

UNIVERSITY OF PUERTO RICO

**MAYAGUEZ CAMPUS
PROGRAM OF FOOD SCIENCE
AND TECHNOLOGY**

**SAFETY RULES AND REGULATIONS FOR UNDERGRADUATE
AND GRADUATE STUDENTS**

FOOD MICROBIOLOGY RESEARCH LABORATORY

CTA-219

I certify that I have read and I understand the Safety Rules and Regulations for Undergraduate and Graduate Students Adopted by the Program of Food Science and Technology in Consideration of Being Permitted to Work in the Food Microbiology Research Laboratory at CITAI.

I will abide by these rules and regulations.

At all times I will use safe laboratory procedures.

SIGNATURE

Date

I will make every effort to assist this student in complying with all of the safety rules and regulations of the Program of Food Science and Technology at University of Puerto Rico, Mayagüez Campus.

RESEARCH ADVISOR

Date

FACILITIES MANAGER

Date

**THE RESEARCH ADVISOR MUST RETURN SIGNED
FORM TO THE FACILITIES MANAGER.**

*Effective March 2005
Revised June 2021*

***SAFETY RULES AND REGULATIONS FOR UNDERGRADUATE AND
GRADUATE STUDENTS
Food Microbiology Research Laboratory
CTA-219***

*Effective March 2005
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These safety rules must be obeyed by all undergraduate and graduate students at all times in the laboratory.

Undergraduate and graduate students who violate these safety rules will be subject to **dismissal** from the laboratory or may be **denied** any further use of the laboratory.

These safety rules are meant to assist clear thinking, reasonable judgment, and the exercise of foresight in the design and implementation of any experiment.

It is essential that you study this material in order to understand what is expected of you while you work in the laboratory.

Everyone is responsible for safe laboratory practices and is expected to exercise all due caution and prudence when working in the laboratory.

A telephone is located near the entrance door

In case of an emergency please contact:

**Emergency 911
University Police Office**

I. RULES FOR PERSONAL PROTECTION

UNDERGRADUATE RESEARCH STUDENTS MUST BE SUPERVISED BY THE FACULTY MEMBER OR A DESIGNATED SURROGATE DURING THE NORMAL WORK DAY (8:00 A.M. - 4:30 P.M.). Undergraduates may not use the laboratory after normal hours or when the University is closed.

GRADUATE STUDENTS ARE ALLOWED TO WORK BY THEMSELVES DURING NORMAL WORK DAY (8:00 A.M.-4:30 P.M.) Graduates students who need to work in a laboratory outside the normal working hours require permission in the form of a signed specific statement from their advisor. This statement must be approved by the laboratory manager and program coordinator. Any person using a laboratory outside normal working hours should, on the day concerned, sign the book in the foyer for recording the times of entering and leaving the laboratory.

There should always be more than one person working in the laboratories unless the activity has been designated “low risk”. **This rule applies to everyone.**

- A. You must wear a protective laboratory coat or apron **buttoned up** at all times in the laboratory. You are advised to wear clothing (preferably not shorts) that covers your legs.
- B. Suitable footwear which covers the feet (i.e. not sandals) must be worn at all times in the laboratory. If you want to wear other shoes to and from work, etc., you might want to keep an old pair of fully enclosed shoes at work to wear in the lab. Thongs, or bare-backed sandals or shoes, or very high heels must not be worn in the laboratory. Bare feet are prohibited in the building.
- C. Hair longer than shoulder length and loose clothing must be confined when working in the laboratory.
- D. Safety goggles must be worn in the laboratory when chemicals and any equipment with moving parts (centrifuge, vortex mixer etc) is being used in the laboratory.
- E. The use of contact lenses in the laboratory is strongly discouraged. Contact lens wearers should be aware of the additional risks, and contact lenses should **never** be worn where there is a possibility of chemicals or ineffective materials entering the eye. If you wear contact lenses, make sure you know where the first aid boxes and emergency eye wash stations are. All students who work in the laboratory must sign a statement that states that they will accept responsibility for any injury caused by their wearing of contact lenses.
- F. If any chemical or biological spills onto your skin, immediately wash the affected area with water. You or a co-worker must immediately notify the research advisor.
- G. Notify your Research Advisor about any sensitivities that you may have to particular chemicals before undertaking any experimental work with such chemicals.
- H. In case of fire you must evacuate the building immediately. If it is possible, extinguish all flames and turn off all equipment, as appropriate, before exit.

