Jordanian Accreditation System
نظام الاعتماد الأردني
Accreditation Unit

SAFETY POLICY IN FOOD TESTING LABORATORIES

Purpose

The purpose of this AU policy is:

- To ensure that lab personnel in the food testing laboratories are informed about hazards in their workplace.
- To protect the lab personnel in the food testing laboratories from potential health hazards.
- To establish safe work practices in food testing laboratories.

Scope

This policy addresses general safety & health requirements for work in the laboratories performing food testing (chemical, microbiological, physical food testing).

Authorship

This publication has been written by the technical committee, and approved by the accreditation director.

Official language

The text may be translated into other languages as required. The English language version remains the definitive version.

Copyright

Further information

This policy is mandatory for laboratories, and shall be implemented within four months from its issuance date For further information about this publication, kindly contact AU.

This document is also available at our website where you can update directly.

Contents

1. Introduction

The following set of guidelines shall be applied for the safety practices of food testing laboratories. The procedures proposed in this set of instructions are to guarantee the safety of persons working in the field, as well as, is to reduce the potential hazards associated with equipment use, physical, biological, and chemical handling.

2. Responsibilities:

- The laboratory management is responsible to inform, and to ensure that the lab personnel apply this policy, as well as, to provide the laboratories with the safety equipment, requirements, and guidelines.
- The lab personnel are responsible to follow and apply this policy for their safety.

3. Policy:

A. General guidelines strictly to be followed in all food laboratory sections:

- Use personal protective equipment (PPE) as required: Eye, skin and body protections are important to protect against chemical and biological exposure. You can use the chemical's safety data sheet, label and/or manufacturer's instructions to identify the required level of PPE and hygiene practices needed for your activity.
- Restrict laboratory access to authorized persons only.
- Absolutely no food, drinks, chewing gum, or smoking is allowed in the laboratory.
- Do not store food in areas where microorganisms or chemicals are stored.
- Never mouth pipette, use mechanical transfer devices mouth pipetting is strictly prohibited.
- Don't wear sandals or open shoes, wear safety lab shoes.
- Long hair must be tied back.
- Keep your head scarf or any dangling jewellery under your lab coat.
- Never touch your face, mouth or eyes.
- Never put anything in your mouth, such as pencils, pens, labels, or fingers.
- Keep working under chemical fume hoods or biological safety cabinets to reduce exposure to hazards.
- Remove your gloves before using instruments, telephone, and cell phones.
- Laboratory coats must be kept fastened. Avoid loose fitting items of clothing.
- If you have an allergy to lab materials or suffer from, a medical condition which may affect you in the laboratory (e.g. diabetes or epilepsy), ensure that your supervisor knows.
- Cover any cuts on your hands with a bandage. Gloves may be worn as extra protection.
- Wash your hands frequently throughout the day, after using chemicals, and before eating and leaving the lab.
- Never smell or taste a chemical or substance for identification purposes.

- Always use hazardous chemicals or standard bacteria as intended.
- Do not wear lab coats, gloves, or other personal protective clothing outside of lab areas.
- Cell phones and use of music headphones should be avoided while working in the lab.
- Have a separate, labeled containers for broken glass, for each different type of hazardous chemical waste and biological waste, for food trash and general trash.
- Avoid working alone in the lab. If you must work alone, make someone aware of your location.
- Know all emergency procedures ,safety equipment, and evacuation procedures.
- Keep work areas as neat and clean as possible.

