



RQF LEVEL 3



TRAINER'S MANUAL



HONEY PROCESSING

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Under Financial and Technical support of



COORDINATION TEAM

RWAMASIRABO Aimable

MARIA Bernadette M. Ramos

NTAHONTUYE Felix

Production Team

Authoring and Review

MUZINDUTSI Cyprien

NZABANTERURA Gilbert

Validation

RUVUGO Jean Claude

DUKUZUMUREMYI Yvonne

Conception, Adaptation and Editorial works

HATEGEKIMANA Olivier

GANZA Jean Francois Regis

HARELIMANA Wilson

NZABIRINDA Aimable

DUKUZIMANA Therese

NIYONKURU Sylvestre

Formatting, Graphics, Illustrations, and infographics

YEONWOO Choe

SUA Lim

SAEM Lee

SOYEON Kim

WONYEONG Jeong

MANIRAKORA Alexis

Financial and Technical support

KOICA Through TQUM Project

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ACRONYMS

%: Percentage

°C: Degree Celsius

°F: Degree Fahrenheit

AGR: Agriculture

ATP: Adenosine triphosphate

CCP: Critical Control Point

CIP: Cleaning in Place

COP: Cleaning Out of Place

e.g.: For example

FOP: Food Processing

HMF: Hydroxymethylfurfural

IC: Indicative content

MINAGRI: Ministry of Agriculture and Animal Resources of Rwanda

PPE: Personal Protective Equipment

PSF: Private Sector Federation

QAC: Quaternary ammonium compound

RP: Rwanda Polytechnic

RQF: Rwanda Qualification Framework

RTB: Rwanda TVET Board

SOP: Standard Operating Procedure

TQUM Project: TVET Quality Management Project

TSS: Technical Secondary School

TVET: Technical and Vocational Education and Training

INTRODUCTION

This trainee's manual includes all the knowledge and skills required in food processing specifically for the module of "**Honey Processing**". 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 trainee'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 trainee, you will start by addressing questions related to the activities, which are designed to foster critical thinking and guide you towards practical applications in the labour market. The manual also provides essential information, including learning hours, required materials, and key tasks to complete throughout the learning process.

All activities included in this training manual are designed to facilitate both individual and group work. After completing the activities, you will conduct a formative assessment, referred to as the end learning outcome assessment. Ensure that you thoroughly review the key readings and the 'Points to Remember' section.

MODULE CODE AND TITLE: FOPHP303 HONEY PROCESSING

Learning Outcome 1: Prepare workplace.

Learning Outcome 2: Extract honey.

Learning Outcome 3: Store honey.

Learning Outcome 1: Prepare the Workplace



Indicative contents

1.1 Selection of tools and equipment

1.2 Cleaning of the workplace

1.3 Selection of honeycombs

Key Competencies for Learning Outcomes 1 : Prepare the workplace

Knowledge	Skills	Attitudes
<ul style="list-style-type: none">• Identification of materials, tools and equipment used in honey processing• Description of cleaning methods and techniques	<ul style="list-style-type: none">• Selecting materials, tools and equipment• Adjusting tools and equipment• Measuring cleaning products• Mixing cleaning products• Cleaning the workplace• Checking the effectiveness of cleanliness• Arranging the workplace	<ul style="list-style-type: none">• Being effective communicator while processing honey• Paying attention to sharp tools• Being careful while filtrating honey• Being responsible when handling tools and equipment



Duration: 15hrs



Learning outcome 1 objectives:

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

1. Identify appropriately materials, tools and equipment according to their use
2. Select correctly tools and equipment according to the selection criteria
3. Describe correctly cleaning products as used in honey processing workplace cleaning
4. Clean effectively the honey processing workplace according to cleaning methods and procedures
5. Check correctly the cleanliness of the workplace, tools and equipment according to cleanliness tests.
6. Organize properly the workplace for optimal honey processing
7. Select properly honeycombs based on honey production requirements



Resources

Equipment	Tools	Materials
<ul style="list-style-type: none"> ● Cooking stove ● Honey extractor ● Wax press ● Honey filtering machine ● Labelling machine ● Pressure cleaner ● Filling machine ● Sealing machine ● PPE ● Balance 	<ul style="list-style-type: none"> ● Buckets ● Bowls ● Sieves ● Straining cloths ● Refractometer ● Uncapping knives ● Stirrers ● Sauce pan ● Spoons ● Mopes ● Squeegee ● Sweepers ● Towels ● pH meter ● Thermometer 	<ul style="list-style-type: none"> ● Honey combs ● Packaging materials ● Labels ● Scotch, ● Glue ● Water ● Soaps, ● Gloves ● Gas

	• Honey strainer	
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Duration: 5 hrs



Theoretical Activity 1.1.1: Identification of tools and equipment for cleaning the honey processing workplace

Tasks:

1: Answer the following questions related to description of tools, equipment and materials used in cleaning the honey processing workplace:

I. Basing on your experience, what could be the tools and equipment used for cleaning honey processing workplace?

II. What can be the use of each tool and equipment?

2: Provide the answers to asked questions by writing them on papers, flip chart, Blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.1.1.



Key readings 1.1.1.: Identification of tools and equipment for cleaning the honey processing workplace

Tool	Description	Use
Broom	<p>The key features of a broom:</p> <ul style="list-style-type: none"> Bristles: The bristles are usually made of natural materials like broomcorn or synthetic fibers. They are designed to sweep up dirt, dust, and debris. Handle: The handle is typically made of wood, which is a durable and natural material. Shape: The broom head can be round, 	A broom is used to sweep floors and other surfaces to remove loose dirt and debris.

	<p>rectangular, or other shapes, depending on the intended use.</p>	
 <p>Dustpan</p>	<p>Dustpan features:</p> <ul style="list-style-type: none"> • Shape: Typically, a dustpan is shaped like a shallow pan with a handle. • Material: Dustpans are often made of plastic or metal. • Size: Dustpans come in various sizes, from small handheld ones for quick cleanups to larger ones for sweeping larger areas. 	<p>A dustpan is used to collect and dispose of dirt and debris that has been swept up.</p>
 <p>brush</p>	<p>Brush features:</p> <ul style="list-style-type: none"> • Bristles: The brush has bristles made of bristles or synthetic fibers. The bristles are designed to sweep up dirt and debris. • Handle: The handle is attached to the back of the brush and is used to sweep the debris into the dustpan. • Shape: Brushes can be round, rectangular, or other shapes. 	<p>Cleaning brushes can be used to scrub away dirt, grime, and stains from surfaces like countertops, floors, and appliances.</p>

