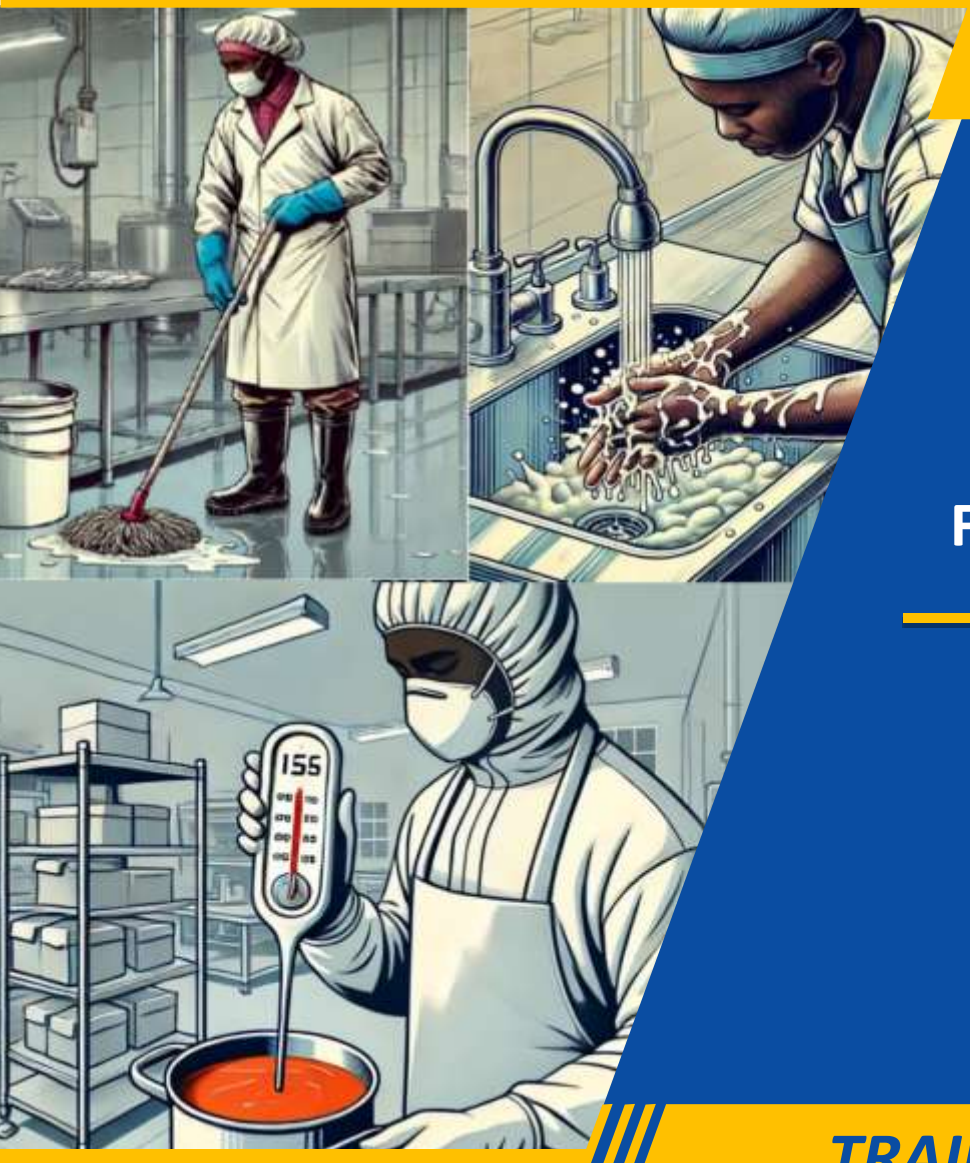
RQF LEVEL 3



FOPHS303

FOOD PROCESSING

Food Hygiene And Safety

TRAINER'S MANUAL

October, 2024

FOOD HYGIENE AND SAFETY

KOICA Korea International Cooperation Agency

TQUM TVET Quality Management Project

2024

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TABLE OF CONTENT

ACRONYMS

^{0}C: Degree Celsius

ATP: Adenosine Triphosphate

CBT/A: Competence Based Training/Assessment

CCP: Critical Control Point

CIP: Clean in Place

CO: Carbon Monoxide

CO2: Carbon Dioxide

COP: Clean out of Place

E. coli: Escherichia Coli

E.g: Example

HACCP: Hazard Analysis Critical Control Point

PPE: Personal Protective Equipment

RTB: Rwanda TVET Board

TQUM Project: TVET Quality Management Project

UV: Ultra-Violet

INTRODUCTION

This trainer's manual includes all the methodologies required to effectively deliver the module titled **"Food Hygiene and Safety."** Trainees enrolled in this module will engage in practical activities designed to develop and enhance their competencies.

The development of this training manual followed the Competency-Based Training and Assessment (CBT/A) approach, offering ample practical opportunities that mirror real-life situations.