B. Food Chemistry Lab Practice and Safety Rules:

- Avoid storing heavy containers above shoulder level.
- Avoid storing chemicals in fume hoods or on counter tops.
- Avoid storing chemicals near sources of heat or in direct sunshine.
- Store concentrated acids and bases separately.
- Keep corrosives away from organic chemicals and combustible materials.
- Keep reactive away from heat, light, water and air
- Keep oxidizing away from flammable and combustible materials
- Keep flammable and combustible away from heat, sparks or flame
- Remember to use the proper goggles, gloves and other personal protective equipment before handling any chemicals.
- There must be an inventory list of hazardous chemicals
- Chemical containers must be properly labeled with a minimum of chemical name, hazard warnings and target organs.
- Locate and keep the material safety data sheet (MSDS) of each chemical accessible to lab personnel.
- Read the label and the MSDS carefully before storing and using a chemical
- Containers shall be dated when received and opened.
- Place the chemical container in an outside (secondary) container or bucket when the chemical is hand carried or cart transporting.
- Chemicals should be stored in the laboratory according to their chemical compatibility or by hazard class not in alphabetical order (see appendix 1).
- At a minimum, chemicals should be segregated as: Corrosives, Oxidizers, Flammable Liquids, Poisons or Toxic Chemicals, Reactive (water or time sensitive).
- If available, use ventilated cabinets for volatile toxic and odoriferous chemicals.
- Use approved flammable storage cabinets for flammable liquids
- When refrigerating flammable, only use refrigerators specifically designed for flammable materials.
- Do not store food in chemical storage refrigerators and label chemical storage refrigerators with the following: No Food – Chemical Storage Only
- Avoid storing liquid chemicals above eye level.
- Avoid storing chemicals in the passageways.
- Avoid overstocking shelves.
- Avoid storing heavy containers above shoulder level.

- Avoid storing chemicals in fume hoods or on counter tops.
- Avoid storing chemicals near sources of heat or in direct sunshine.
- Store **concentrated acids and bases** separately.
- Keep **corrosives** away from organic chemicals and combustible materials.
- Keep **reactive** away from heat, light, water and air
- Keep **oxidizing** away from flammable and combustible materials
- Keep **flammable and combustible** away from heat, sparks or flame
- Remember to use the proper goggles, gloves and other personal protective equipment before handling any chemicals.

C. Food Microbiology Lab Practices and Safety Rules

- Wash your hands with disinfectant soap when you arrive at the lab and again before you leave.
- Keep your workspace free of all unnecessary materials. Backpacks, purses, and coats should be placed in the cupboard by the front door of the lab.
- Disinfect work areas before and after use with 70% ethanol or fresh 10% bleach. Laboratory equipment and work surfaces should be decontaminated with an appropriate disinfectant on a routine basis, and especially after spills, splashes, or other contamination.
- When you flame sterilize with alcohol, be sure that you do not have any papers in place.
- Label everything clearly. All cultures, chemicals, disinfectants, and media should be clearly and securely labeled with their names and dates. If they are hazardous, label them with proper warning and hazard information according to their MSDS.
- Replace caps on reagents, solution bottles, and bacterial cultures. Do not open Petri dishes in the lab unless absolutely necessary.
- Inoculating loops and needles should be flame sterilized in a Bunsen burner before you lay them down.
- Turn off Bunsen burners when not is use.
- Treat all microorganisms as potential pathogens. Use appropriate care and do not take cultures out of the laboratory.
- Wear disposable gloves when working with potentially infectious microbes or samples. If you are working with a sample that may contain a pathogen, then be extremely careful to use good bacteriological technique.
- Sterilize equipment and materials. All materials, media, tubes, plates, loops, needles, pipettes, and other items used for culturing microorganisms should be sterilized by autoclaving.
- Consider everything a biohazard. Do not pour anything down the sink. Autoclave liquids and broth cultures to sterilize them before discarding.
- Laboratory personnel must be provided medical surveillance, as appropriate, and offered available immunizations for the agents handled or potentially present in the laboratory.

D. Safety Rules to Avoid Physical Hazards

- Always keep floors clean and dry.
- Keep corridors and passageway clear with no obstruction across.
- Ensure that spills are reported and cleaned up immediately.
- Close cabinet doors and drawers to prevent accidental fall down.
- Keep sharp knives sharp. They are less likely to cause an accident than dull ones.
- Keep your fingers away from the beaters and blades in appliances.
- Use knives and other tools only for their intended purposes.
- Sweep up broken glass immediately; use a dustpan and brush, not your hand, to pick up broken glass.
- When opening cans, cut the lids completely off.
- Don't leave sharp knives and other sharp objects in a sink full of water.
- Use salt or baking soda, not water to put out a grease fire.
- Use a spoon or pincers, not your fingers, to remove the hot object.
- Keep electrical cords away from water and hot objects.
- Unplug portable appliances after using them.
- Before using an electrical appliance, make sure your hands are dry and that you are standing on a dry surface.
- Never leave heat sources unattended (e.g., gas burners, hot plates, heating mantles, sand baths).
- Locate the main power supply to be turned off in case of an emergency.
- Maintain a comfortable temperature, humidity, and air movements for the worker in the laboratory.