 <p>A mop</p>	<p>Main features of a mop:</p> <ul style="list-style-type: none"> • Mop head: The mop head is made of a material that absorbs water and dirt. Common materials for mop heads include cotton, microfiber, or synthetic fibers. • Handle: The handle is attached to the mop head and allows for easy maneuvering. Handles can be made of wood, metal, or plastic. 	<p>A mop is used to clean floors and other surfaces with water and cleaning solution.</p>
 <p>Bucket</p>	<p>Key features of a bucket:</p> <ul style="list-style-type: none"> • Handle: A bucket has a handle for easy carrying and pouring. • Shape: Buckets are usually cylindrical in shape, but they can also be square or rectangular. • Size: Buckets come in various sizes, from small buckets for personal use to large buckets for commercial cleaning. 	<p>A bucket is used to hold water and cleaning solution.</p>
 <p>Sponge</p>	<p>Key features of a cleaning sponge:</p> <ul style="list-style-type: none"> • Porosity: Sponges are porous, meaning they have many small holes that can absorb liquids and dirt. • Absorbency: Sponges are highly absorbent, making them effective at cleaning up spills and messes. • Softness: Sponges are 	<p>A sponge is used to clean surfaces such as countertops, appliances, and windows.</p>

	<p>generally soft and gentle on surfaces, making them suitable for cleaning delicate items.</p> <ul style="list-style-type: none"> • Durability: Sponges are durable and can be reused many times. • Shapes and sizes: Sponges come in various shapes and sizes, including rectangular, square, and round. 	
 <p>Microfiber cloth</p>	<ul style="list-style-type: none"> • Microfiber: The fibers are typically made from polyester and polyamide. These fibers are so small that they can penetrate deep into pores and crevices, trapping dirt and grime. • Absorbency: Microfiber cloths are highly absorbent, making them effective at cleaning up spills and messes. • Softness: Microfiber cloths are soft and gentle on surfaces, making them suitable for cleaning delicate items. • Durability: Microfiber cloths are durable and can be reused many times. • Lint-free: Microfiber cloths are designed to be lint-free, so they won't leave behind any residue. 	<p>A microfiber cloth is a versatile cleaning tool that can be used to clean a variety of surfaces.</p>

 <p>Squeegee</p>	<p>Features of a squeegee:</p> <ul style="list-style-type: none"> • Rubber blade: The blade is made of a flexible rubber material that can effectively remove water from surfaces. • Handle: The handle is attached to the blade and allows for easy maneuvering. • Size: Squeegees come in various sizes, from small handheld squeegees to larger ones used for commercial cleaning. 	<p>A squeegee is used to remove water from surfaces, such as windows and floors.</p>
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Equipment	Description	Use
 <p>Pressure washer</p>	<p>Key features of a pressure washer:</p> <ul style="list-style-type: none"> • Pump: The pump generates the high-pressure water that is used to clean surfaces. • Hose: The hose connects the pressure washer to the cleaning wand or nozzle. • Trigger: The trigger controls the flow of water. • Nozzle: The nozzle directs the high-pressure water stream 	<p>A pressure washer is used to clean hard surfaces with a high-powered stream of water.</p>
	<p>Key features of a floor scrubber:</p> <ul style="list-style-type: none"> • Rotating brush or pad: The brush or pad is made of a durable material, such as bristles or microfiber, 	<p>A floor scrubber is a machine that is used to clean and polish floors.</p>

 <p>Floor scrubber</p>	<p>and rotates to scrub the floor.</p> <ul style="list-style-type: none"> • Water tank: A water tank holds the cleaning solution. • Vacuum: Many floor scrubbers also have a built-in vacuum to suck up dirt and water after scrubbing. • Handle: The handle allows the operator to control the machine and maneuver it around the floor. 	
 <p>Industrial vacuum cleaner</p>	<p>Key features of an industrial vacuum cleaner:</p> <ul style="list-style-type: none"> • Powerful motor: Industrial vacuum cleaners have powerful motors that can generate high suction power, allowing them to effectively remove dirt and debris from various surfaces. • Large capacity: They have large dust bins or collection tanks to accommodate large amounts of waste. • Durable construction: Industrial vacuum cleaners are built to withstand harsh conditions and heavy use. • Versatile attachments: They often come with a variety of attachments, such as floor tools, crevice tools, and upholstery attachments, to handle 	<p>An industrial vacuum cleaner is a powerful vacuum cleaner that is used to clean up large amounts of dirt and debris.</p>

	<p>different cleaning tasks.</p> <ul style="list-style-type: none"> • Wet/dry capabilities: Many industrial vacuum cleaners are designed to handle both dry and wet debris, making them versatile for a wide range of cleaning applications. 	
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Theoretical Activity 1.1.2: Identification of tools and equipment used for honey extraction

Tasks:

1: Answer the following questions related to identification of tools, equipment and materials used in honey extraction:

- I. What do you think could be the tools and equipment used for honey extraction?
- II. Based on the list provided, what can be the use of each tool and equipment used for honey extraction.

2: Write the answers on papers, flip chart, blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.1.2.



Key readings 1.1.2.: Identification of tools and equipment used for honey extraction

- List and uses of tools and equipment for honey extraction:

- ✓ Tools:

Name	Description	Use
Uncapping fork	<p>Main features of honey uncapping fork:</p> <ul style="list-style-type: none">• Tines: The fork has multiple tines (sharp points) that are arranged in a specific pattern, often resembling a comb. These tines are used to puncture the wax cappings.• Handle: Is typically made of wood or plastic, providing a comfortable grip for the beekeeper.• Size: Uncapping forks come in various sizes, depending on the scale of honey production.	This tool is used to remove the wax caps from the honeycomb.
Honey strainer	<p>Key features of a honey strainer:</p> <ul style="list-style-type: none">• Mesh: The strainer has a fine mesh that allows the honey to pass through while trapping impurities.• Handle: The handle provides a comfortable grip for easy use.• Size: Honey strainers	It is used to remove wax particles and other impurities from honey

	<p>come in various sizes, depending on the scale of honey production.</p>	
 <p>Food-grade bucket</p>	<p>Key features of a food-grade bucket:</p> <ul style="list-style-type: none"> • Material: There are typically made from materials such as stainless steel, polypropylene, or polyethylene. These materials are non-toxic, durable, and resistant to corrosion. • Smooth surface: The surface of the bucket should be smooth to prevent the buildup of food particles and bacteria. • Easy to clean: Food-grade buckets should be easy to clean and sanitize, using hot water and detergent. • Stackable: Many food-grade buckets are stackable for efficient storage and transportation. • Lid: Some food-grade buckets come with lids to help prevent contamination and preserve the freshness of the food. 	<p>This is used to hold the honey during and after extraction.</p>

