



A TRAINING GUIDE TO TRAINERS MICRONESIA GROWS TECHNOLOGY

A Program to Facilitate
Distance Learning for
Agriculture and
Extension Students at
the College of
Micronesia-FSM

PREPARED BY:

JENNIFER HELIEISAR

ALVIE B. CABAÑEZ

PRESENTED BY:

COLLEGE OF MICRONESIA-FSM





ACKNOWLEDGMENT

*This project was supported
by Agriculture and Food
Research Initiative Award
no. 2021-70004-35162 from
the USDA National Institute
of Food and Agriculture,
entitled, Micronesia Grows
Technology: A Program to
Facilitate Distance Learning
for Agriculture and
Extension Students at the
College of Micronesia-FSM.*

GLOSSARY

CURING

A METHOD OF FOOD PROCESSING THAT INVOLVES THE APPLICATION OF SALT.

PICKLING

IT USES ACIDIC BRINE TO PRESERVE FOOD.

DANGER ZONE

REFERS TO THE RANGE OF TEMPERATURE WHEREIN FOOD-BORNE BACTERIA CAN GROW TO UNSAFE LEVELS.

SMOKING

INVOLVES EXPOSING FISH OR MEAT TO SMOKE FROM BURNING WOOD.

DRYING

REFERS TO A SIMPLE METHOD OF MOISTURE REMOVAL LIKE SUN-DRYING.

FOOD SPOILAGE

A CHANGE IN FOOD THAT RENDERS IT UNFIT FOR EATING.

TABLE OF CONTENTS

I	Acknowledgment	1
II	Glossary	2
III	Table of Contents	3
IV	General Instruction	4-5
V	Project Brief	6
VI	In a Nutshell: FSM Agriculture	7
VII	Pre-test	8-9
VIII	Module 4 Fundamentals of Food Processing	10
IX	Objectives	11
	Topic 1 Principles of Food Processing	12-13
	Topic 2 Food Safety & Sanitation	14-20
	Topic 3 Food Manufacturing Practices	21-24
	Topic 4 Dietary Laws	25-26
X	Post test	27-28
XI	References	29

GENERAL INSTRUCTION

01

INFORMATION AND INSTRUCTIONS TO THE TRAINER

This manual should be used purely as a facilitator's guide. The sessions under each module are presented with an outcome(s) to facilitate the assessment of participants' understanding and depth of knowledge at the end of each session. Following the outcomes are the topics to be covered and facilitating methodology. However, the facilitator should feel free to adapt the methodology suggested to the needs of participants. To enhance a participatory learning process, some methods of presentation and the steps to follow are therefore outlined. The manual also provides some background information on each session. The information is also meant to aid the facilitator in the preparation for the session. Like all participatory methods, the involvement of the participants in all stages of the learning process is vital. However, all users of this manual must study and research into the content of each module before the presentation. Start each sub-topic and group activity by explaining the objective and learning outcomes expected of them, and ensure they are met.

The session should be interactive, participatory, lively and interesting. Let the participants express themselves in local language, if deemed necessary, for them to understand the concepts. Encourage them to ask questions especially on concepts that they do not understand. Switch to either English or vernacular language when you find some farmers or all of them do not understand you in one of the languages.

Start the session with greetings, welcoming remarks, and introduce yourself. Ensure you have the necessary stationery, equipment, and materials for the trainees: projector, flip charts or whiteboard, whiteboard markers, marking pens, posters, and handouts. Be time conscious as you facilitate the session.

This manual is organized around aspects of Food Processing, its fundamentals and principles, food sanitation, food-borne illnesses, and dietary laws.

02

USERS OF THE MANUAL

The manual is intended to be used by facilitators in conducting training workshops across the College of Micronesia-FSM through the aid of C.R.E extension agents and agriculture major students.

03

PRESENTATION METHODOLOGY

The methods of presentation outlined in the manual are suggested as a guide to the facilitator. The facilitator is expected to use his or her judgement in selecting the appropriate method or combination of methods in presenting each session.