E. Equipment:

1- Laboratory Equipment:

- Never use any laboratory equipment unless you are trained & have been authorized to do so.
- Always keep instruction manuals of each equipment accessible to every authorized person as some equipment need especial handling.
- Ensure that installation, modification, and repairs of analytical equipment are carried out by authorized maintenance engineers.
- When using knives, cut/slice away from your body so. Also, if you need to let someone else use a knife, hand it to him by the handle, not the blade.
- Unplug electric appliances before cleaning them. Do not immerse them in water for cleaning. Some parts may be taken out to be cleaned with other glassware, but you should wipe down these parts with a damp cloth.
- If you are washing tools such as knives, wash them individually and do not let them sit at the bottom of the soapy water.

- Never use gas cylinders without formal training, store them externally and well fitted. Use a cylinder trolley to move gas cylinders, check all connections of the gas cylinder using soap solution.
- Use correct techniques for the insertion of tubing onto glassware.
- Never use glassware under pressure or vacuum unless it is designed for the job and suitably shielded.
- Dispose of chips or broken glassware in a special container.
- Use heat- resistant glassware for the preparation of solutions that generate heat (e.g., not bottles or graduated cylinder).
- Don't put dirty glassware back in with clean glassware.

2- Safety Equipment:

- Laboratories must be equipped at least with the following: Fume hoods, biological safety cabinets, eyewash units, emergency showers, first aid kits, flammable storage cabinets, fire extinguishers, and emergency electrical generators.
- Carry out periodical inspection of the conditions of emergency equipment.
- Do not block access to emergency equipment Keep the floor area around them free and clear of all obstructions.
- All lab personnel must locate and know how to use and operate emergency equipment.
- All lab personnel must familiarize themselves with the content of first aid kit and how to use them.
- Keep instructions readily available for using of emergency equipment.
- Assign and train some of lab personnel on first aid principles (see appendix 3).

F. General Tidiness

- Keep your workplace tidy, as A tidy laboratory avoids accidents to everyone.
- Decontaminate any equipment or work areas that may have been in contact with hazardous materials.
- Clean up waste, deal with washing up and put things away as you finish.
- Leave behind protective clothing when leaving the lab.

G. Spills

1- Food and Oil Spills:

- If you are dealing with liquid food or drink spills, get a clean sponge and absorb as much of the excess liquid as you can. For solid food spills, carefully pick up the loose particles using your hands. For oil spill clean up the spill with tissue paper, then sprinkle the area with salt or starch, leave it for a few minutes, sweep up the salt or starch.
- Blot the area with a clean cloth or paper towels.
- Clean the area with a detergent solution and warm water.

2- Chemical Spills

- Determine appropriate clean up method by returning to MSDS

- The lab must have a general chemical spill kit which at least consist of plastic container, personal protective equipment, inert absorbent, and clean up tools.
- All lab works must have an access to a spill kit which must be located in work areas.
- Keep work instruction for proper using of spill kit.
- Special danger chemical spills need special treatments like mercury spill and bromine spill.
- If the spill is minor and of limited danger clean up immediately.
- If the spill is danger alert everyone present and evacuate the place.
- If the spill cannot be handled call Civil Defense 911.

3- Aflatoxin Solutions Spill

- Wear an appropriate PPE
- If hands become contaminated, wash immediately with undiluted bleach followed by soap and water.
- Clean areas and materials contaminated by any aflatoxin solution or positive
- (i.e., > 20 ppb) extraction solutions spills with bleach. The affected area should be completely covered with 5-6 percent sodium hypochlorite (household bleach) dispensed from a plastic wash bottle or spray bottle.
- Apply 10 parts of bleach to 1 part of spilled material and leave for at least 5 minutes.
- Wipe up the bleach using an absorbent cloth or paper towels.
- Place cleaning materials and PPE in a plastic waste bag, close tightly, and discard.
- Wash your hand again using bleach followed by soap and water.