 <p>Honey extractor</p>	<p>Key components of a honey extractor:</p> <ul style="list-style-type: none"> Drum or basket: The drum or basket is a cylindrical container that holds the honeycomb frames. Handle or motor: The drum or basket is rotated by a handle or a motor. Honey collector: The honey is collected in a container at the bottom of the extractor. 	<p>This is a machine that uses centrifugal force to extract honey from the honeycomb.</p>
 <p>Refractometer</p>	<p>Key features of a handheld refractometer:</p> <ul style="list-style-type: none"> Portable design: Handheld refractometers are small and lightweight, making them ideal for field use. Prism: The heart of the instrument is a prism that refracts light passing through the sample. Eyepiece: The eyepiece allows the user to view the image created by the refracted light. Scale: The scale is calibrated to display the refractive index 	<p>It is used to measure the water and sugar content (Brix) of honey</p>

	<p>directly.</p> <ul style="list-style-type: none"> • Temperature compensation: Many handheld refractometers have automatic temperature compensation to ensure accurate measurements at different temperatures. 				
 pH meter	<p>Key features:</p> <ul style="list-style-type: none"> • Pen-like design: The pH meter is shaped like a pen, making it convenient to carry and use. • Electrode: The electrode is a probe that is inserted into the solution to measure the pH. It typically consists of a glass electrode and a reference electrode. • Display: The display shows the measured pH value, usually in digital format. • Calibration: Many pen pH meters have automatic calibration features, making it easy to ensure accurate measurements. 	<p>A pH meter is used to measure the pH level of honey</p>			
<p>✓ Equipment</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Description</th> <th>Use</th> </tr> </thead> </table>			Name	Description	Use
Name	Description	Use			

 <p>Electric uncapping knife</p>	<p>Main components of an uncapping knife:</p> <ul style="list-style-type: none"> • Heated blade: The blade of an electrical uncapping knife is heated to a specific temperature, softening the wax and making it easier to cut. • Temperature control: Many models allow you to adjust the temperature of the blade to suit different types of wax and honeycombs. 	<p>This is a heated knife that can be used to quickly and easily remove the wax caps from the honeycomb.</p>
 <p>Honey press</p>	<p>Key components of a honey press:</p> <ul style="list-style-type: none"> • Pressing chamber: This is the chamber where the honeycomb frames are placed. • Pressing mechanism: The pressing mechanism applies pressure to the honeycomb frames, squeezing out the honey. This can be a manual lever, a hydraulic system, or a pneumatic system. • Honey collector: The honey is collected in a container at the bottom of the press. • Frame holders: These hold the honeycomb 	<p>This is a machine that uses pressure to extract honey from the honeycomb.</p>

	<p>frames securely in place during the pressing process.</p>	
 <p>Honey filter</p>	<p>Key features of a honey filter:</p> <ul style="list-style-type: none"> Mesh: The filter has a fine mesh that allows the honey to pass through while trapping impurities. Handle: The handle provides a comfortable grip for easy use. Size: Honey filters come in various sizes, depending on the scale of honey production. 	<p>This is used to remove wax particles and other impurities from honey. It is typically used in conjunction with a honey extractor.</p>
 <p>Pump</p>	<p>Key components of a honey pump:</p> <ul style="list-style-type: none"> Motor: The pump is powered by an electric motor. Pump head: The pump head is responsible for creating suction and pushing the honey through the pump. Hose: A hose connects the pump to the honey source and the destination container. Valves: Valves are used to control the flow of honey. 	<p>This is used to transfer honey from one container to another.</p>



Theoretical Activity 1.1.3: Identification of tools and equipment used for honey storage



Tasks:

1: Answer the following questions related to identification of tools, equipment and materials used in honey storage:

- I. What do you think could be the tools and equipment used for honey extraction?
- II. Based on list of tools and equipment provided, what can be the use of each tool and equipment?

2: Provide the answers to asked questions by writing them on papers, flip chart, blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.1.3.



Key readings 1.1.3: Identification of tools and equipment used for honey storage

- List and uses of tools and equipment for honey storage:
 - ✓ Tools

Name	Description	Use
Food-grade buckets or containers	<p>Key features of a food-grade bucket:</p> <ul style="list-style-type: none">• Material: There are typically made from materials such as stainless steel, polypropylene, or polyethylene. These materials are non-toxic, durable, and resistant to corrosion.• Smooth surface: The surface of the bucket should be smooth to prevent the buildup of food particles and bacteria.• Easy to clean: Food-	These are used to store honey.

	<p>grade buckets should be easy to clean and sanitize, using hot water and detergent.</p> <ul style="list-style-type: none"> • Stackable: Many food-grade buckets are stackable for efficient storage and transportation. • Lid: Some food-grade buckets come with lids to help prevent contamination and preserve the freshness of the food. 	
 <p>Honey dipper</p>	<p>Key features of a honey dipper:</p> <ul style="list-style-type: none"> • Handle: The handle is usually made of wood or plastic and provides a comfortable grip. • Bowl: The bowl is shaped to hold a small amount of honey. • Size: Honey dippers come in various sizes, but they are generally small and lightweight. 	<p>It is a utensil used to collect viscous liquid (generally honey or syrup) from a container, which is then dispensed at another location.</p>

✓ **Equipment:**

Name	Description	Use

 <p>Honey tanks</p>	<p>These tanks are typically made of food-grade stainless steel to ensure that the honey remains uncontaminated and preserves its quality.</p> <p>Key features:</p> <ul style="list-style-type: none"> • Heating elements: to help maintain a consistent temperature, which is important because honey can crystallize when it gets too cold. • Agitators: to keep the honey mixed and prevent separation. 	<p>These are large tanks that are used to store bulk quantities of honey</p>
 <p>Honey drum</p>	<p>Key features of a honey drum:</p> <ul style="list-style-type: none"> • Size: Honey drums come in various sizes, ranging from small drums for individual use to large drums for commercial storage and transportation. • Material: Honey drums are typically made of stainless steel or other food-grade materials that are durable and easy to clean. • Lid: Honey drums have a lid that seals tightly to prevent 	<p>This is a large, cylindrical container that is used to store and transport honey.</p>

	<p>contamination and preserve the quality of the honey.</p> <ul style="list-style-type: none"> • Handles: Handles are attached to the sides of the drum for easy lifting and transportation. 	
 <p>Honey filler</p>	<p>Key components of a honey filler machine:</p> <ul style="list-style-type: none"> • Filling head: This is the part of the machine that dispenses the honey into the containers. It can be a single-head or multi-head filling machine, depending on the desired production capacity. • Conveyor belt: A conveyor belt transports the empty containers to the filling head and then carries the filled containers away. • Weighting system: Some honey filler machines have a weighing system that measures the weight of each filled container to ensure accuracy. • Control panel: The control panel allows the operator to adjust the filling speed, container size, and other settings. 	<p>This machine is used to fill honey jars and bottles.</p>

