferably not shorts) that covers your legs.
- Hair longer than shoulder length and loose clothing should be confined when working in the laboratory.
- The use of contact lenses in the laboratory is strongly discouraged. Students may ask the Supervisor for permission to wear contact lenses in the laboratory.
- Allow only authorized personnel in the laboratory.

Rules for personal protection(2)

- Wash hands frequently — always before leaving the laboratory and prior to eating, drinking, smoking, applying cosmetics, etc.
- Do not wear gloves while typing on laboratory computers.
- If any chemical spills onto your skin, immediately wash the affected area with water. You or a co-worker must immediately notify the Supervisor.
- When the fire alarm sounds you must evacuate the building immediately. Extinguish all flames and turn off all equipment, as appropriate, before exiting.
- You are advised to avoid wearing synthetic finger nails in the laboratory. Synthetic finger nails are made of extremely flammable polymers which burn to completion and are not easily extinguished.
- No chemical should ever be tasted. If you need to smell a chemical, do so by gently fanning the vapors toward your face.
- When heating or carrying out a reaction in a test tube or flask, never point the apparatus toward your co-workers or yourself.
- Eating, drinking or smoking in laboratory rooms is strictly prohibited.
- No chemical apparatus or glassware should never be used for eating or drinking purposes in any location whatsoever.
- In all experiments, including distillations, in which explosions, implosions or violent reaction is possible, the operator and neighbors should be protected by safety shields.

Rules for personal protection(3)

- All hazardous chemicals not packaged for shipping must be transported within the buildings in “safety carriers” (e.g. a rubber pail with a handle).
- Equipment operated by a motor-driven belt (such as a vacuum pump) must be protected by a suitable belt shield or guard.
- Those working with lasers must wear suitable protective eye wear. Supervisors who are directing work using lasers must post warning signs about the hazards of lasers.
- Special equipment utilizing high voltage components, radiation devices (e.g., X-ray generators, electron capture detectors, etc.), ultraviolet sources, high pressure components and other such equipment must incorporate commonly accepted safety features. Suitable warnings must be posted on entry doors.
- Remove gloves before you exit the laboratory. Never wear gloves outside of the laboratory, as pressing elevator buttons, touching door handles, etc., will spread chemical and/or biological residues to areas outside of the laboratory. Wash your hands at the end of your laboratory work before you exit the laboratory.

Rules for general protection(1)

- Unauthorized experimentation and work in the laboratory are forbidden.
- Unauthorized personnel or unsupervised undergraduate students are not permitted in a laboratory.
- Excessive noise and boisterous conduct are forbidden.
- No laboratory work involving any hazard may be carried out unless responsible assistance is available nearby in the event of an accident. Responsible assistance is interpreted to mean a Supervisor.
- Any personal injury or accident that may occur in the laboratory must be reported to Public Safety by activating the emergency telephone or intercom next to the door of the laboratory.
- Vocal warning should be given to those working nearby in case of fire, explosion, spillage of dangerous chemicals, release of toxic fumes, etc. The information should be reported to the supervisor and any other person whom might be affected by such an occurrence.
- Everyone must have been trained and know the location and proper use of fire extinguishers, safety showers, eyewash stations, fire blankets and first aid kits that are available in the laboratory in which he or she is working.
- All water, gas, air, electrical and other service connections must be made in a safe and secure manner.
- All worn, frayed, or damaged cords and plugs on all electrical equipment must be replaced by satisfactory cords and plugs. Electrical components, power cords, etc., should be kept off of the floor in case of flooding. All tubing for water must be securely fastened.
- Solid materials (paper, towels, broken glass, stoppers, rubber tubing, etc.) must be kept out of the sinks at all times to minimize the danger of plugging drains.
- Exposure of most chemicals to direct sunlight should be avoided when reasonably possible.
- Reactions that are chemically or mechanically hazardous must never be left unattended.
- If a room contains a special hazard, a sign designating the presence and nature of the hazard must be posted on the door.

GOOD HOUSE KEEPING

- Aisles and exits must be unobstructed.
- Fume hoods and laminar flow hoods must be left empty and available for work as much as possible and certainly once the day's work is completed.
- Bench tops must be kept as free from unnecessary apparatus as possible.
- Clean up chemical spills (including water) immediately. Do not leave spilled chemicals on the bench top or floor. Clean up chemicals spill in the appropriate manner. Notify the Faculty Advisor and Safety Officer immediately of spills requiring special cleanup.
- Keep glassware clean. Wash used glassware immediately and certainly before you leave for the day.
- All Biomedical Waste (i.e. used pipets, pipet tips, petri dishes, culture flasks, etc.) must disposed of in a CLOSED Biomedical Waste bag and placed in the designated location for autoclaving. No Biomedical Waste may be left in an open container at the end of the day's work.
- ALL chemicals, including those in a refrigerator or freezer, must be in clearly-labeled containers.
- Coats, bags and other personal items should be stored in the proper areas in the laboratory room; not on the bench tops or in the aisles.

General Accident Procedure

- Inform Laboratory Technician
- Inform Laboratory In charge
- Head of the Department :
- Dean Students Welfare/Hostel Balance : 4419, 4418
- Ambulance : 4434
- Make sure that an accident report is filled out.