4- Biological Spills:

- Wear appropriate PPE before cleaning the spill
- Cover any spills or broken culture tubes with a 70% ethanol or 10% bleach solution; then cover with paper towels.
- After allowing the spill to sit with the disinfectant for a 10 minutes contact time, carefully clean up the spill, working from the outer edges into the center.
- Place the materials paper towels and the gloves in a biohazard autoclave bag to be autoclaved.
- Wash the area again with disinfectant.
- Dispose of any contaminated clothing properly.
- Wash your hand with the disinfectant soap.

H. Waste Disposal:

1- Broken Glass:

- Never pick up glass fragments with your fingers; instead, use a brush and dustpan.
- Broken glass must not be discarded in the wastebaskets or trash cans; neither the housekeeping staff nor the trash facilities are equipped to handle it.

- Dispose of glassware in cardboard boxes provided for this purpose. When the box is full, seal it with tape, and label it WASTE GLASS.
- Place it in the hall for removal.

2- Food Waste:

- Dispose of oils and fats by collecting them in a jar not in the sink. Throw the jar of fat into the trash when it gets full, don't recycle the jar.
- Put meats and other foods that rot quickly into the trash on the day it will be collected. Rotting food will attract pests and insects.
- Tie meats and any raw foods you are disposing of into plastic bags before you put them into your trash bag. This will minimize leaks and odors.
- Waste disposal and storage bins are to be emptied when full or on a regular basis.
- Waste disposal bins are to be cleaned and sanitized daily and placed upside down to drain overnight

3- Chemical Waste

- Place liquid wastes in a 1 gallon glass or plastic bottles with caps that can be tightly sealed.
- Don't fill containers over the indicated fill line.
- Fill out the label completely indicating exact contents; include pH for acids and bases.
- Allocate a chemical waste accumulation area and don't put waste containers in corridors or other public locations.
- Make sure container is in a good condition and is clean or has been triple rinsed and original label is defaced if use the chemical bottles available in the laboratory.
- Make sure container is compatible with chemicals that will placed in it (see appendix (2)).
- Perform all liquid waste bulking in properly operating fume hood with splash goggles, lab coat, and appropriate gloves.
- Keep all containers sealed unless actively adding waste and stored.
- Don't mix organic and aqueous waste together in the same waste container .
- Don't mix halogenated organic solvent waste with non-halogenated organic solvent waste.
- Never mix cyanide solutions waste with an acid solution waste.
- Concentrated sulfuric acid and nitric acid, must be diluted at least 5 times before disposing of them to the inorganic acid container.
- Remember that sinks inside fume hoods are not designed for disposing of chemical wastes.

4- Biological Waste

All items to be discarded such as culture tubes, culture plates, swabs, wipes, disposable transfer needles, and gloves, should be placed in a biohazard autoclave bag and

autoclaved 30 to 40 minutes at 121° C at 20 pounds of pressure. If no autoclave is available and you are not working with pathogens, the materials can be covered with a 10% bleach solution and allowed to soak for at least 1 to 2 hours.

4. References

[1] Vindiola, A. Laboratory Safety, appendix B, AOAC, 2012.
[2] Pandey, A. & Anbu, M., Laboratory Safety Manual: Including Chemical Hazards And Safety Procedures
[3] Laboratory Safety **Guidance**, OSHA, 3404-11R, 2011.
[4] James, Daniel E., Nine Safe Practices for the Microbiology Laboratory, Carolina Biological Supply, Burlington, NC. 2008.
[5] Biosafety in Microbiological and Biomedical Laboratories, 5th ed, No. (CDC)21-1112, 2009.