 <p>Honey capper</p>	<p>Key features of a honey capper:</p> <ul style="list-style-type: none"> • Capping head: The capping head presses the lids onto the containers, sealing them tightly. • Conveyor belt: A conveyor belt transports the filled containers to the capping head and then carries the capped containers away. • Control panel: The control panel allows the operator to adjust the capping speed and other settings. 	<p>This machine is used to cap honey jars and bottles.</p>
 <p>Honey labeller</p>	<p>Key features of a honey labeler:</p> <ul style="list-style-type: none"> • Labeling head: The labeling head applies the labels to the containers. It can be a single-head or multi-head labeler, depending on the desired production capacity. • Conveyor belt: A conveyor belt transports the containers to the labeling head and then carries the labeled containers away. • Label dispenser: The 	<p>This machine is used to apply labels to honey jars and bottles.</p>

	<p>label dispenser holds the labels and feeds them to the labeling head.</p> <ul style="list-style-type: none"> • Control panel: The control panel allows the operator to adjust the labeling speed, label position, and other settings. 	
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Practical Activity 1.1.4: Selection of tools and equipment used in honey



processing

Task:

You are asked to go to the honey processing workshop to select tools and equipment to be used in honey processing.

- 1: Apply safety precautions.
- 2: Referring to the selection criteria and procedures, select tools and equipment for honey processing.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 1.1.4
- 5: Perform the task provided in application of learning 1.1.



Key readings 1.1.4: Selection of tools and equipment used in honey processing

- **Procedure for selecting tools and equipment for honey production**
 - ✓ **Identify the tasks that need to be completed.**

This could include cleaning the workplace, extraction of honey and storing honey.

- ✓ **Consider the specific needs of the workplace.**

This could include the size and type of operation and the level of automation.

- ✓ **Review the selection criteria for tools and equipment.**

These factors may include;

- Efficiency
- Safety
- Compliance
- Durability

- ⊕ Ease of maintenance
- ⊕ Cost
- ⊕ Energy efficiency.

Based on the selection criteria and the specific needs of the workplace, select tools and equipment that are appropriate for the tasks.



Practical Activity 1.1.5: Adjustment of tools and equipment used in honey processing



Task:

You are requested to go to the honey processing workshop to adjust tools and equipment to be used in honey processing.

- 1: Apply safety precautions.
- 2: Referring to the adjusting procedures, adjust tools and equipment for honey processing.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 1.1.5
- 5: Perform the task provided in application of learning 1.1.



Key readings 1.1.5: Adjustment of tools and equipment used in honey processing

- **Functionality of tools and equipment.**
- ✓ **Refractometer**

⊕ **Analog/handheld refractometer:**

To use an analog/handheld refractometer follow the steps below:

1. Open the cover and aim the refractometer with the prism towards bright light or a light source. If necessary, turn the focus ring until the scale is sharp.
2. Open the cover and wipe the prism with a soft cloth.
3. Apply a few drops of fluid to be measured to the prism. Close the cover and press lightly so that the liquid spreads over the prism without forming bubbles.
4. Hold the device horizontally and wait 30 seconds for temperature compensation to work.
5. Read the value on the dividing line between white and blue.
6. Clean and dry the prism.

Digital refractometer:

To use a digital refractometer, follow the steps below:

1. Switch On the device.
2. Clean the test area and prism with a clean and soft textile or paper towel before applying the test liquid.
3. Place the device on a flat, horizontal surface.
4. Apply a few drops of the test liquid to the test area. Then press the Read button.
5. After a few seconds the reading will be displayed on the screen.
6. Clean the test area immediately after use.

pH-meter:

To use a pHmeter, follow the steps below:

1. Remove protective cap of pH-meter
2. First rinse the electrode with distilled water and suck it with filter paper.
3. Turn the meter on by pressing “ON/OFF” key.
4. Immerse the pH meter electrode in the solution to be tested (should not be over the immersion line).
5. Stir gently and wait around 30 seconds till the reading stabilizes.
6. After finishing, clear the electrode with pure water, turn the pH meter off by pressing “ON/OFF” key.
7. Always replace the protective cap after use.

Balance:

Weighing balances are used to measure the weight of objects with a high degree of accuracy. However, over time, balances can become inaccurate due to wear and tear, environmental factors, or improper use. It is important to adjust your weighing balance regularly to ensure that it is providing accurate readings.

Steps to adjust a weighing balance

1. Make sure the balance is levelled.

Use a spirit level to check the level of the balance platform. If the balance is not levelled, adjust the feet until it is levelled.

2. Zero the balance.

Place a tared weight on the balance platform and press the zero button. The balance should now read zero.

3. Adjust the sensitivity.

The sensitivity of the balance controls how much the balance needle moves in response to a change in weight. Adjust the sensitivity so that the needle moves smoothly and evenly.

4. Calibrate the balance.

Calibration is the process of comparing the readings of the balance to a known standard weight. To calibrate the balance, use a calibration weight that is certified by a recognized laboratory.

Calibration procedure:

1. Place the calibration weight on the balance platform.
2. Read the weight displayed on the balance.
3. Adjust the balance so that the displayed weight matches the known weight of the calibration weight.
4. Repeat steps 2 and 3 for each calibration weight that you are using.

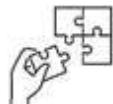
• Adjusting a honey bottling machine:

1. Make sure that the machine is turned off and disconnected from the electrical outlet.
2. Clean the machine and remove any honey residue.
3. Locate the adjustment screws for the filling volume and the capping speed.
4. Use a screwdriver to adjust the screws to the desired settings.
5. Turn On the machine and test it to make sure that it is filling and capping the bottles correctly.



Points to Remember

- Common tools used in cleaning honey processing workplace are sponges and cloths, broom, dustpan, bucket, mop, scrubber and squeegee
- Common equipment used in cleaning honey processing workplace are pressure washer, floor scrubber and industrial vacuum cleaner.
- For safety issue, always wear PPE before selecting tools and equipment for honey processing
- When you are selecting tools and equipment for honey processing, select tools and equipment that meet the selection criteria.
- While adjusting tools and equipment for honey processing, it is strictly recommended to follow manufacturer's instructions
- Adjust the weighing balance regularly to ensure that it is providing accurate readings
- Never weigh on untarred balance.



Application of learning 1.1. Selection of tools and equipment

You are requested to go to the honey processing workshop to select tools and equipment for honey processing.