04

ASSESSMENT

At the end of each session, the facilitator is expected to assess/evaluate the participants' understanding and level of knowledge by using a simple question and answer session as appropriate. In some of the sessions, assessment questions are suggested as activities whilst in some, the facilitator is given a free hand in determining the kind of questions to be asked. However, all assessments must relate to the session.



PROJECT BRIEF

The Federated States of Micronesia are situated in the Pacific Island region and have a mix of traditional cultures impacted greatly by successive Spanish, German, Japanese, United Nations and United States colonizations and territorial agreements. The food systems here are in transition. Large pelagic and near shore aquatic resources are spread across thousands of kilometers and the potential for misuse is extreme. Local land-based agricultural practices are a mix of traditional and imported crop farming and husbandry. Both ocean- and land-based systems are subject to increasingly challenging results from climate change. In this context, one of the most important tools that local communities have is their knowledge. Showing how traditional knowledge integrates with modern, scientific agricultural research and practices is one of the benefits of a robust CRE program.

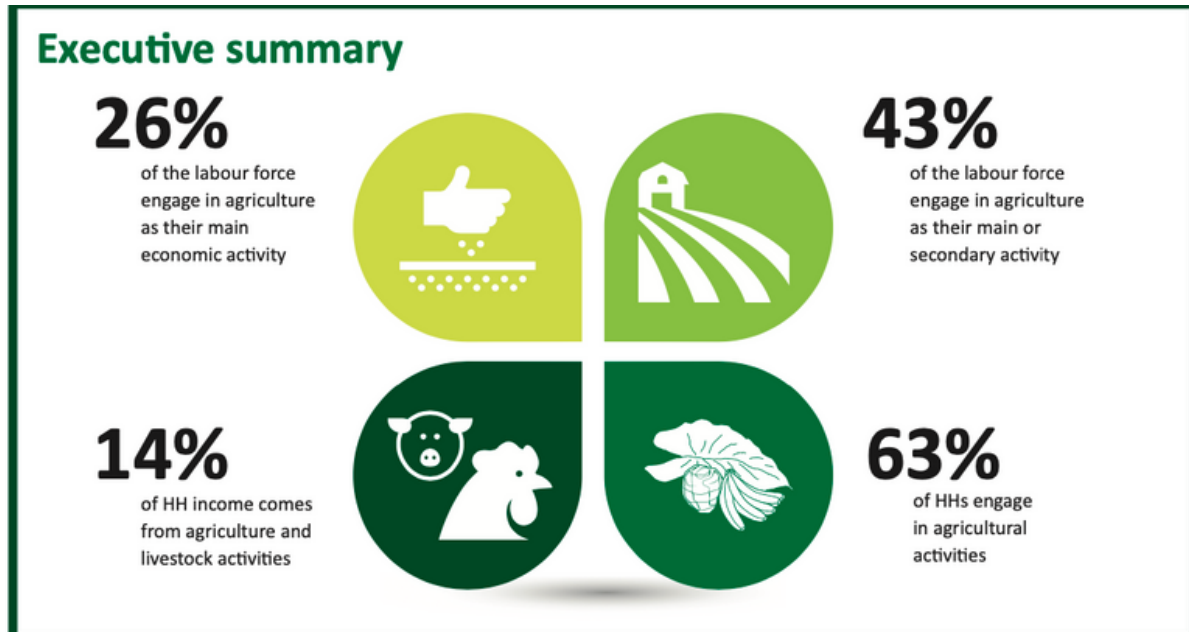
The College of Micronesia-FSM is a learner-centered institution of higher education that is committed to the success of the Federated States of Micronesia by providing academic and career & technical educational programs characterized by continuous improvement and best practices. The college is accredited by the Accrediting Commission for Community and Junior Colleges (ACCJC) of the Western Association of Schools and Colleges (WASC). Prior to the coronavirus pandemic, the college was not accredited to offer distance education programs to its students.