- I. 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.
- J. No chemical or culture media should ever be tasted.
- K. Do not attempt to dry glassware by inserting a towel wrapped around a glass rod.
- L. No smoking, eating, drinking, chewing gum or sucking confectionary, or applying cosmetics in laboratory areas. No food or drink is to be stored in laboratories (including cold rooms, refrigerators and freezers). No chemical apparatus should ever be used for eating or drinking purposes in any location whatsoever.
- M. Autoclave any biological material (petri dishes, dilution bottles, pippets, gloves) in the biological bag before discard.
- N. Discard all material in the biosafety box. Contact the Academic Secretary to remove containers when they are full.
- O. Wash your hands at the end of your laboratory work before you exit the laboratory.
- P. Remove gloves and laboratory coat before you exit the laboratory.
- Q. Return all equipment and/or materials to its proper place

II. RULES FOR GENERAL SAFETY

- A. Unauthorized experimentation and work in the laboratory are forbidden.
- B. Unauthorized personnel are not permitted in a laboratory.
- C. Excessive noise and hazardous conduct are forbidden.
- D. Any personal injury or accident that may occur in the laboratory must be reported to the research advisor in charge, or, if he or she is not immediately available, to some other faculty member.
- E. 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 report to the research advisor in charge and any other person who might be affected by such an occurrence.
- F. Each student must 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.
- G. 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.
- H. Solid materials (paper, matches, towels, broken glass, stoppers, rubber tubing, etc.) must be kept out of the sinks at all times to minimize the danger of plugging drains.
- I. Good housekeeping is essential. Aisles, emergency exits, and breakout panels must be unobstructed. Hoods must be available for work.
- J. Bench spaces should always be left clean. Bench tops must be kept as free from unnecessary apparatus as possible. Clean up all spills (including water) immediately. Do not leave spills on the benchtop or floor. Minimize aerosol

- production when carrying out work on an open bench. Use equipment designed to contain aerosols for all manipulations such as shaking, mixing or sonication. A period of five minutes is required after these manipulations to allow aerosols to settle. If appropriate, subculture organisms in biological safety cabinets. Decontaminate work benches after spills and after work has been completed.
- K. Keep glassware clean. Glassware and other containers should be rinsed and stacked carefully. Broken glass must be immediately disposed of in the bin provided for the purpose. Breakages must be reported to the laboratory manager.
 - L. All materials, including those in a refrigerator, must be labeled (Name, date and content, expiration date).
 - M. Coats, bags, and other personal items should be stored in the proper areas in the laboratory room; not on the benchtops or in the aisles.
 - N. Sinks should not be filled with dirty glassware.
 - O. Clear visibility from corridors into laboratories must be maintained. Only authorized warning signs and directories are permitted on the glass of the laboratory doors; no posters, etc. are permitted.
 - P. In the event of a mercury spill, contact the Laboratory Manager, Research Advisor or Program Coordinator Academic. All mercury spills must be cleaned up promptly and appropriately.
 - Q. As a reminder of University policy, smoking is prohibited in all laboratory facilities.
 - R. Space in the laboratories is, unfortunately, very confined so it is essential that the following rules are strictly obeyed.
 - S. Any experiment left running unattended should be labelled in such a manner that the laboratory technician or anyone else entering the laboratory, and who may be familiar with the apparatus, can shut it down without risk. Overnight running of equipment is not desirable. Weekend running of equipment is forbidden, except by special permission . In every case, an authorization document must be completed and signed by the advisor, laboratory manager and program coordinator.
 - T. All containers and samples should be labelled so that the laboratory personnel knows who owns them.
 - U. On leaving the laboratory, make sure all electrical equipment you have used is switched off and the plugs removed, except when equipment is labelled as having an experiment in progress.
 - V. Any laboratory equipment that is required outside the laboratory must be signed out by the laboratory technician.
 - W. **PIPETTING BY MOUTH IS NOT ALLOWED. Avoiding ingesting microorganisms.** The best protection to ingesting microorganisms is not to put them in your mouth. Labels and envelopes must not be licked. Pencils and pens must not be placed in the mouth. Chewing of fingernails, playing with hair, applying lipstick, eating, drinking, etc., are not allowed. Wash your hands when leaving the laboratory to go to lunch, etc.
 - X. **Syringes and needles.** Restrict the use of "sharps" to a minimum. Do not bend needles, or try to replace the caps after use. Use syringes fitted with blunt cannulas where possible. Avoid using syringes to mix infectious liquids (if