Duration: 5hrs

**Theoretical Activity 1.2.1: Description of cleaning products for honey processing workplace.****Tasks:**

1: Answer the following questions related to description of cleaning products used to clean workplace for honey extraction:

- i. According to your experience, what do you think could be the cleaning products to use in honey processing workplace?
- ii. What could be the requirements for a cleaning product to be used in honey processing workplace cleaning?

2: Provide the answers to asked questions by writing them on papers, flip chart, Blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.2.1

**Key readings 1.2.1.: Description of cleaning products for honey processing workplace.**

The following are some cleaning products that can be used in honey processing:

- **Food-grade sanitizers:**

These are essential for disinfecting surfaces that come into contact with honey. Choose options approved for food processing facilities and specifically safe for bees. Common choices include:

- ✓ **Chlorine-based sanitizers:**

Effective against bacteria and viruses, but require careful dilution and rinsing.

- ✓ **Acid-based sanitizers:**

Effective against certain bacteria and mould, but can be corrosive to some materials.

- ✓ **Hydrogen peroxide:**

Effective against a wide range of microorganisms, breaks down into water and oxygen, leaving no residue.

- **Mild detergents:**

Use for general cleaning of surfaces that don't directly contact honey. Opt for biodegradable and phosphate-free options.

- **Vinegar:**

A natural alternative for cleaning and removing light stains. Dilute with water for safe use. There are a variety of cleaning methods that can be used in honey processing. The specific cleaning method that is used will depend on the type of equipment and surfaces that need to be cleaned, as well as the level of cleanliness that is required.



Practical Activity 1.2.2: Cleaning the workplace, tools and equipment processing workplace



Task:

Go to the honey processing workshop to clean the workplace, tools and equipment.

- 1: Apply safety precautions.
- 2: Referring to the cleaning methods and procedures provided, clean the work, tools and equipment for honey processing.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary.
- 4: Read the key reading 1.2.2
- 5: Perform the task provided in application of learning 1.2.



Key readings 1.2.2: Cleaning the workplace, tools and equipment processing workplace

- The common cleaning methods used in honey processing
 - ✓ Manual cleaning:

Manual cleaning involves using a brush or sponge to clean equipment and surfaces with a cleaning solution. This method is often used to clean small pieces of equipment and hard-to-reach areas.

- ✓ Automated cleaning:

Automated cleaning systems use a combination of water, cleaning solution, and mechanical action to clean equipment and surfaces. These systems are often used to clean large pieces of equipment, such as honey extractors and filters.

✓ Ultrasonic cleaning:

Ultrasonic cleaning uses high-frequency sound waves to create cavitation bubbles in a cleaning solution. These cavitation bubbles burst and release energy that removes dirt, grease, and other contaminants from equipment and surfaces. Ultrasonic cleaning is often used to clean delicate equipment or equipment with complex geometries.

✓ CIP (Clean-in-Place):

CIP systems are used to clean equipment and surfaces without having to disassemble them. These systems circulate a cleaning solution through the equipment and surfaces to remove dirt, grease, and other contaminants. CIP systems are often used to clean large pieces of equipment, such as honey tanks and pipelines.

In addition to the above cleaning methods, there are a number of other cleaning methods that can be used in honey processing, such as:

✓ Steam cleaning:

Steam cleaning uses high-temperature steam to clean equipment and surfaces. This method is often used to clean equipment that is difficult to clean with other methods, such as honeycombs and frames.

✓ Dry ice cleaning:

Dry ice cleaning uses pellets of solid carbon dioxide to clean equipment and surfaces. The dry ice pellets sublimate and expand rapidly, creating a shock wave that removes dirt, grease, and other contaminants. Dry ice cleaning is often used to clean delicate equipment or equipment with complex geometries.

✓ Ozone cleaning:

Ozone cleaning uses ozone gas to clean equipment and surfaces. Ozone is a powerful oxidizer that can kill bacteria, yeast, molds, and other contaminants. Ozone cleaning is often used to clean equipment and surfaces that are difficult to clean with other methods, such as honeycombs and frames.

The best cleaning method for a particular application will depend on a number of factors, including:

- ✓ The type of equipment and surfaces that need to be cleaned
- ✓ The level of cleanliness that is required
- ✓ The cost of the cleaning method

- ✓ The availability of the cleaning method

The procedure for cleaning and sanitizing honey processing equipment and surfaces:

- ✓ Pre-rinse all equipment and surfaces with clean water. This will help to remove any loose dirt and debris.
- ✓ Apply the cleaning product to the equipment and surfaces. Follow the manufacturer's instructions for dilution and application.
- ✓ Allow the cleaning product to sit on the equipment and surfaces for the recommended amount of time. This will give the cleaning product time to work.
- ✓ Scrub the equipment and surfaces with a clean brush or sponge. Be sure to scrub all areas, including hard-to-reach areas.
- ✓ Rinse all equipment and surfaces thoroughly with clean water. This will remove any residual cleaning product.
- ✓ Sanitize all equipment and surfaces with a food-grade sanitizer. Follow the manufacturer's instructions for dilution and application.
- ✓ Allow the sanitizer to air dry on the equipment and surfaces.

By following these tips, you can help to ensure that your honey processing equipment and surfaces are clean and sanitary. This will help to prevent the growth of harmful bacteria and protect the quality of your honey.

- Methods of checking of cleanliness of workplace

There are a number of methods that can be used to check the cleanliness of a workplace. The specific method that is used will depend on the type of workplace and the level of cleanliness that is required.

Here are some of the most common methods used to check the cleanliness of a workplace:

- ✓ Visual inspection:

Visual inspection is the simplest way to check the cleanliness of a workplace. This involves looking for dirt, dust, debris, and other contaminants on equipment, surfaces, and floors.

- ✓ Swab testing:

Swab testing is used to check the level of microbial contamination on surfaces. A sterile swab is wiped on the surface to be tested and then placed in a culture medium. The culture medium is then incubated to see if any bacteria or yeast grow.

- ✓ ATP testing:

ATP (adenosine triphosphate) testing is used to check the level of organic contamination on surfaces. ATP is a molecule that is present in all living cells. When ATP is broken down, it releases light. ATP testing devices use a light meter to measure the amount of light emitted from a surface. The amount of light emitted is proportional to the amount of organic contamination on the surface.

- ✓ Luminescence testing:

Luminescence testing is used to check the level of microbial contamination on

surfaces. A luminescent molecule is applied to the surface to be tested. The luminescent molecule will bind to bacteria and yeast cells. When the luminescent molecule is excited by UV light, it emits light. The amount of light emitted is proportional to the amount of microbial contamination on the surface.