Distance education plays a major part in this process of integration now with the pandemic, as academic offerings of the college are exclusively online where feasible. As a result of the Micronesia Grows Technology program, well-trained agricultural workers will adopt best practices in the region, and will succeed in bringing integrated knowledge to local, state, and regional actors. Acting in concert with the college, which serves all four states of the Federated States of Micronesia (FSM), this progress will reach national communities and impact international practices as well-spoken contributions come from these former agricultural research and extension students. Affording them with personal laptop computers will make this possible in a way that faces forward and opens up access to the whole world of internet offerings in agricultural practices. Familiarity with computing helps make this happen.

The Cooperative Research and Extension (CRE) program provides training, knowledge and skill development in agriculture and aquaculture, nutrition, resource management, and youth and families through our research, extension, and resident instruction programs. The rental program providing laptops to agriculture students will add momentum to the overall goals of the college, and in particular will aid the CRE in its mission to provide unrestrained support in aiding the development of the Federated States of Micronesia.

In a Nutshell

FSM AGRICULTURE



Agriculture is extremely important for the livelihoods of households (HH) across the Federated States of Micronesia (FSM). 63% of HHs report conducting some form of agriculture and forestry. 43% of the labour force conduct agriculture as a primary or secondary activity, and agriculture contributes 14% to overall HH income.

However, most of these agricultural activities are for subsistence. Nearly 40% of HHs produce goods purely for their own consumption (subsistence). Only 24% of FSM HHs have sold any part of their agriculture production. Very few agriculturally active HHs hire labour or use inputs such as fertiliser and irrigation.

Agricultural production varies considerably across states. The most important food crops (in terms of total value sold, gifted and consumed) were: taro in Yap, breadfruit in Chuuk, yam in Pohnpei and banana in Kosrae.

Other crops also provide significant income in some states. Sakau (kava) had the highest value of production in total, and provides the highest income from sales, with more than USD2.5 million in sales in Pohnpei. Betel nut was a major income earner in Yap, and was sold, gifted and consumed across all states.

Livestock is also important for subsistence. 51% of HHs reported raising livestock but only 20% of these HHs sold their production. Pigs are the most important livestock, with 80% of livestock HHs reporting having pigs.

PRE-TEST

01

True or False: Food spoilage is any change in food which renders it unfit for eating. It can be due to contamination or natural decay which are both associated to the growth of microorganisms.

- a. True b. False

02

This method of food processing extends the shelf-life of food by adding salt which reduces water activity in a process called Osmosis.

- a. Fermentation b. Salting c. Thermal Application d. Drying

03

It is the microbial breakdown of carbohydrates into alcohols and acids.

- a. Hydrolysis b. Cellular Respiration c. Salting d. Fermentation

04

Also referred to as canning, it kills microorganisms by subjecting food to intense heat and pressure.

- a. Pressurization b. Thermal Processing c. Pasteurization d. Salting

05

This refers to the range of temperature wherein food-borne bacteria can grow to unsafe levels.

- a. Heat Zone b. Danger Zone c. Thermal Zone d. Pathogenic Zone

06

It is the amount of free or non-chemically bound water in food that is available for microbial growth:

- a. pH b. water Activity c. Moisture Content d. Salinity

07

Food is processed for the following reasons, except:

- a. To add value to raw agricultural produce c. To create new food products
b. To exhaust the environment's resources d. To extend shelf-life of food

08

The following are examples of food-borne pathogens except:

- a. E. coli b. Norovirus c. Hibiscus d. Salmonella

09

True or False: Wear outer garments in order to prevent contamination of food, food-contact surfaces, or food-packaging materials.

- a. True b. False

10

_____ is crucial in preventing food contamination.

- a. Handwashing b. Danger Zone c. Pathogens d. HACCP



MODULE 4

FUNDAMENTALS OF FOOD PROCESSING



OBJECTIVES

AT THE END OF THE MODULE, YOU SHOULD BE ABLE TO:

- Cite methods of food processing;
- Explain how food spoilage occurs;
- Demonstrate food safety and sanitation practices;
- Perform occupational safety procedures;
- Practice good housekeeping and proper waste disposal; and
- Identify dietary laws in food processing

Topic 1 Principles of Food Processing

Food is processed for several reasons – to add value to raw agricultural products, to extend shelf-life, to create new food products, to improve the nutritional value of products, to create new food products and more. Food processing has introduced so many products – from bacon to pickles, canned goods, even candies!