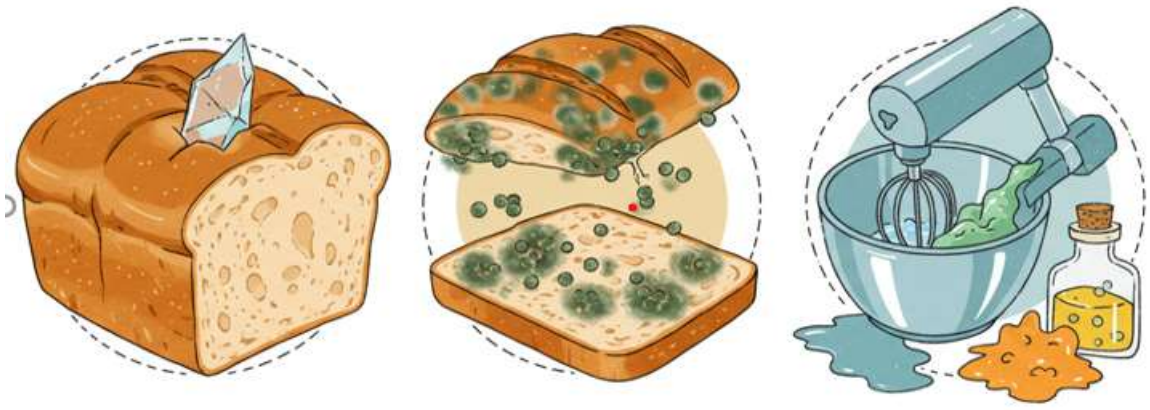
The trainer's manual is organized into Learning Outcomes, which is broken down into indicative content that includes both theoretical and practical activities. It provides detailed information on the key competencies required for each learning outcome, along with the objectives to be achieved.

As a trainer, you will begin by asking questions related to the activities to encourage critical thinking and guide trainees toward real-world applications in the labor market. The manual also outlines essential information such as learning hours, didactic materials, and suggested methodologies.

This manual outlines the procedures and methodologies for guiding trainees through various activities as detailed in their respective trainee manuals. The activities included in this training manual are designed to offer trainees opportunities for both individual and group work. Upon completing all activities, you will assist trainees in conducting a formative assessment known as the end learning outcome assessment. Ensure that trainees review the key reading and the points to remember section.

MODULE CODE AND TITLE: FOPHS303 FOOD HYGIENE AND SAFETY

Learning Outcome 1: Identify food contaminants and hazard.
Learning Outcome 2: Perform hygienic practices.
Learning Outcome 3: Implement food safety.



Indicative contents

1.1 Identification of physical contaminants and hazards

1.2 Identification of chemical contaminants and hazards

1.3 Categorization of biological contaminants and hazards

Key Competencies for Learning Outcome 1: Identify food contaminants and hazard

Knowledge	Skills	Attitudes
• Description of physical contaminants and hazards • Description of chemical contaminants and hazards • Description of biological contaminants and hazards	• Differentiating food contaminant and hazard	• Being careful while differentiating food contaminant and hazards

Duration: 10hrs

Learning outcome 1 objectives: s

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly physical food contaminants according to their sources.
2. Describe correctly chemical food contaminants according to their sources.
3. Describe effectively biological food contaminants and hazards according to their types.

Resources

Equipment	Tools	Materials
• PPE • Projector • Computer	• Sieves • Filters • Magnets • Winnowing basket	• Physical contaminants (slivers of glass, human hair, nails, false nails, nail polish(verni), metal fragments dirt, stones, glass) • Biological contaminants (bacteria, molds, viruses, and cat saliva, house dust, mites, cockroaches.) • Chemical contaminants (Cleaning chemicals, Excessive use of permissible chemicals**,** Heavy metal, presence in foodstuffs way above the recommended limit**,** Packaging materials that are not food grade, resulting in chemical leaching into the food, Pesticides) • Uncontaminated food • Contaminated food

Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail a classroom
- Prepare a photo of food mixed with physical contaminants (beans mixed with stones for example)
- Avail samples of food with physical contaminants (stones, hails, grasses, broken glass)

Indicative content 1.1: Identify Physical Contaminants and Hazards

Duration: 3hrs

Theoretical Activity 1.1.1: Description of physical contaminants and hazards

Notes to the trainer:

- Trainer may use small groups for description of physical contaminants and hazards
- The use of pictures or tutorial videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by:
   a. A hazard?
   b. A contaminant?
   c. Food hygiene?
   d. Food safety?
   e. Physical contaminants?
   f. Cross contamination?
   g. Physical hazards?
ii. Give out the examples of physical contaminants you know.
iii. What could be the sources of physical contaminants in food?
iv. What could be the effects of physical contaminants in food?

Step2: Monitor discussions in groups and ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step3: Facilitate trainees to discuss the provided answer and

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns

Step6: Read key reading 1.1.1

Points to Remember

- Hygiene and safety should consider the prevention of physical contaminants in food because they can lead to various injuries when ingested, to psychological distress among consumers and also to businesses fail due to customer complaints related to physical hazards.
- Environmental, processors/workers and tools/equipment are source of physical contaminants.
- Physical contaminants present in food are unaffected by thermal processing.

Application of learning 1.1

Organize trainees visit school workshop .Ask trainees to observe physical contaminants found in cereals workshop.

Solution

SN	Criteria/Solution for application	Indicator	Observation	
			Yes	No
1.	Physical contaminants and hazards are correctly explained	1.1. Examples of physical contaminants and hazards are given		
		1.1. Sources of physical contaminants and hazards are mentioned		
		1.3. Effects of physical contaminants are mentioned		
2.	Field visit report is well done	2.1. Trainee identification is mentioned		
		2.2. visit location is mentioned		
		2.3. Key competences are curved		

Indicative content 1.2: Identify of Chemical Contaminants and Hazards

Duration: 3hrs

Theoretical Activity 1.2.1: Description of chemical contaminants and hazards

Notes to the trainer:

- Trainer may use small groups for description of chemical contaminants and hazards
- The use of pictures or tutorial videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by chemical contaminant in food?

ii. Give out the examples of chemical contaminants you know.

iii. What could be the sources of chemical contaminants in food?

iv. What could be the effects of chemical contaminants in food?