✓ **Air sampling:**

Air sampling is used to check the level of microbial contamination in the air. An air sampler is used to collect a sample of air. The air sample is then placed in a culture medium to see if any bacteria or yeast grow.

The best method for checking the cleanliness of a workplace will depend on the specific needs of the workplace. For example, a food processing plant will need to use more stringent cleaning methods and testing methods than an office.

It is important to consult with a qualified professional to determine the best cleaning methods and testing methods for your specific needs.



Practical Activity 1.2.3: Arrangement of workplace for honey processing



Task:

You are asked to go to the honey processing workshop to arrange the workplace for honey processing.

- 1: Apply safety precautions.
- 2: Referring to the honey processing flow chart, arrange the workplace for honey processing.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary.
- 4: Read the key reading 1.2.3
- 5: Perform the task provided in application of learning 1.2.



Key readings 1.2.3: Arrangement of workplace for honey processing

- **Purpose of workplace arrangement**

The purpose of workplace arrangement in honey processing is to ensure the safety, efficiency, and quality of the honey processing operation. A well-arranged workplace can help to:

- ✓ **Prevent contamination of the honey**

By arranging the workplace in a way that minimizes cross-contamination, honey processors can help to ensure that the honey is safe to consume.

✓ **Improve efficiency**

By arranging the workplace in a way that allows for the smooth flow of honey and equipment, honey processors can improve the efficiency of their operation.

✓ **Maintain the quality of the honey**

By arranging the workplace in a way that protects the honey from heat, light, and other contaminants, honey processors can help to maintain the quality of the honey.

- **Honey processing flow chart**

- ✓ **Select honeycombs**

- ❖ **Colour:** Honeycombs should be a light golden colour. A darker colour indicates that the honey is older and may have crystallized.

- ❖ **Wax:** Honeycombs should be covered in a thin layer of wax. Too much wax can make it difficult to extract honey, while too little wax can make honeycombs fragile.

- ❖ **Pollen:** Honeycombs should contain some pollen. This indicates that the bees have collected nectar from a variety of flowers, which will produce a more complex and flavourful honey.

- ❖ **Moisture:** Honeycombs should be moist, but not wet. If they are too dry, honey will be difficult to extract. If they are too wet, honey may be diluted.

- ✓ **Uncapping**

- Remove wax caps from honeycombs using an uncapping knife or machine.

- ✓ **Extraction**

- Place honeycombs in a honey extractor and spin them to remove honey.

- ✓ **Filtration**

- Filter the honey to remove any impurities.

- ✓ **Heating**

- Heat the honey to a temperature of 63°C for a few minutes to kill bacteria.

- ✓ **Cooling**

- Cool the honey to room temperature.

- ✓ **Packaging**

- Package honey in jars, bottles, or other containers.

- ✓ **Storage**

- Store the honey in a cool, dark place.

- ✓ **Steps for arranging a honey processing workplace:**

To organize the honey processing workplace, you can follow these steps:

- ❖ **Identify the different tasks that need to be completed in the honey processing**

process. This includes tasks such as harvesting, extracting, straining, filtering, clarifying, and bottling honey.

- ⊕ **Group similar tasks together.** For example, you could group together all of the tasks that involve preparing the honey for extraction, or all of the tasks that involve packaging the honey.
- ⊕ Create a designated workspace for each group of tasks. This will help to ensure that all of the necessary tools and supplies are within reach.
- ⊕ **Arrange the workspaces in a logical order.** This will help to minimize the amount of walking and backtracking that needs to be done.
- ⊕ **Label all of the workspaces and tools.** This will help everyone to know where things belong and make it easy to find what they need.
- ⊕ **Implement a system for cleaning and disinfecting the workplace and equipment.** This is important to prevent the growth of bacteria and ensure the quality of the honey.

By following these tips, honey processors can create a workplace that is safe, efficient, and conducive to the production of high-quality honey.



Points to Remember

- Common types of cleaning products used in honey processing include: Food grade sanitizers, mild detergents and vinegar.
- Always read the manufacturer's information on the cleaning products label before using it.
- To ensure that the cleanliness is achieved, you are recommended to use tests such; visual inspection, ATP testing, swab testing, and luminescence testing.
- A well-arranged workplace helps to ensure the safety, efficiency, and quality of the honey processing operation.
- To avoid cross-contamination, always follow the process flow chart of honey processing.



Application of learning 1.2.

You are requested to go to the honey processing workshop to clean and arrange the workplace, tools and equipment.



Duration: 5hrs

**Theoretical Activity 1.3.1: Description of honey categories.****Tasks:**

1: Answer the following questions related to description of honey categories:

- I. Basing on your experience, what could be the honey categories?
- II. What could be the criteria to classify categories of honey?

2: Provide the answers to asked questions by writing them on papers, flip chart, blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.3.1.

**Key readings 1.3.1: Description of honey categories.**

- **Honey and honey categories**

Honey is a sweet, viscous liquid produced by bees from the nectar of flowers. It is a complex substance that contains over 180 different compounds, including sugars, water, enzymes, vitamins, minerals, and antioxidants.

Honey is classified in a variety of ways, including **by floral source, processing method, colour, flavour, and texture**.

⊕ **Categories of honey by floral source:**

Monofloral honey: Monofloral honey is made from the nectar of one or a few types of flowers. This type of honey is often named after the floral source, such as Manuka honey, lavender honey, or orange blossom honey.

Polyfloral honey: Polyfloral honey is made from the nectar of many different types of flowers. This type of honey is often called "**wildflower honey**" or "**Multifloral honey**".

⊕ **Categories of honey by processing method**

Raw honey: Raw honey is honey that has not been heated or filtered. It contains all of the natural pollen, enzymes, and vitamins of honey.

Unfiltered honey: Unfiltered honey is honey that has not been filtered to remove pollen and other impurities. It has a thicker texture and a more intense flavour than filtered honey.

Filtered honey: Filtered honey has been passed through a filter to remove pollen and other impurities. It has a smoother texture and a more delicate flavour than unfiltered honey.

Pasteurized honey: Pasteurized honey has been heated to kill yeast and bacteria. This makes it more shelf-stable than other types of honey, but it also destroys some of the enzymes and nutrients in the honey.

Categories of honey by colour

Light honey: Light honey is made from the nectar of light-coloured flowers, such as clover and alfalfa. It has a mild flavour and a light texture.

Medium honey: Medium honey is made from the nectar of medium-coloured flowers, such as sunflower and buckwheat. It has a more intense flavour and a slightly thicker texture than light honey.

Dark honey: Dark honey is made from the nectar of dark-coloured flowers, such as Manuka and chestnut. It has a bold flavour and a thick texture.