essential, hold the tip of the needle under the surface of the fluid and avoid excessive force). Discard used syringes and needles into an approved sharps container.

III. BACTERIOLOGICAL LOOPS

When flaming wire loops, draw the loop gradually from the cooler to the hotter part of the flame to minimise spattering, or use electric heaters. Ensure the loop is completely closed and the loop wire is not longer than 6 cm.

Disposable plastic loops must be placed loop-end down in disinfectant for 18-24 hours.

IV. FUNGAL SPORES

Petri dish cultures of fungi should be sealed and incubated with the lid uppermost to prevent the dispersal of fungal spores. Recognize fungi as potential pathogens and be aware of the ability of some species to produce mycotoxins.

V. PETRI DISHES

Take care when handling Petri dishes that contain condensate. This may contain viable microorganisms that can be spread via droplets or aerosols when the plates are opened or dropped.

VI. TISSUE GRINDERS AND HOMOGENIZERS

Open and operate tissue grinders in a biological safety cabinet. Hold glass grinders in a wad of absorbent material and wear gloves. Wait 10 minutes before opening a blender bowl to allow aerosols to settle. Refrigerate to condense aerosols. Use models designed to prevent leakage from rotor bearings and O-ring gaskets or use a "stomacher".

VII. WORKSTATIONS/COMPUTERS IN LABORATORY AREAS

If possible, do not place computers in laboratories. If this is required to run equipment or log data, or is otherwise unavoidable, reorganize the laboratory so that equipment that may harm people working on computers, or damage the computers themselves, is not placed near the computers.

VIII. FLAMMABLE LIQUIDS

A. All flammable liquids are to be stored in approved safety cabinets. **EVERYONE IS URGED TO MINIMIZE THE TOTAL VOLUME OF FLAMMABLE LIQUIDS STORED IN A LABORATORY.** All flammable solvents from bulk (large metal containers) should be dispensed into approved safety cans. Flammable liquids not stored into approved safety can should be stored in the safest possible manner and in the smallest quantity appropriate for the intended use. Experience has established that the

most serious laboratory fires have involved large volumes of flammable solvents in a laboratory.

B. Very volatile flammable substances must not be heated in open containers near a flame or laboratory equipment where the flammable substance may ignite. Before very volatile substances are heated, the area must be carefully inspected for the presence of open flames, hot plates, potential electric sparks, etc. If in doubt about the flammability of a substance, consult your research advisor or MSDS sheet.

IX. GASES AND TOXIC FUMES

A. All cylinders containing gases under pressures of more than 100 lbs/sq. in. and/or more than 36 inches in height must be handled or transported only on suitable trucks. Such cylinders in use or in storage inside a laboratory must be secured by a cylinder strap or a chain positioned approximately 1/4 of the way down the cylinder. Compressed gases must be transported with the safety cap covering the valve (i.e., no regulators). The regulator must be removed and replaced with a safety cap prior to transport of a gas cylinder.

B. Cylinders containing poisonous, corrosive, or flammable gases must not be opened by any operator who has not used them previously without permission and instruction from the research advisor in charge or other proper authority. Furthermore, such cylinders may be opened only when properly connected to apparatus contained in a hood under draft. Adequate traps must be placed between the cylinders and other apparatus.