METHODS	MEANING
CURING	A method of food processing that involves the application of salt.
SMOKING	A method of food processing that involves fish or meat to smoke from burning wood.
HOT SMOKING	A method of food processing that is usually done at temperature up to 63-80 degrees Celsius.
COLD SMOKING	A method of food processing that is usually done at temperature up to 27-37 degrees Celsius.
PICKLING	A method of food processing that uses acidic brine to preserve food.
DRYING	A method of food processing that refers to a simple moisture removal like sun-drying.
DEHYDRATION	A method of food processing that controls the temperature, time, and humidity of an equipment where the food is dried.



METHODS	TYPES	MEANING
FERMENTATION	LACTIC ACID	<p>Lactic acid fermentation is the anaerobic microbial breakdown of sugar which yields energy in the form of ATP and produces a byproduct called lactic acid.</p> <p>Lactic acid fermentation is caused by good bacteria, which you may have heard is an ingredient of a probiotic drink.</p>
	ALCOHOLIC	<p>Alcoholic fermentation is the anaerobic microbial breakdown of sugar into alcohol and carbon dioxide due to the addition of yeast. The final product of alcoholic fermentation is ethanol.</p>
	ACETIC ACID	<p>In acetic acid fermentation, ethanol undergoes oxidation to produce vinegar. This type of fermentation follows alcoholic fermentation and uses a mother/starter vinegar from the genus Acetobacter to feed on the alcohol to produce acetic acid.</p>
SUGAR CONCENTRATION	PECTIN	<p>Is a soluble gelatinous polysaccharide present in ripe and under-ripe fruits. It is the setting agent of jams and jellies.</p>
	SUGAR	<p>Has the same osmotic effect as salt that reduces the amount of free water in food where microorganisms multiply.</p>
	ACIDITY	<p>Pertains to the level of acid in fruits and is measured by using a pH meter. Acid toughens the fibers of the gel network.</p>
THERMAL APPLICATION	PASTEURIZATION	<p>It is also referred to as partial sterilization, entails heating food up to 100 degrees Celsius.</p>
	PRESSURIZATION	<p>It kills microorganisms by subjecting it to intense pressure and heat.</p>

Topic 2 Food Safety & Sanitation

Imagine opening the refrigerator and you see a jar of your favorite food. You are very excited and can't wait to eat it. But as you opened the lid, the rancid smell fills your nostrils and you scrunch your face and say, "Yuck!" The food is expired. But you just bought it last week, you say in vain!

Imagine opening the refrigerator and you see a jar of your favorite food. You are very excited and can't wait to eat it. You open the lid, it looks normal. You eat it but feel something is off. You spend the next 3 hours at the toilet with an upset stomach.

Food spoilage is any change in food that renders it unfit for eating. It can be due to contamination or natural decay which are both associated with the growth of microorganisms.

CONDITIONS THAT SUPPORT THE GROWTH OF MICROBIAL PATHOGENS INCLUDE:

F **Food.** Pathogens need a source of food—especially proteins or carbohydrates, which are readily available in many of the foods you serve.



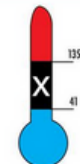
A **Acidity.** Pathogens grow best in foods with low acidity; ingredients like lemon or tomato can make the food too acidic for rapid growth of pathogens



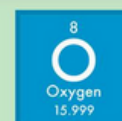
T **Time.** Pathogens need time to grow. A single bacterium can multiply over 1,000,000,000 bacteria in 10 hours.



T **Temperature.** Pathogens grow best between 41°F (5°C) and 135°F (57°C)—The Danger Zone.



O **Oxygen.** Some pathogens need oxygen.



M **Moisture.** Pathogens need moisture to grow.