Type of Accident - Burns

- **Burns - 1st Degree**
- **Source :** Light contact with hot objects, Scalding by hot water or steam, Slight contact with concentrated acids or bases or prolonged contact with dilute acids or bases.
- **Characteristics:** Reddening of the skin, Mild swelling, Very painful..
- **Treatment**
- Area should be coated with antiseptic ointment from the First Aid Kit.
- Medical treatment may be necessary

- **Burns - 2nd Degree**
- **Source:** Contact with hot surfaces, hot liquids or with steam., Flash burns from flammable liquids., Major contact with concentrated acids or bases.
- **Characteristics:** Reddening and blistering of the skin, Considerable swelling., Wet appearance on the surface of the skin due to the loss of plasma through damaged layers of the skin, Very painful.
- **Treatment**
- Gently clean the skin. Pat gently, do not rub.
- Get medical attention immediately.

BURN 3RD DEGREE

- **Source:** Flames. Ignited clothing. Immersion in hot liquids., Electricity., Contact with hot objects.
- **Characteristics:** Burns involve the entire thickness of the skin, with or without charring., Temperature and duration of contact determine extent of tissue destruction..
- **Treatment**
- DO NOT remove adhered particles of charred clothing.
- DO NOT apply ointment, commercial preparations, grease, or any home remedy.
- Cover burns with thick, sterile dressing or a freshly laundered sheet or other household linen.
- If the hands are involved, keep them above the level of the victim's heart.
- Keep burned feet or legs elevated.
- Have victims with face burns sit up and keep them under continuous observation for breathing difficulty. If victim has a hard time breathing, maintain an open airway.
- DO NOT immerse an extensively burned area or apply ice water to it because cold may intensify the shock reaction. However, a cold pack may be applied to the face or the hands or feet.
- Treat for shock.
- Arrange for immediate medical attention.
- Transport to the hospital

CHEMICAL BURN & INHALATION

- **Chemical Inhalation**

- **Symptoms**
- Excessive flow of tears.
- Choking and coughing.
- Chest pain.
- Nausea and vomiting.
- Person may have collapsed.
- **Treatment**
- Move from area immediately to fresh air if possible.
- Absolute rest, do not allow victim to move about.
- Apply artificial respiration if necessary.
- Get medical attention immediately.

- **Chemical Burns - Skin**

- **Source:** Strong acids and bases, Corrosive chemicals., Neutralizing agent., The agent itself may be too strong., The heat of reaction may result in burns to the skin., The reaction products formed may burn the skin.
- **Treatment**
- Use the Safety Shower.
- **IMMEDIATELY** remove all contaminated clothing, while under the safety shower.
- Thoroughly drench with water for 15-20 minutes.
- Flood acid burn with a dilute solution of bicarbonate soda.
- Flood alkali burn with a dilute solution of vinegar.
- Get medical treatment immediately.

- **Chemical Burns - Eyes**

- **Treatment**
- Use Eye Wash Fountain
- Remove contact lenses if present.
- Thoroughly drench with water for 15-20 minutes.
- Must hold eyes open - someone may have to assist.
- Get medical treatment immediately.

Type of Accident - Accidents

- **Cuts**
- **Treatment**
- Put on Latex Gloves before treating.
- Thoroughly clean the wound.
- Cover it with a single layer of non-sticking gauze.
- If non-sticking gauze is not available, cover with a good antiseptic first aid cream then dress the wound.
- Bandage with sterile gauze pad and adhesive tape.
- Necessary items are in the First Aid Kit.
- Use first aid procedures to stop excessive bleeding.
- Get medical treatment if necessary.

- **Cuts**
- **Lacerated Wounds**
- **Treatment**
- -Put on Latex Gloves before treating.
- -Cover the injured area with a thick sterile dressing.
- -Bandage it firmly in place.
- -Necessary items are in the First Aid Kit.
- -Get medical attention.

Electrical Shock

- **Prevention**
- To prevent electrical shock from occurring, make sure all cords are grounded and keep all electrical areas (including floor space) dry during performance of the experimental operation.
- **Accidents**
- Assume that the power is still on. Locate the main power switch and turn off.
- **IMPORTANT: DO NOT TOUCH VICTIM OR LIVE WIRES UNTIL IT IS CONFIRMED THAT THE POWER IS OFF. DO THIS BEFORE TOUCHING THE VICTIM.**
- If a live wire is trapping the victim, turn off main power switch.
- Once electrical contact has been broken, check if victim is conscious and breathing.
- **First Aid**
- If breathing has stopped, begin artificial respiration and get medical attention immediately.
- If cardiac arrest has occurred. Get immediate medical attention.
- Treat any burns if they occur.
- **Miscellaneous**
- Have an electrician inspect the accident area and get permission before turning electricity back on.

Type of Accidents - Fire

- **Fire**
- Use the Safety Shower to extinguish a clothing fire.
- Use fire extinguisher to put out an equipment or facilities fire if this can be done without endangering yourself.
- Shut down experiment.
- Evacuate laboratory immediately and safely.
- Sound fire alarm.
- Dial 4434 on any campus phone.
- Group Managers verify that all group members were evacuated.
- Do not re-enter building until told to do so by a Public Safety Officer.

Type of Accidents – Chemical Spills

- **Chemical Spills**
- Know the hazards associated with all chemicals used in the lab.
- Know the location of spill response supplies and the procedure for containing any type of spill before using any chemicals in Lab.
- If a chemical is splashed on a person's skin, eyes, or clothing use the safety shower and/or eyewash fountain immediately and remove any contaminated clothing.
- Minor spills and large spills of non-hazardous chemicals must be cleaned up immediately.
- In the event of a major spill or the spill of any hazardous chemical, notify the lab supervisor immediately. If you feel others may be in danger because of the spill, evacuate the building, close the doors to isolate the area..