C. Experiments involving odorous, lachrymatory, vesicant, toxic, corrosive, or otherwise obnoxious substances must be carried out **in a hood under draft** and not on the bench top. Provisions should be made to absorb corrosive, toxic, and obnoxious fumes. Obnoxious and dangerous gases must not be released into the laboratory.

D. Reactions or operations involving high or low pressure - especially those using or generating hazardous or explosive gases - must be properly contained and/or vented.

E. Gas valves must be kept closed except when a burner is in use.

X. WASTE DISPOSAL

A. Biological waste is to be stored in appropriate containers.

B. Chemical and biological waste must be collected in appropriate containers, properly labeled, and submitted with the proper paperwork to the academic secretary.

D. Chemical waste stored in the smallest container possible (i.e., not 500 mL in a 2L bottle). The container should be reasonably full (but with 1-2 inches of headspace) prior to pickup.

E. **DO NOT POUR CHEMICALS DOWN THE DRAIN.**

XI. GLASSWARE

A. Tubing ends must be fire-polished or ground smooth. Towels or gloves must be used to protect the hands when inserting glass tubing into corks or stoppers. Lubricants such as soapy water, mineral oil, or glycerol may be useful.

B. Do not use cracked glassware.

- C. Heavy pieces of apparatus must be supported with clamps suitably protected with pads and also with bottom support such as tripods or rings.
- D. Broken glass should be disposed of in containers specifically designed for that purpose, not in the normal trash containers. Contact the Academic Secretary to remove broken-glass containers when they are full.
- E. Reagent bottles may be cleaned for re-use.

XII. COURTESY

- A. In the daily operation of these rules, the laboratory worker is to be considerate of the safety, comfort, and welfare of his or her neighbors.
- B. Radios must not be audible from outside the immediate laboratory or office and use must be discontinued if potentially hazardous situations exist or if it disturbs coworkers.

XIII. ENFORCEMENT

- A. The laboratory manager will inspect laboratories regularly and will make a written report of its inspection.
- B. Persons repeatedly cited for violation of safety rules will be subject to disciplinary action.

IX. ACCIDENTS

There are first aid boxes in the laboratory. In the event of a more serious incident contact a member of staff. In research laboratories all the workers must share responsibility for safety.

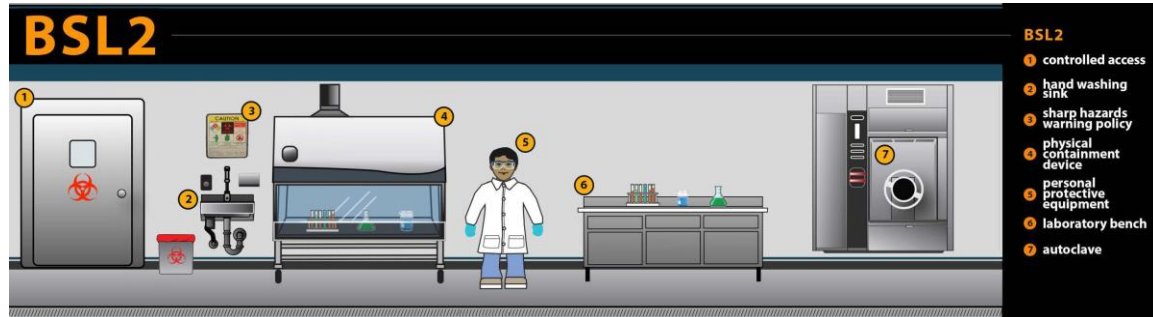
GENERAL REFERENCES

1. *“Prudent Practices in the Laboratory: Handling and Disposal of Chemicals”*, National Research Council, National Academy Press, Washington, D.C., 1995.
2. *“Merck Index”*, 12 edition.
3. *“Aldrich Catalog Handbook of Fine Chemicals”*,

NOTE: From time to time regulations affecting safety in the laboratory are issued as amendments to this book; attention will be drawn to these by notices posted on the Safety Notice board which is situated in the main entrance.