The growth of microorganisms is significantly attributed to the availability of water. Just like in humans, water supports the growth of bacteria, yeasts, and molds. You may have observed that most food processing methods aim to decrease the concentration of free water by adding sugar or salt or by allowing water to evaporate from the foodstuff. Food spoilage can also be caused by reactions with oxygen, light, and chemical constituents of the food. Furthermore, these causes can act together and increase the rate of food spoilage. When spoiled food is consumed, it can lead to food-borne illnesses.



Bacteria



Molds



Yeast

- +1
- single-celled, can only be seen through a microscope
 - can either be good or bad
 - produce slimy substance
 - multiplies fast
- ✓

- +1
- type of fungus
 - thrives in low moisture content, cold environment
 - appearance: cottony, green/white/yellow/brown
- ✓

- +1
- type of fungus
 - thrives in acidic and sugary solutions, and low moisture environment
 - can adapt to cold temperatures
 - used in fermentation but is undesirable in other food products
- ✓

COMMON FOOD-BORNE PATHOGENS



Listeria

fresh milk,
unwashed produce



E. coli

fecal
contamination



Campylobacter

undercooking,
unhygienic kitchen



Salmonella

undercooking,
poor hygiene



Staphylococcus

unrefrigerated food



Ciguatera

coral algae toxin



Shigella

human waste
contamination



Botulism

damaged cans

COMMON CAUSES OF OUTBREAKS OF FOOD-BORNE ILLNESSES

1. Failure to properly refrigerate food.
2. Failure to thoroughly heat or cook food.
3. Employees who practice poor personal hygiene.
4. Foods prepared a day or more before they are served.
5. Raw, contaminated ingredients incorporated into foods that receive no further cooking.
6. Foods allowed to remain at temperatures favoring bacteria growth.
7. Failure to reheat cooked foods to temperature that kill bacteria.

8. Cross-contamination of cooked foods with raw items either by workers who mishandle foods or through improperly cleaned equipment.

HAZARD ANALYSES AT CRITICAL CONTROL POINT (HACCP)

Hazard Analyses at Critical Control Points (HACCP) refers to a food safety management system which identifies, evaluates and controls hazards which are significant for food safety at critical points during a given stage in the food supply chain.

Food Safety Hazards is any biological, chemical, or physical agent in food with the potential to cause adverse effects on health.

Examples:

- Biological: bacteria, viruses, parasites, molds
- Chemical: pesticides, processing chemicals, drug residue, allergens
- Physical: bones, pits, glass, metal, hair

Risk is the result of exposure to a hazard.

HOW TO DEVELOP A HACCP PLAN

There are five (5) steps that you must first take in order to develop the HACCP Plan.

1. Assemble the HACCP Team. Ideally, the HACCP Team is composed of members from different departments: Top Management, Purchasing, Food Safety and Quality Assurance, Production, Maintenance, and Sales.
2. Describe the product. What are the raw materials? What are the product specifications? What should be the conditions for storage?
3. Specify intended use and target consumers. Who can consume the product? Who should not?
4. Draw a flow diagram to describe the process steps. Begin with the supplier and take note of every step that the product undergoes up until distribution.
5. Visit the plant for on-site confirmation of flow diagram.

7 Principles of HACCP

Hazard Analysis and Critical Control Points

1

Conduct a hazard analysis

Determine if any biological, chemical, or physical property, if not controlled, can cause a safety hazard ; identify the preventive measures to control these hazards.

2

Identify critical control points

The Critical control point (CCP) is a point in the production process in which control is applied to prevent, eliminate, or reduce safety hazards to an acceptable level.

3

Determine the critical limits

The critical limit is the maximum and/or minimum value in which a safety hazard can be controlled. It is a specific value to which a physical, biological, or chemical hazard must be controlled, prevented, eliminated, or reduced to an acceptable level.

4

Define monitoring procedures

The monitoring activities are the process which ensure that every process is under control at each critical control point. The measurements taken, the frequency and who is responsible are part of the monitoring process.

5

Implement corrective actions

When a deviation in a critical limit occurs, corrective actions must be initiated. The corrective actions process is put in place to prevent health hazards and establish corrective measures to eliminate the deviation.