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to discuss the provided answer and

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.2.1

Points to Remember

- Food hygiene and safety should consider the prevention of chemical contaminants in food. Because they are toxic to humans and can cause harm and are associated with foodborne disease outbreaks.
- The impact of chemical contaminants on consumer health and well-being is often apparent only after many years of processing. Prolonged exposure at low levels (example cancer)
- Agricultural compounds, industrial chemicals, environmental, chemical preservatives and allergens are sources of chemical contaminants and hazards.
- Chemical contaminants present in food are often unaffected by thermal processing

Application of learning 1.2.

Organize trainees field visit to the food processing plant located nearby your school that process fruits into nectar and squash, ask trainee to cross observe chemical contaminants that could happen there.

Checklists

SN	Criteria/Solution for application	Indicator	Observation	
			Yes	No
1	Chemical contaminants and hazards are effectively described	1.1.list of chemical contaminants and hazards are found		
		1.2. Sources of chemical contaminants and hazards are mentioned		
		1.3. Effects of chemical contaminants are mentioned		
2	Field visit report is well done	2.1. Trainee identification is mentioned		
		2.2. Field visit address is mentioned		
		2.3. Key competences are curved		

Indicative content 1.3: Categorization of Biological contaminants and hazards

Duration: 4hrs

Theoretical Activity 1.3.1: Description of Biological contaminants

Notes to the trainer:

- Trainer may use small groups for describing biological contaminants
- The use of pictures or tutorial videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What Do you understand by?
a. Biological hazards?
b. Food poisoning?
c. Food spoilage?
d. Food intoxication?
e. Food infection?
f. Macro biological contaminants in food?
g. Microbiological contaminants in food?
h. What could be examples in f and g?
ii. What could be the sources of microbiological contaminants for food?
iii. What could be the effects of microbiological contaminants?

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to present the provided answer

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Ask trainees to read the key reading 1.3.1

Points to Remember

- Food hygiene and safety should consider the prevention of biological contaminants in food, because they can spoil food, they can cause food poisoning and diseases to consumers
- Water, processor, equipment waste, air sewage raw materials are sources of biological contaminants and hazards.
- Biological contaminants present in food can be reduced or eliminated by thermal processing.

Application of learning 1.3.

Organize trainees field visit in food processing plant nearby your school that process fruits into jam and jelly. Ask trainee to categorize biological contaminants and hazards found there.

Checklist

SN	Criteria/Solution for application	Indicator	Observation	
			Yes	No
1	Biological contaminants and hazards are effectively described	1.1. Macro biological contaminants and hazards are explained		
		1.2. Microbiological contaminants and hazards are explained		
		1.3. Sources of biological contaminants and hazards are mentioned		
		1.4. Effects of biological contaminants are mentioned		
2	Field visit report is well done	2.1. Trainee identification is mentioned		
		2.2. Field visit address is mentioned		
		2.3. Key competences are curved		

Learning outcome 1 end assessment

Written assessment

1. In table below match each term with its corresponding meaning and provide your answer in designed space.

Answers	Terms	Meaning
1……	1. A food hazards	A. The introduction or occurrence of a contaminant in food or food environment
2……..	2. Contamination	B. Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.
3…….	3. Food hygiene	C. A biological, chemical or physical agent in a food with the potential to cause adverse health effects
4…….	4. Food contaminants	D. A biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability.
5……	5. Food safety	E. All conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.

Answer

Answers	Terms	Meaning
1…**C**	1. A food hazards	A. The introduction or occurrence of a contaminant in food or food environment
2…**A**	2. Contamination	B. Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.
3….**E**	3. Food hygiene	C. A biological, chemical or physical agent in a food with the potential to cause adverse health effects

4……**D**	4. Food contaminants	D. A biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability.
5……**B**	5. Food safety	E. All conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.

2. Answer by true or false

a) Agricultural compounds may be the biological food contaminant that comes from raw materials processed.

b) Biological contaminants can reduce product shelf life by causing food spoilage

c) Microorganisms in the air can contaminate foods during processing, packaging, storage, and preparation.

d) Some physical contaminants and hazards are identified by using organoleptic test mainly nose for smelling.

e) Chemical contaminant result in food chemical poisoning and injury to consumers

f) Physical contaminant is an object that is not designed for consumption and somehow ends up in a food item or meal. These can be man-made items or those of organic origin.

g) Physical contaminants are not usually result from accidental contamination and /or poor food handling practices at some stage of the production or preparation process.

Answer

a) False
b) True
c) True
d) False
e) True
f) True
g) False

3. The following are examples of direct biological food contaminants except

a. Bacteria
b. stone

c. Virus
d. Yeasts
e. Protozoa

Answers: b. Stone

4. From the following choose the sources of physical contaminants and hazards
   i. Environment
   ii. Soil
   iii. Bacteria
   iv. Mould
   v. Waste
   vi. workers
   vii. Yeast
   viii. Equipment
   ix. Protozoa

   Answer:

   The Sources of chemical contaminants and hazards include:

   i. Environment
   vi. Workers.
   viii. Equipment

5. By using the terms in bracket (**Food infections, Food poisoning, Food spoilage, indirect biological contamination, Food intoxication**) fill in the following empty spaces with the appropriate one.
   a. Foodborne illness caused by eating food that contains toxins made by microbes or chemical poisons. Is called **……**
   b. Food poisoning caused by toxins from microorganisms. Is called **…….**
   c. Metabolic process that causes foods to be undesirable or unacceptable for human consumption. Is called ……
   d. The process that an organism spread or shed the real contaminants or hazards (pathogenic microorganisms, physical particles...) on food when they sit on food, bite the food, chew the food, walk on food or leave their droppings on food. Is called…….. ……
   e. Illnesses that are not caused by bacterial by-products, such as toxins, but through ingestion of infectious microorganisms is called **……..**

   Answer

   a. Foodborne illness caused by eating food that contains toxins made by microbes or chemical poisons. Is called **Food poisoning**
   b. Food poisoning caused by toxins from microorganisms. Is called **Food intoxication**
   c. Metabolic process that causes foods to be undesirable or unacceptable for human consumption **Is called Food spoilage**

d. Organisms that spread or shed the real contaminants or hazards (pathogenic microorganisms, physical particles...) on food when they sit on food, bite the food, chew the food, walk on food or leave their droppings on food. Are called Indirect biological contaminants or hazards
e. Illnesses that are not caused by bacterial by-products, such as toxins, but through ingestion of infectious microorganisms is called **Food infection**

6. Distinguish microbiological from macro biological group of microorganisms by showing how they are identified in food products.