Categories of honey by flavour

Mild honey: Mild honey has a delicate flavour and is often described as being "buttery" or "floral." It is often made from the nectar of light-coloured flowers, such as clover and alfalfa.

Medium honey: Medium honey has a more intense flavour than mild honey and is often described as being "fruity" or "honey-like." It is often made from the nectar of medium-coloured flowers, such as sunflower and buckwheat.

Strong honey: Strong honey has a bold flavour and is often described as being "spicy" or "earthy." It is often made from the nectar of dark-coloured flowers, such as Manuka and chestnut.

Categories of honey by texture:

Smooth honey: Smooth honey has a liquid texture and is easy to pour. It is often made from the nectar of light-coloured flowers, such as clover and alfalfa.

Crystallized honey: Crystallized honey has a solid texture and is difficult to pour. It can be liquefied by heating it gently in a warm water bath. Crystallization is a natural process and does not affect the quality of the honey.



Theoretical Activity 1.3.2: Description of honeycombs and their handling conditions



Tasks:

1: Answer the following questions related to description of honeycombs and their handling conditions:

- I. What do you know about a honeycomb?
- II. What can be the handling conditions of honeycombs?

2: Provide the answers to asked questions by writing them on papers, flip chart, blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 1.3.2



Key readings 1.3.2: Description of honeycombs and their handling conditions

- **Definition**

Honeycomb is a natural structure made by honey bees to store honey and pollen. It is made of hexagonal wax cells that are arranged in layers. The bees collect nectar from flowers and store it in the honeycomb cells. The nectar then evaporates, leaving behind honey.

- **Status of honeycombs**

The following are criteria to identify a honeycomb with ripe honey

- ✓ **Colour:** Ripe honey has a golden yellow to amber colour.
- ✓ **Viscosity:** Ripe honey is thick and viscous.
- ✓ **Capping:** The wax cappings on ripe honeycombs are sealed tightly.
- ✓ **Weight:** Ripe honeycombs are heavy.

To free a honeycomb with ripe honey of bees use the following methods

- ✓ **Use a bee smoker:** Smoke will help to calm the bees and make them less likely to sting.
- ✓ **Brush the bees off the comb:** Use a soft brush to gently brush the bees off the honeycomb.
- ✓ **Shake the bees off the comb:** Gently shake the comb to remove any remaining bees.
- ✓ **Place the comb in a bee escape:** A bee escape is a device that allows bees to leave a hive but prevents them from returning.

To select good quality honeycombs, make sure to:

- ✓ **Inspect the honeycombs carefully:** Brood honeycombs will contain eggs, larvae, or pupae.
- ✓ **Avoid honeycombs with capped brood:** Capped brood is brood that has been sealed in the wax cells.
- ✓ **Avoid honeycombs with uncapped brood:** Uncapped brood is brood that has not been sealed in the wax cells.

Honeycomb handling conditions:

Cleanliness of honeycomb container

The cleanliness of the honeycomb container is important to prevent contamination and preserve the quality of the honeycomb. Here are some tips on how to clean a honeycomb container:

- ✓ Rinse the container with cold water. This will remove any loose dirt and debris.
- ✓ Wash the container with a mild dish soap and warm water. Use a sponge or soft cloth to scrub the container, paying special attention to any areas where honeycomb wax may have accumulated.
- ✓ Rinse the container thoroughly with cold water. Make sure to remove all of the soap residue.
- ✓ Sanitize the container with a food-grade sanitizer. Follow the manufacturer's instructions for dilution and application.
- ✓ Allow the container to air dry completely. Do not use the container until it is completely dry.
- ✓ If the honeycomb container is heavily soiled, you may need to soak it in a cleaning solution for a few hours before scrubbing it. You can also use a power washer to clean the container, but be careful not to damage the honeycomb.

Here are some additional tips for cleaning a honeycomb container:

- ✓ Use a dedicated honeycomb container for storing and transporting honeycomb. This will help to prevent cross-contamination.
- ✓ Clean the container immediately after use. This will prevent the honeycomb wax from hardening and becoming difficult to remove.
- ✓ Avoid using harsh chemicals or abrasive cleaners to clean the container, as these can damage the honeycomb and leave behind residues that can contaminate the honey.

Transport conditions of honeycombs

Honeycombs are delicate and can be easily damaged during transportation. It is important to take steps to protect the honeycombs and ensure that they arrive at their destination in good condition.

Here are some tips on how to transport honeycombs:

 **Prepare the honeycombs for transport.**

Remove any excess honey from the honeycombs and wrap them in plastic wrap or foil. This will help to prevent the honeycombs from sticking together and from drying out.

 **Pack the honeycombs carefully.**

Place the honeycombs in a sturdy box or crate. Surround the honeycombs with packing material, such as foam peanuts or bubble wrap, to cushion them from shock and vibration.

 **Transport the honeycombs in a cool, dark place.**

Avoid transporting the honeycombs in direct sunlight or in hot weather. This could cause the honeycombs to melt or become damaged.

 **Handle the honeycombs with care.**

When loading and unloading the honeycombs, be careful not to drop them or bump them together.



Practical Activity 1.3.3: Selection of honeycombs for honey extraction



Task:

You are asked to go to the honey processing workshop to select honeycombs for honey extraction.

- 1: Apply safety precautions
- 2: Referring to the factors to consider when selecting honeycombs, select honeycomb for honey extraction.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 1.3.3
- 5: Perform the task provided in application of learning 1.3



Key readings 1.3.3: Selection of honeycombs for honey extraction

- **Factors to consider when selecting honeycombs for extraction**
 - **Capped honeycombs:** Honeycombs that are capped or nearly capped are ready to be extracted. Uncapped honeycombs contain honey that is not ripe and will have a higher moisture content, making it more likely to ferment.
 - **Clean honeycombs:** Honeycombs should be free of debris, such as propolis, wax cappings, and bee parts. Any debris on the honeycombs can contaminate the honey.
 - **Undamaged honeycombs:** Honeycombs should be free of damage, such as holes, cracks, and tears. Damaged honeycombs may be difficult to extract honey from and may produce lower quality honey.
 - **Honeycombs from a healthy hive:** Honeycombs from a healthy hive will be free of pests and diseases. Honeycombs from an unhealthy hive may produce honey that is contaminated with pests or diseases.

- **The benefits of selecting good honeycombs for extraction**

Selecting good honeycombs for extraction is important because it affects the quality of the honey produced. Honey produced from good honeycombs will be of higher quality than honey produced from poor quality honeycombs. Good honeycombs are also easier to extract honey from, which can save time and effort.