6

Establish verification procedures

Validation ensures that the HACCP plan is working as designed and that it is successfully producing a safe product. Audits, record reviews, system and equipment calibrations, and product testing may be part of the validation activities.

7

Create record keeping procedures

Documents must be available to prove that the critical limits are being followed. Documents such as the HACCP team, hazard analysis, monitoring of CCP, critical limits, and the corrective action process must be maintained.

FOOD SAFETY

PERSONAL HYGIENE

The illustration shows a person from the waist up, wearing a light blue hairnet, a yellow short-sleeved shirt, and a purple apron. The person's hair is tucked inside the hairnet. On the left side, there are callouts with green checkmarks indicating correct practices: hair tucked inside the hairnet, no earrings or piercings, no outer pockets, wearing neat and clean clothes, no watches, bracelets, or non-plain rings, covering all wounds, short and clean nails, torn clothes repaired or replaced, and wearing closed toe shoes in good repair. On the right side, there are callouts with red X marks indicating incorrect practices: hair coming outside the hairnet, earring or body piercing, outer pocket and contents, dirty clothes, watch/bracelet/ring, open and bleeding wounds, long/painted nails or fake nails, torn clothes, and open toe shoe or exposed foot.

- ✓ Hair should be properly tucked inside the hairnet.
- ✗ Hair coming outside of the hairnet.
- ✓ No earrings or piercings.
- ✗ Earring or body piercing.
- ✓ No outer pockets.
- ✗ Outer pocket and contents.
- ✓ Wear neat and clean clothes.
- ✗ Dirty clothes.
- ✓ No watches, bracelets, or non-plain rings.
- ✗ Watch/bracelet/ring.
- ✓ Cover all wounds.
- ✗ Open and bleeding wounds.
- ✓ Nails should be short and clean.
- ✗ Long/painted nails, or fake nails.
- ✓ Torn clothes should be repaired or replaced.
- ✗ Torn clothes.
- ✓ Wear closed toe shoes in good repair.
- ✗ Open toe shoe or exposed foot.

SAFE FOOD MAKES HAPPY CUSTOMERS



HANDWASHING

MY GOAL:
Have clean hands and prevent spread of germs

HAND WASHING IS IMPORTANT BECAUSE...

- Regularly washing your hands with soap and water can protect you from illnesses caused by viruses and bacteria
- It is the best way to stop germs from spreading



6 EASY STEPS TO CLEAN HANDS

- 1 WET YOUR HANDS**
- 2 APPLY SOAP**
- 3 WASH YOUR HANDS FOR 20 SECONDS**
Don't forget to scrub between your fingers, under your nails, and the top of your hands.
- 4 RINSE WELL**
- 5 DRY YOUR HANDS**
- 6 TURN OFF WATER WITH PAPER TOWEL**

WHEN TO WASH YOUR HANDS

- After using the toilet
- Before preparing, touching, or eating food
- After playing with animals
- After your sports practice
- After coughing, sneezing, or blowing your nose or mouth

HOW DO I KNOW IF I WASHED MY HANDS FOR 20 SECONDS?

Sing Happy Birthday to yourself twice
OR
Sing the alphabet song to yourself





Topic 3 Food Manufacturing Practices

An effective food processing worker possesses knowledge and skills in food processing techniques. Aside from that, he/she must also be aware of the supervisory aspects of working in the food processing industry.

GOOD MANUFACTURING PRACTICES (GMP)

1. Maintaining personal hygiene;
2. Reporting on medical conditions that could potentially contaminate food or could spread disease among your co-workers;
3. Keeping equipment in an appropriate state of repair and condition;
4. Participating in trainings that will equip you with knowledge to effectively perform your job;
5. Reporting on pest infestations immediately so the management can call an exterminator;
6. Following quality control operations procedure. this requires knowldege of quality standards that ensure that food is suitable for human consumption and that food-packaging materials are safe and suitable;
7. sanitary handling of raw materials and other ingredients;
8. Monitoring critical control points and implementing corrective action;
9. Recordkeeping for quality audits;
10. Disposing waste properly.



SAFETY MEASURES IN THE FOOD PROCESSING PLANT



WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT (PPE).