   Answers:

   Macro biological: all organisms which can be seen with our eyes. They are identified by using visual inspection. (Ex: appearance: moulds development),

   Microbiological: All microorganisms of great concern that cannot be seen with naked eyes. They are identified by organoleptic tests mainly smelling and tasting. (ex: odor: Spoilage odors, bad smelling, taste: Spoilage taste) or using laboratory tests.

Practical assessment

IZUBA BAKERY is a company located in Western province, Rubavu district, The store keeper found 30 breads spoiled in the store room due to poor handling and poor storage conditions. As a food processing assistant technician, observe, IZUBA bakery bread and help them to identify types of contaminants in those breads, the task will be performed within 1 hour.

Check list

No	Criteria/Solution for application	Indicator	Observation	
			Yes	**No**
1.	**Personal hygienic practices are well respected**	1.1 PPE are selected		
		1.2 PPE are put on		
		1.3 Hand washing is respected		
2.	**3. Food contaminants are properly selected**	2.1 Physical contaminants are identified		
		2.2 Chemical contaminants are identified		
		2.3 Biological contaminants are identified		
		2.4. Time is respected		

Further information to the trainer

Di Stefano,V.,&Avellone,G. (2014). Food contaminants. *Journal of food studies*, 88-103.

Singh,P.K.,Singh,R.P.,Singh,P.,&Singh,R.L. (2019). Food hazards: Physical,chemical,and biological . *Food safety and human health*, 15-65.

Singh,Pradeep kumar. (2019). Food hazards:physical,chemical,and biological. *Food safety and human health*, 15-65.

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Hair cover
Face mask
Overall
Gloves
Boots

Indicative contents
2.1 Maintain personal hygiene **2.2 Cleaning of the workplace** **2.3 Waste disposal**

Key Competencies for Learning Outcome 2: Perform Hygienic practices

Knowledge	Skills	Attitudes
• Description of personal behaviour in food processing plant • Explanation of health statements of food handler • Description of personal protective equipment • Description of types of cleaning agents • Differentiation of tools and equipment used in Cleaning • Description of cleaning methods and techniques • Description of types of food processing wastes • Differentiation of waste disposal methods	• Maintaining personal hygiene • Preparing cleaning agents • Applying cleaning stages • Checking cleanliness of working Area.	• Being responsible while maintaining personal hygiene • Being prudent while preparing cleaning agents • Being motivated while cleaning stages • Being attentive while checking cleanliness of the workplace

Duration: 10 hrs.

Learning outcome 2 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly personal behaviour in food processing plant
2. Explain clearly health statements of food handler in food processing plant
3. Describe properly personal protective equipment for a food handler
4. Maintain appropriately personal hygiene in food processing plant
5. Describe clearly types of cleaning agents to clean to workplace
6. Prepare effectively cleaning agents to clean a workplace
7. Differentiate correctly tools and equipment used in Cleaning of workplace
8. Describe clearly cleaning methods and techniques used to clean workplace
9. Apply correctly cleaning stages for cleaning workplace as required in food processing plant
10. Check carefully cleanliness of working Area as required in food processing plant
11. Describe appropriately types of food processing wastes in food processing plant
12. Differentiate correctly waste disposal methods in food processing plant

Resources

Equipment	Tools	Materials
● PPE ● Sink ● Hand dryer machine ● Incinerators	● Basins ● Bins ● Mops ● Squeegee ● Brushes ● Flip-chart stand	● Sanitizers ● Disinfectants ● Degreasers ● Soap ● Clean ● Waters ● Flip-chart ● Markers ● Pens ● Chalks

Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail a classroom and workshop
- Avail photos showing a person wearing PPE
- Prepare samples of cleaning agents
- Avail waste disposal site
- Prepare teaching aids and didactic materials (manuals/guides, task sheets)

Indicative content 2.1: Maintaining personal hygiene practices

Duration: 3hrs

Theoretical Activity 2.1.1: Description of personal hygiene practices

Notes to the trainer:

- Trainer may use small groups for describing personal hygiene practices.
- The use of pictures or tutorial videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by?

b. Hygiene?

c. Food handler?

i. What could be the purpose of maintaining personal hygiene?

ii. What do you think are bad habits in food processing plant?

iii. To respect cleanliness habits for persons handling food, at which time do you think person handling food should wash hands?

iv. How could be health statement of food handler in order to ensure that food is not contaminated?

v. Outline the personal protective equipment required in maintaining personal hygiene practices that you know.

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to present the provided answer

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: For more clarification read the key reading 2.1.1

Points to Remember

- Personal handling food should keep clean hair, body, hands, fingers, feet and clothing because they are the main source of food contamination.
- Food handling person should wear personal protective equipment such as gloves, aprons, hair nets, face masks and safety boots to maintain safety food.
- Avoid the following bad habits in food processing plant; coughing, sneezing, spitting, scratching, smoking, chewing gum, scratching touching money, hair, phone, and take food/drink because they can cause contamination food.
- For persons handling food directly, unclean hands are usually the most possible way of transferring contaminants and hazards to food. Therefore, hands should be washed according to instructions and indicated hand washing signs and posts.