Classification of laboratories according to use

It is generally accepted one to four biosafety laboratory level. In the CDC classification our lab is a BSL-2.



Medical emergency

Major

- Remain calm.
- Initiate lifesaving measures if required.
- Do not move person unless there is danger of further harm.
- Keep person warm.
- Call for emergency response.

Minor

- Initiate first aid.
- Report incident.

Fire emergency

Major

- Alert people in area to evacuate.
- Activate nearest fire alarm or call Security number.
- Close doors to confine fire.
- Evacuate to safe area or exit building through stairwell; do not use lift.
- Have person knowledgeable of incident and laboratory assist emergency personnel.

Minor

- Alert people in laboratory and activate alarm.
- Smother fire or use correct fire extinguisher.
- Aim extinguisher at base of fire.
- Always maintain accessible exit.
- Avoid smoke or fumes.

Further information on fire emergencies

- Small fires can be extinguished without evacuation.
- Fire extinguishers should only be used by trained personnel.
- Never enter a room that is smoke filled.
- Never enter a room containing a fire without a backup person.

Chemical spill emergency

Major

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- If spilled material is flammable, turn off ignition and heat sources.
- Call for assistance.
- Close doors to affected area.
- Have person knowledgeable of incident and laboratory assist emergency personnel.

Minor

- Alert people in immediate area of spill.
- Wear protective equipment, including safety goggles, gloves, and long-sleeve laboratory coat.
- Avoid breathing vapors from spill.
- Confine spill to small area.
- Use appropriate kit to neutralise and absorb inorganic acids and bases. Collect residue, place in container, and dispose as chemical waste.
- For other chemicals, use appropriate kit or absorb spill with vermiculite, dry sand, or diatomaceous earth. Collect residue, place in container and dispose as chemical waste.

Further information on chemical spills

- The range and quantity of hazardous substances used in laboratories require preplanning to respond safely to chemical spills.
- The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel.
- Spill kits with instructions, absorbents, reactants, and protective equipment should be available to clean up minor spills.
- A minor chemical spill is one that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel. All other chemical spills are considered major.

Biological spill emergency

Major

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in immediate area of spill.
- Close doors to affected area.
- Cover spill with paper towels or other absorbent materials.
- Carefully pour a freshly prepared 1 in 10 dilution of household bleach around the edges of the spill and then into the spill. Avoid splashing.
- Allow a 20-minute contact period for the bleach solution to be effective.
- Use paper towels to wipe up the spill, working from the edges into the centre.
- Clean spill area with fresh towels soaked in disinfectant.
- Place towels in a plastic bag and decontaminate in an autoclave.
- Have person knowledgeable of the incident and laboratory assist emergency personnel.

Minor

- Soak paper towels in disinfectant and place over spill area.
- Place towels in plastic bag for disposal.
- Clean spill area with fresh towels soaked in disinfectant.

Clothing on fire

- Roll person around on floor to smother flame, or drench with water if safety shower is immediately available.
- Obtain medical attention, if necessary.
- Report incident to supervisor.

Chemical spill on body

- Flood exposed area with running water from faucet or safety shower for at least 5 minutes.
- Remove contaminated clothing at once.
- Make sure chemical has not accumulated in shoes.
- Obtain medical attention, if necessary.
- Report incident to supervisor.

Biological spill on body

- Remove contaminated clothing.
- Vigorously wash exposed area with soap and water for one minute.
- Obtain medical attention, if necessary.
- Report incident to supervisor.

Hazardous material splashed in eye

- Immediately rinse eyeball and inner surface of eyelid with water continuously for 15 minutes.
- Forcibly hold eye open to ensure effective wash behind eyelids.
- Obtain medical attention.
- Report incident to supervisor.

Minor cuts and puncture wounds

- Vigorously wash injury with soap and water for several minutes.
- Obtain medical attention.
- Report incident to supervisor.