OBSERVE MANUFACTURER'S INSTRUCTIONS WHEN CLEANING AND OPERATING COOKING EQUIPMENT AND HEAVY EQUIPMENT.



HANDLE TOOLS WITH CARE.

REPORT TO THE SUPERVISOR ABOUT ANY HAZARD THAT MAY BE DISCOVERED IN THE WORKPLACE.



BE AWARE OF POSSIBLE FIRE DANGERS.

LOCATE THE EMERGENCY EXITS.



5S OF GOOD HOUSEKEEPING



PROPER WASTE DISPOSAL

SOLID WASTE MANAGEMENT



PROPER DISPOSAL OF CHEMICAL WASTE

Aqueous Waste (<40% Organic Chemicals)



1. **Acidic** (pH < 4)
2. **Neutral** (pH ~4-10)
3. **Basic** (pH > 10)

Organic (>40% Organic Chemicals)



1. **Non-chlorinated**
(e.g. THF, ethyl acetate, hexanes, toluene, methanol, etc.)
2. **Chlorinated**
(e.g. DCM, chloroform, chlorobenzene, etc.)

3. Chemicals in a commercial bottle

Undamaged bottle:
Dispose in original bottle (no label necessary)

Damaged bottle:
Arrange disposal with Chem Stores

Solid Waste

1. Lightly Contaminated

- No visible loose powders
- Collect in unlabeled green pails
- Empty into the solid waste drums on the 7th floor



Examples:

Gloves, Kimwipes, paper towels, empty vials/centrifuge tubes, etc.

2. Chemical

- Loose powders
- Heavily contaminated solid materials



Examples:

Used filter paper, unwanted samples, heavily contaminated gloves/kimwipes/paper towels, etc.

3. Silica gel

- Dispose in separate container
- May not be combined with other types of chemical wastes



4. Chemicals in a commercial bottle

Undamaged bottle:
Dispose in original bottle (no label necessary)

Damaged bottle:
Place in secondary container with a waste label



Special Cases

1. Sharps

(e.g. needles, razor blades, etc.)



2. Inorganic Oxidizing

• Place in a container with a disposal label



Examples:

Peroxides, chromates, etc.

3. Violently Reactive

• Contact Ken Greaves and Mike Dymarski

Examples:

LAH, nBu-Li, HF, Piranha, etc.

4. Mercury Thermometers

• Labeled separate puncture resistant container



5. Any uranium, thorium or mercury containing compounds

• Contact Ken Greaves and Mike Dymarski

A Note on Labeling:

- Indicate the content in the disposal container
- Write out all chemical names
- If the content is a mixture of chemicals, indicate the major components and list the most hazardous component(s)

Topic 4 Dietary Laws

HALAL GUIDELINES IN FOOD PROCESSING

SOURCES	EXAMPLES
ANIMAL	<ul style="list-style-type: none"> (a) Pigs and boars. (b) Dogs, snakes, and monkeys. (c) Carnivorous animals with claws and fangs such as lions, tigers, bears and other similar animals. (d) Birds of prey with claws such as eagles, vultures, and other similar birds. (e) Pests such as rats, centipedes, scorpions, and other similar animals. (f) Animals that are forbidden to be killed in Islam i.e., ants, bees and woodpecker birds. (g) Animals which are considered repulsive generally like lice, flies, maggots and other similar animals. (h) Animals that live both on land and in water such as frogs, crocodiles, and other similar animals. (i) Mules and domestic donkeys. (j) All poisonous and hazardous aquatic animals. (k) Any other animals not slaughtered according to Islamic Law. (l) Blood
PLANT	<p>Intoxicating and hazardous plants except where the toxin or hazard can be eliminated during processing.</p>
DRINK	<ul style="list-style-type: none"> (a) Alcoholic drinks. (b) All forms of intoxicating and hazardous drinks.
FOOD ADDITIVES	<p>All food additives derived from prohibited animals, plants, and drinks.</p>