Practical Activity 2.1.2: Maintaining personal hygiene

Notes to the trainer

- The trainer should ensure that there is cleaning agents in the workshop.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As a food processing assistant technician, you are asked to go in the food processing workshop and respect maintaining personal hygiene practice.

Step2: Explain the task and provide clear work instruction (Task, time allocated)

Step 3: Demonstrate how maintaining personal hygiene. While demonstrating, explain well the procedures.

Step 4: Asks trainees to maintain personal hygiene and monitor the procedures.

Step5: Verify whether personal hygiene is maintained and provide feedbacks where necessary.

Step6: Ask trainees to read key reading 2.1.1 and 2.1.2

Step 7: Ask trainees to perform the task provided in application of learning 2.1

Points to Remember

- For persons handling food directly, unclean hands are usually the most possible way of transferring contaminants and hazards to food. Therefore, hands should be washed according to instructions and indicated hand washing signs and posts.

Application of learning 2.1

Organize trainees field visit to the Milk processing plant nearly the school that produces different milk products. Ask trainees respect person hygiene practice.

Checklist

SN	Criteria	Indicators	Observation	
			Yes	No
1	Personal hygienic practices are well respected	1.1. Body contamination parts are checked		
		1.2. Hand washing is respected		
2	Cleaned Person protective equipment are properly won	2.1. Hairnet is respected		
		2.2. Overcoat is respected		
		2.3. Mouth mask is respected		
		2.4. Gloves are respected		
		2.5. Safety shoes are respected		
2	Field visit report is well done	2.1. Trainee identification is mentioned		
		2.2. Field visit address is mentioned		
		2.4. Key competences are covered		

Indicative content 2.2: Cleaning of the Workplace

Duration: 4hrs.

Theoretical Activity 2.2.1: Description of cleaning of the workplace

Notes to the trainer:

- Trainer may use small groups for describing workplace cleaning practice
- The use of drawings, pictures or videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by
   a. Cleaning
   b. Sanitizing
   c. Disinfecting
   d. Sterilize
   e. Cleaning agents
ii. What do you think are the purpose of cleaning workplace?
iii. What could be the types of cleaning products?
iv. Give out examples of cleaning agents used to clean the workplace that you know.
v. What are tools and equipment used for cleaning that you know?
vi. How do you think cleaning agent should be prepared?
vii. What could be cleaning methods for work area cleaning?
viii. What could be stage of cleaning of the working area?
ix. What could be the test used for Checking cleanliness of the working Area?

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to discuss the provided answer

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.2.1

Points to Remember

- When using cleaning agent read and follows the safety instructions given by manufacture.
- Never mix bleach with ammonia or any other cleaner because it can lead to a dangerous chemical reaction that produces toxic gases, specifically chloramine gas which can result in serious health issues.

Practical Activity 2.2.2: Cleaning of work area and checking Cleanliness

Notes to the trainer

- Ensure that there are cleaning agents in the workshop.
- Avail cleaning tools

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in the food processing workshop, clean and check the cleaning effectiveness of the workplace.

Step 2: Explain the task and provide clear work instruction (Task, PPE, Time allocated)

Step 3: Demonstrate how you can clean the workplace and check the cleaning effectiveness. While demonstrating, explain well the procedures.

Step 4: Asks trainees to clean and check the cleanliness, and monitor the procedures.

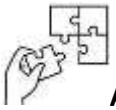
Step 5: Verify whether the workplace is properly cleaned and the cleaning effectiveness is well checked, and provide feedbacks where necessary.

Step 6: Ask trainees to read key reading 2.2.2 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 2.2.

Points to Remember

- Wear rubber or other non-porous boots, gloves, and eye protection.
- Try not to breathe in product fumes. If using products indoors, open windows and doors to allow fresh air to enter.



Application of learning 2.2.

Ask trainee to go in the workshop of your school to prepare cleaning product and to clean a workshop and to check cleanliness.

Checklist

SN	Criteria	Indicators	Observation	
			Yes	**No**
1	**Workplace is properly cleaned**	1.2. Safety precautions of cleaning product is respected		
		1.2. Cleaning products are prepared		
		1.3. Tools and equipment are used		
		1.3 Cleaning procedure is respected		
2	**Cleanliness of the workplace is effectively achieved**	2.1. Good surface appearance is observed		
		2.2. Good smell is achieved		

Indicative content 2.3: Waste Disposal

Duration: 3hrs

Theoretical Activity 2.3.1: Description of Food Processing Waste

Notes to the trainer:

- Trainer may use small groups for describing food processing waste
- The use of drawings, pictures or videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by?
   a. Waste
   b. Food wastes
   c. Waste management
ii. What could be the purpose of disposing waste in food industry?
iii. Give out types of food processing wastes that you know?
iv. What could be regulations of waste disposal?
v. What could be waste disposal methods?

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Ask trainees to present the provided answers

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.3.1

Points to Remember

- Food processing industry should consider waste management system in order to prevent the waste effects on food.
- In Food processing biodegradable and no biodegradable waste are kept separately because no biodegradable wastes do not decompose are major pollutants.

Application of learning 2.3.

Organize trainee's field visit to in your school. Ask trainees to separate biodegradable from no biodegradable waste.

Checklist

SN	Criteria	Indicators	Observation	
			Yes	No
1	Wastes are appropriately separated	1.1. Biodegradables wastes are identified		
		1.2. No biodegradable waste is identified		
		1.3. Waste management equipment and tools are used		

Learning outcome 2 end assessment

Written assessment

1. You are going to clean the oil that was drained on the floor, what is the cleaning method to be used?
   Answer: Wet cleaning:
2. Write in appropriate order the following steps or procedure for hand washing.
   a. Apply liquid soap or detergent.
   b. Drying hands well.
   c. Rinse hands thoroughly with clean water.
   d. Rub hands together between fingers, thumbs and wrists.
   e. Select appropriate detergent.
   f. Wet hands with water.