Annex (1):

Example of incompatible combinations of some commonly used chemicals

CHEMICAL	KEEP OUT OF CONTACT WITH:
Acetic Acid	chromic acid, nitric acid, hydroxyl compounds, perchloric acid, peroxides, permanganate
Acetylene	chlorine, bromine, copper, fluorine, silver, mercury
Alkali Metals (e.g. Sodium)	water, chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia, Anhydrous	mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium Nitrate	acids, metal powders, flammable liquids, chlorates, nitrites, sulphur, finely divided combustible materials
Aniline	nitric acid, hydrogen peroxide
Bromine	same as chlorine
Carbon, Activated	calcium hypochlorite, all oxidizing agents
Chlorates	ammonium salts, acids, metal powders, sulphur, finely divided combustible materials
Chromic Acid	acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol, flammable liquids
Chlorine	ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Copper	acetylene, hydrogen peroxide
Flammable Liquids	ammonium nitrate, inorganic acids, hydrogen peroxide, sodium peroxide, halogens
Hydrocarbons	fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrofluoric Acid	anhydrous ammonia, ammonium hydroxide
Hydrogen Peroxide	copper, chromium, iron, most metals or their salts, alcohols,

CHEMICAL	KEEP OUT OF CONTACT WITH:
	acetone, aniline, nitromethane, flammable liquids, oxidizing gases
Hydrogen Sulphide	fuming nitric acid, oxidizing gases
Mercury	acetylene, fulminic acid, ammonia
Nitric Acid	acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulphide, flammable liquids, flammable gases
Oxalic Acid	silver, mercury
Perchloric Acid	acetic anhydride, bismuth and its alloys, organic materials
Potassium	carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	sulphuric and other acids
Potassium Permanganate	glycerin, ethylene glycol, benzaldehyde, sulphuric acid
Silver	acetylene, oxalic acid, tartaric acid, ammonia compounds
Sodium Peroxide	alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulphide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulphuric Acid	potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)

Annex (2)

Chemical waste compatibility table

Chemical container	Waste type	Incompatibility	Comment
A. Alkali	Sodium hydroxide, potassium hydroxide, ammonia solution, metal solutions	**Chromium(VI)**	Metal solution can be collected in this container
B. Chromium solution	Solution that contain chromium(VI)		
C. Cyanide solution	Cyanide or mixtures containing cyanide, ***pH inside this container must be kept strongly alkaline to prevent the evaluation of a lethal gas-hydrogen cyanide***	**Acids**	pH kept strongly alkaline using ***NaOH***
D. Halo solvent	Organic solvents and compounds with halogens (F, CL, Br, & I) *(e.g. trichloromethane, trichloroethylene, and dichloromethane)*		
E. Hydrofluoric acid	Hydrofluoric acid		
F. Inorganic acid	Hydrochloric acid, nitric acid, sulphuric acid, and perchloric acid	**Organic acid**	Strong acid must be diluted less than 25% before poured into this container
G. Lube oil	Pump oil, lubricating oil, liquid paraffins, mineral oil, hydraulic oil etc		
H. Metal solution	Aqueous solutions containing metallic ions or precipitates	**Chromium VI**	Dilute acid and alkali can be dispose
I. Non- halo solvent	Organic solvent and compound without halogens	**halogens**	

Chemical container	Waste type	Incompatibility	Comment
	(e.g. acetone, hexane, and petroleum ether)		
J. Organic acid	All organic acid	**Inorganic acid**	
K. Organic gel	Toxic gel such as polyacrylamide gel, or gel contaminated with toxic chemicals (e.g. ethidium bromide)		
L. Oxidizer, acidic	Oxidizer , (e.g. permanganate, persulfate and perchlorate) in solution with pH<7		
M. Oxidizer, alkali	Oxidizer (e.g. hypochlorite) in solution with pH>7		
N. Sink	Dilute acids and bases, buffers, salts, color solutions (dyes), standards (1-10ppm)		

Annex (3):

First Aids

First Aid for Chemicals in the Eyes

- Don't rub the eyes.
- Hold eyelids open and flush with water for 15 minutes.
- Be careful not to contaminate the other eye.
- Seek additional medical attention First Aid for Chemicals on the Skin.

First Aid for Chemicals contact with skin

- Flush area with lukewarm water for 15 minutes.
- Remove clothing and jewelry from the burning area.
- Seek additional medical attention.

First Aid for Chemical Inhalation

- Move victim to fresh air.
- Get medical attention as soon as possible.

First Aid for Chemical Ingestion

- Get medical attention immediately.