KASHRUT GUIDELINES IN FOOD PROCESSING

PERMITTED	FORBIDDEN
meat from animals that "have cloven hooves" and "chew the cud"	meat from animals that only fulfill one condition such as: (a) Pigs (have cloven hooves but does not chew cud) (b) Camel (chews the cud but does not have cloven hooves)
milk derived from kosher animals (have cloven hooves and chew the cud)	dairy products that are derived from non-kosher sources
goose, duck, chicken, turkey	birds of prey such as eagle, owl, vulture, stork
eggs of kosher birds	eggs of non-kosher birds and eggs that contain blood inside the shell
fish with fins and scales such as tuna, salmon, and herring	shellfish such as shrimps, crabs, mussels, and lobsters
all products that grow in the soil – plants, bushes, trees	insects and infested plants
wine produced in a kosher winery	(a) hybrid fruits (b) fruits from trees planted within the last three years

POST-TEST

01

True or False: Food spoilage is any change in food which renders it unfit for eating. It can be due to contamination or natural decay which are both associated to the growth of microorganisms.

- a. True b. False

02

This method of food processing extends the shelf-life of food by adding salt which reduces water activity in a process called Osmosis.

- a. Fermentation b. Salting c. Thermal Application d. Drying

03

It is the microbial breakdown of carbohydrates into alcohols and acids.

- a. Hydrolysis b. Cellular Respiration c. Salting d. Fermentation

04

Also referred to as canning, it kills microorganisms by subjecting food to intense heat and pressure.

- a. Pressurization b. Thermal Processing c. Pasteurization d. Salting

05

This refers to the range of temperature wherein food-borne bacteria can grow to unsafe levels.

- a. Heat Zone b. Danger Zone c. Thermal Zone d. Pathogenic Zone

06

It is the amount of free or non-chemically bound water in food that is available for microbial growth:

- a. pH b. water Activity c. Moisture Content d. Salinity

07

Food is processed for the following reasons, except:

- a. To add value to raw agricultural produce c. To create new food products
b. To exhaust the environment's resources d. To extend shelf-life of food

08

The following are examples of food-borne pathogens except:

- a. E. coli b. Norovirus c. Hibiscus d. Salmonella

09

True or False: Wear outer garments in order to prevent contamination of food, food-contact surfaces, or food-packaging materials.

- a. True b. False

10

_____ is crucial in preventing food contamination.

- a. Handwashing b. Danger Zone c. Pathogens d. HACCP

REFERENCES

Anjum, N. and Ayoub, A. et. al., (2021). Fundamentals of Food Processing and Preservation. Astral International. India.

Brown, A. (2018). Understanding Food: Principles & Preparation. 6th edition. Cengage Learning. USA.

Bureau of Agriculture and Fisheries Standards. (2016). Code of Good Animal Husbandry Practices for Chickens - Broilers and Layers. Retrieved from Bureau of Agriculture and Fisheries Standards: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiX9c-z--XpAhUPc3AKHdyCsQQFjAAegQIARAB&url=http%3A%2F%2Fwww.bafps.da.gov.ph%2F2017-10-12-00-46-55%2Fstandard-formulation%2Fphilippine-national-standards%3Fdownload%3D>

Bureau of Agriculture and Fisheries Standards. (2016). Philippine National Standards for Organic Agriculture. Retrieved from National Organic Agriculture Program: <http://organic.da.gov.ph/images/downloadables/PNS/PNS-Organic-Agriculture-2016-final.pdf>

Bureau of Agriculture and Fisheries Standards. (2018). Philippine National Standard for Free Range Chicken. Retrieved from Bureau of Agriculture and Fisheries Standards: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiitIC7-eXpAhXCPXAKHeWuAZ8QFjAAegQIARAB&url=http%3A%2F%2Fbafps.da.gov.ph%2F2017-10-12-00-46-55%2Fstandard-formulation%2Fphilippine-national-standards%3Fdownload%3D464%3>

<https://www.tesda.gov.ph>

Technical Education and Skills Development Authority. (n.d.). Training Regulations for Organic Agriculture Production NC II. Taguig, Metro Manila: Technical Education and Skills Development Authority.