   Answer:

   I. Select appropriate detergent.
   II. Wet hands with water.
   III. Apply liquid soap or detergent.
   IV. Rub hands together between fingers, thumbs and wrists.
   V. Rinse hands thoroughly with clean water.
   VI. Drying hands
3. Match the terms bellow with their corresponding meaning

Answer	**terms**	**Meaning**
1……..	**1. A food handler** is	**A.** Using a chemical agent, boiling water, or steam to eliminate all microorganisms
2……..	**2. Personal hygiene** is	**B**. The process of killing harmful pathogenic organisms or rendering them inert (it is meant to slow or make stable, having no action or power to move, or being unreactive. (Kill 100% of germs, bacteria and viruses).
3……	**3. Sterilizing**	**C.** Maintaining an appropriate degree of personal cleanliness and behaves and operates in an appropriate manner in food processing plant or industry.
4……	**4. Disinfecting**	**D.** is process of killing 99.9% of basic germs and bacteria such as E. coli and salmonella in place such as food contact surface. (kill 99.9 of germs and bacteria)

5……	**5. Sanitizing**	**E.** Anyone who works in a food business and who handles food, or surfaces that are likely to be in contact with food.
		F. The process of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment.

Answer

Answer	**terms**	**Meaning**
1……..E	1. **A food handler** is	**A.** Using a chemical agent, boiling water, or steam to eliminate all microorganisms
2……..C	2. **Personal hygiene** is	**B**. The process of killing harmful pathogenic organisms or rendering them inert (it is meant to slow or make stable, having no action or power to move, or being unreactive. (Kill 100% of germs, bacteria and viruses).
3……A	3. **Sterilize**	**C.** Maintaining an appropriate degree of personal cleanliness and behaves and operates in an appropriate manner in food processing plant or industry.
4……B	4. **Disinfecting**	**D.** is process of killing 99.9% of basic germs and bacteria such as E. coli and salmonella in place such as food contact surface. (Kill 99.9 of germs and bacteria)
5……D	5. **Sanitizing**	**E.** Anyone who works in a food business and who handles food, or surfaces that are likely to be in contact with food.

4. Write True or False to the following:
   - **i.** To remove dirt, dust, crumbs, and germs from surfaces or objects is only the purpose of cleaning workplace in food processing industry.
   - **ii.** IT is advised to mix bleach with ammonia or any other cleaner when preparing cleaning agent.

iii. Operating ventilation systems as needed to allow sufficient air flow and to prevent build-up of hazardous

Answer

i. False
ii. False
iii. True

5. Visible debris, soil build-up, colour of equipment surface (white films, stains, etc.) is checked by ATP testing

   True☐

   False☐

   Answer

   True☐

   False☑

6. In the following table there is description (column) and related terms (raw). Read carefully and match the description with the corresponding one.

Description	**Food wastes**	**Waste**	**Waste management**
Is a material which has served its original intended use and sometimes discarded after primary use, or it is worthless, defective and of no use.			
Organic residues produced by the processing of raw materials into food.			
or waste disposal includes the processes and actions required to manage waste from its inception to its final disposal. It involves the processes of waste collection, transportation, processing, as well as waste recycling or disposal.			

Answer

	Food wastes	**Waste**	**Waste management**
Is a material which has served its original intended use and sometimes discarded after primary use, or it is worthless, defective and of no use.		☑	
Organic residues produced by the processing of raw materials into food.	☑		

or waste disposal includes the processes and actions required to manage waste from its inception to its final disposal. It involves the processes of waste collection, transportation, processing, as well as waste recycling or disposal.			☑

Practical assessment

XYZ company located in Kayonza district is a company that processes fruits into juices. However, after checking the cleaning effectiveness of the work area, it is remarked that the cleaning was not efficiently done and the company was asked to close due to its poor hygiene till they improve it. As a food processing assistant technician, help the company to improve the hygiene in the food processing industry. You are requested to do this work in 1hour. Cleaning materials, tools and equipment are available in the store room.

Checklist

SN	Criteria	Indicators	Yes	No
1.	**Cleaning tools, equipment and materials are well selected**	1.1 Tools are selected		
		1.2 Equipment are selected		
		1.3 Materials are selected		
2.	**Cleaning methods and techniques are properly applied**	2.1 Reagents are prepared		
		2.2 Cleaning methods are applied		
		2.3 Cleaning techniques are applied		
3.	**Cleaning stages are correctly respected**	3.1 Pre-cleaning is done		
		3.2 Main cleaning is performed		
		3.3 Rinsing is performed		
		3.3 Disinfection is performed		
		3.5 Drying is applied		

Further information to the trainer

Kamboj, S., Gupta, N., J.D., Gandotra, G., & Anjum, N. . (2020). Food safety and hygiene. *International journal of Chemical studies*, 358-368.

Kamboj, Sahil, et al. (2020). Food safety and hygiene. *International journal of Chemical studies*, 358-368.

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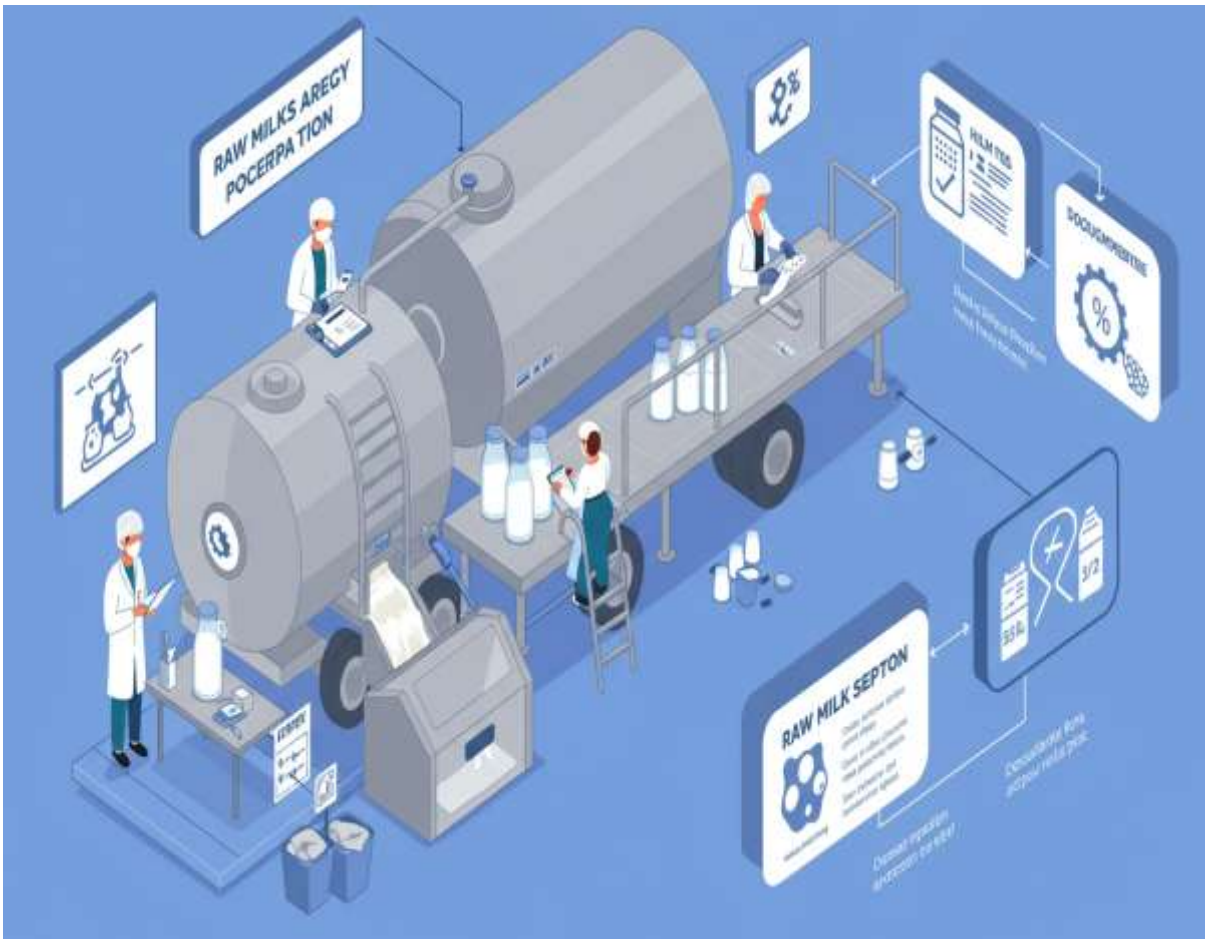
RAW MILKS AREGY
POCERPA TION
RAW MILK SEPTON

Indicative contents
3.1 Implementation of preventive measures for contaminants **3.2 Controlling pest in food processing plant** **3.3 Respecting Critical Control Point**

Key Competencies for Learning Outcome 3: Implement food safety

Knowledge	Skills	Attitudes
● Description of Administrative control measures ● Description of Engineering control measures ● Description of Controlling Exposure ● Description of food preservation techniques ● Identification of potential pest ● Description of pest control measures ● Description of CCP	● Applying pest control measures ● Respecting Critical control point	● Being attentive while applying pest control measures ● Being prudent while monitoring CCP

Duration: 20hrs

Learning outcome 3 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe clearly administrative control measures for contaminants
2. Describe correctly engineering control measures for contaminants
3. Describe correctly controlling Exposure for contaminants
4. Describe properly food preservation techniques for contaminants
5. Describe effectively pests' control measures in a food processing plant
6. Describe clearly CCP in food processing plant

Resources

Equipment	Tools	Materials
• Air compressor • Pasteurizer • Sterilizer • Sprayers	• Traps • Bins • Hummers • Water bath	• Detergents • Sanitizers • Water • Preservatives • CCP Guidelines • UV light Bulbs • Fumigants tables • Insect nets • Nails • Chalks • Flip-charts • Pens

Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail a classroom and workshop
- Prepare teaching aids and didactic materials (manuals/guides, task sheets, photos, audio-visuals/movies, …)

Indicative content 3.1: Implementation of Preventive measures for contaminants

Duration: 10hrs

Theoretical Activity 3.1.1: Description of implementation of preventive measures for contaminants.

Notes to the trainer:

- Trainer may use small groups for identifying preventive measures for contaminants
- The use pictures as tutorial didactic materials is required

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by

a. Administrative control measure of food contaminants?

b. Engineering control measures of food contaminants?

c. Controlling Exposure of food contaminants.

d. Food preservation Techniques

ii. What could be the techniques used for food preservation

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to present the provided answers.

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.1.1 in trainee manual

Points to Remember

- preventive measures for contaminants should be considered to ensure Food safety.

Application of learning 3.1

Organize Trainees field trip to the factory near the school that produces soymilk and tofu. Ask trainees to observe the contaminants and describe preventive measures for contaminants found.

Checklist

SN	Criteria	Indicators	Observation	
			Yes	No
1	Preventive measures for contaminants are well described	1.1 Administrative control measures are mentioned		
		1.2Engineering control measures are mentioned		
		1. 3 Controlling Exposure is mentioned		
		1.4 Food preservation Techniques are mentioned		

Indicative content 3.2: Controlling pest in Food processing plant

Duration: 5hrs

Theoretical Activity 3.2.1: Description of pest control measures in a food

Notes to the trainer:

- Trainer may use small groups for describing pest control measures in a food processing plant
- The use of drawings and pictures as didactic materials is required

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by pest in food processing plant?

ii. Give out purpose of pest control in food processing plant that could you know.

iii. How many main groups of pests that are encountered in food business?

iv. What could be the control measures of pests in Food Company?

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to present the provided answers

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.2.1 in trainee manual

Points to Remember

- Food Company should consider pest control measures not only pests because pests are sources of microorganisms but also to protect health and wellbeing, peace of mind premises and investment, income and also to respect laws and regulations.

Application of learning 3.2

Organize learners field trip to the factory near the school that make bread where individual trainee will be able to identify the pest control measures used in that factory. Ask learners to identify the pest control measures.

Checklist

SN	Criteria	Indicators	Observation	
			Yes	**No**
1	Pest control measures are properly identified	1.1 Groups of pests are identified		
		1.2 Examples of pests are mentioned		
		1.3 Measures are identified		

Indicative content 3.3: Respecting Critical control point

Duration: 5hrs

Theoretical Activity 3.3.1: Description of a Critical control point

Notes to the trainer:

- Trainer may use small groups for describing a critical control point
- The use of pictures and tutorial videos as didactic is required

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

i. What do you understand by
   a. Critical control point (CCP)?
   b. Hazard analysis and critical control point (HACCP)?

ii. Give out examples of critical limits that you know

Step 2: Ask trainees to write the findings on papers, flip chart, Blackboard or white board.

Step 3: Facilitate trainees to present the provided answers

Step 4: Provide the expert view and clarify ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.3.1

Points to Remember

- Food processor should consider critical control point (CCP) as a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels.

Application of learning 3.3

Organise trainees field trip to the factory located nearly school that process fruits into jam and jelly. Ask trainees to identify critical control point in jam and jelly production

Checklist

SN	Criteria	Indicators	Observation	
			Yes	No
1	Critical control point is properly respected	1.1. Critical steps are identified		
		1.2. 1.2 Possible hazards are identified		
		1.3. 1.3 critical limit is respected		

Learning outcome 3 end assessment

Written assessment

2. For controlling contaminants, they are preventive measures that are to be implemented, match the control measure in (column) with corresponding example in (raw):

	Controlling procedures, eg ways of working, supervision and training	**Isolation** – separating workers from the hazard by distance or the use of barriers	job-rotation schedules or a work-rest schedule	Fermentation
Administrative control measures				
Controlling Exposure				
Engineering control measures				
Preservation Techniques				

Solution

	Controlling procedures, eg ways of working, supervision and training	**Isolation** – separating workers from the hazard by distance or the use of barriers	job-rotation schedules or a work-rest schedule	**Fermentation**
Administrative control measures			✓	
Controlling Exposure	✓			
Engineering control measures		✓		
Preservation Techniques				✓

2. Critical limits must involve measurable parameters and may also be known as the absolute tolerance or safety limit for CCP. Choose some examples of critical limit
    1) Pasteurization

2) Time□
3) Cooking□
4) Temperature□
5) pH □

Answers:

1) Pasteurization□
2) **Time**☑
3) Cooking□
4) **Temperature**☑
5) **pH** ☑

3. The table below showing Heat preservation (pasteurization, sterilization) method, complete the empty space with the missing one:

SN	**Point**	**Pasteurization**	**Sterilization**
1	Application	Kill pathogen microorganisms	**…… …….**
2	Temperature	63^{o}C or 72^{o}C	**……..**
3	Time	……..	15 sec

Solution

SN	**Point**	**Pasteurization**	**Sterilization**
1	Application	Kill pathogen microorganisms	**kill all form of <u>microorganisms</u>**
2	Temperature	63^{o}C or 72^{o}C	**<u>121 ^{o}C</u>**
3	Time	**<u>30 min</u>**	15 sec

4. **Write True or False to the following:**
   a. The exterior windows have to be provided with insect screen is the only one measures need to control pest in food company
   b. Insect killers have to be placed to cleaning zone only
   c. Pests are grouped into 2 groups in food businesses

Solution

a. The exterior windows have to be provided with insect screen that is the one measure of controlling pest in food company **False**

b. Insect killers have to be placed to cleaning zone only **False**
c. Pests are grouped into 2 groups in food businesses **False**

5. Write in full the following abbreviations:
    a. CCP
    b. HACCP

Solution

c. CCP: critical control point
d. HACCP: Hazard analysis and critical control

6. Arrange in order the following principles of HACCP from the 1st one up to 7th one

Conduct a hazard analysis.
Determine the critical control points (CCPs).
Establish corrective actions.
Establish critical limits.
Establish monitoring procedures.
Establish record-keeping and documentation procedures.
Establish verification procedures.

Solution

Principle 1: Conduct a hazard analysis.
Principle 2: Determine the critical control points (CCPs).
Principle 3: Establish critical limits.
Principle 4: Establish monitoring procedures.
Principle 5: Establish corrective actions.
Principle 6: Establish verification procedures.
Principle 7: Establish record-keeping and documentation procedures.

Further information to the trainer

Mensah,L.D.,&Julien,D. (2011). Implementation of food safety management systems in the UK. *Food control*, 1216-1225.

Mensah,Lena Dzifa et Juliene,Denyse. (2011). Implementation of food safety management systems in the UK. *Food control*, 1216-1225.

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END

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