- **Identification of ready to be extracted honeycombs**

Honeycombs that are ready to be extracted are capped or nearly capped. Capped honeycombs are sealed with a thin layer of wax by the bees. This indicates that the honey is ripe and ready to be harvested.

- **Identification of damaged or diseased honeycombs**

Damaged honeycombs may have holes, cracks, or tears. Diseased honeycombs may have a strange smell or appearance. Honeycombs that are infested with pests may have visible pests or evidence of pest activity, such as webbing or droppings.

- **Handling honeycombs before and after extraction**

Before extraction, honeycombs should be carefully removed from the hive and brushed to remove any bees. Honeycombs should also be rinsed with clean water to remove any debris. After extraction, honeycombs should be rinsed again and then dried thoroughly.

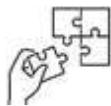
- **Tips for selecting good honeycombs for extraction:**

- ✓ Select honeycombs that are capped or nearly capped.
- ✓ Avoid honeycombs that are dirty or damaged.
- ✓ Avoid honeycombs from unhealthy hives.
- ✓ Select honeycombs that are heavy.
- ✓ Avoid honeycombs that are too dark.
- ✓ Avoid honeycombs that have a strange smell.



Points to Remember

- Honey is a sweet, viscous liquid produced by honey bees from the nectar of flowers.
- Honey is classified according to floral source, processing method, colour, flavour, and texture.
- Select honeycombs carefully bearing in mind selection criteria
- Honeycombs selection greatly affects the quality of honey.
- Always handle honeycomb carefully to avoid damages.
- Avoid using harsh chemicals or abrasive cleaners to clean the container, as these can damage the honeycombs and leave behind residues that can contaminate the honey.



Application of learning 1.3.

You are requested to go to the honey processing workshop to select honeycombs for honey extraction.



Learning Outcome 1 end Assessment

Theoretical assessment

1. From the table below, match the following tools and equipment with their uses by writing the letter with the corresponding digit in the provided space.

Answer	Use	Tool/equipment
.....	1. It is used to sweep floors and other surfaces to remove loose dirt and debris.	A. Honey dipper
.....	2. It is used to collect viscous liquid (generally honey or syrup) from a container, which is then dispensed at another location.	B. Uncapping fork
.....	3. This is a machine that uses centrifugal force to extract honey from the honeycomb.	C. Refractometer
.....	4. This is used to remove wax particles and other impurities from honey	D. Broom
.....	5. It is used to measure the sugar content of honey.	E. Honey extractor
		F. Honey drum

2. The following are steps of selecting tools and equipment for honey processing. Rearrange them in the logical sequence.

- I. Review the selection criteria for tools and equipment.
- II. Identify the tasks that need to be completed.
- III. Select tools and equipment that meet the selection criteria and are appropriate for the tasks that need to be completed.
- IV. Consider the specific needs of the workplace.

3. Fill in the blank space with the right methods related to cleaning in a honey processing workshop. (**Manual cleaning, Automated cleaning, Cleaning In Place, Ultrasonic and Steam cleaning**)

- I. uses a combination of water, cleaning solution, and mechanical action to clean equipment and surfaces. These systems are often used to clean large pieces of equipment, such as honey extractors and filters

- II.involves using a brush or sponge to clean equipment and surfaces with a cleaning solution. This method is often used to clean small pieces of equipment and hard-to-reach areas.
- III.is used to clean equipment and surfaces without having to disassemble them. These systems circulate a cleaning solution through the equipment and surfaces to remove dirt, grease, and other contaminants.
- IV.uses high-frequency sound waves to create cavitation bubbles in a cleaning solution. These cavitation bubbles burst and release energy that removes dirt, grease, and other contaminants from equipment and surfaces.
- V. uses high-temperature steam to clean equipment and surfaces. This method is often used to clean equipment that is difficult to clean with other methods, such as honeycombs and frames.

4. Circle the letter corresponding to the right answer.

- I. The following are the purposes of arranging the workplace for honey processing except:
 - a) Prevent contamination of the honey
 - b) Improve efficiency
 - c) Increase the sugar content of honey
 - d) Maintain the quality of the honey
- II. Among the following definitions of honey, circle the letter corresponding to the right answer.
 - a) Honey is a sour, viscous liquid produced by bees from the nectar of flowers. It is a complex substance that contains over 180 different compounds, including alcohols, water, enzymes, vitamins, minerals, and antioxidants.
 - b) Honey is a sweet, viscous liquid produced by butterfly from the nectar of flowers. It is a complex substance that contains over 180 different compounds, including fat, proteins, enzymes, vitamins, minerals, and antioxidants.
 - a) Honey is a sweet, viscous liquid produced by bees from the nectar of flowers. It is a complex substance that contains over 180 different compounds, including sugars, water, enzymes, vitamins, minerals, and antioxidants.

6. Read the following statements and answer by **True** for the correct statements and **False** to the wrong statements.

- a) Categories of honey by colour includes; monofloral and polyfloral
- b) When loading and unloading the honeycombs, drop them or bump them together.

- c) Uncapped honeycombs contain honey that is not ripe and will have a higher moisture content, making it more likely to ferment.
- d) When selecting honeycombs, avoid ones that are too dark
- e) Selection of honeycombs for extraction does not affects the quality of the honey produced.

Practical assessment

INGANZO Honey Ltd located in Gicumbi district wants to process honey for exportation purpose. Recently, the company received tools and equipment for honey processing but the company's workers do not have knowledge and skills of preparing workplace and selecting honeycombs for honey processing.

You as a qualified honey processing technician, you are requested by the production manager to:

1. Select tools and equipment used in workplace of honey processing,
2. Clean the work place, tools and equipment for honey production,
3. Select honeycombs to use in honey processing

The task should be completed in 3 hours.



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END

Learning Outcome 2: Extract Honey



Indicative contents

2.1 Uncapping the honeycombs

2.2 Straining and filtration of honey

2.3 Checking the quality of honey

Key Competencies for Learning Outcome 2 : Extract honey

Knowledge	Skills	Attitudes
<ul style="list-style-type: none">• Description of honey straining methods• Identification of organoleptic properties of honey• Identification of honey quality specifications	<ul style="list-style-type: none">• Uncapping honeycombs• Extracting honey• Filtrating honey• Straining honey• Draining honey• Checking the quality of honey	<ul style="list-style-type: none">• Paying attention when extracting honey• Being a good time manager in processing honey• Being responsible when using tools and equipment• Being effective communicator in the workplace• Being careful when draining honey• Being patient when draining honey



Duration: 30 hrs



Learning outcome 2 objectives:

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

1. Uncap properly the honeycombs referring to honey uncapping methods and procedures.
2. Extract effectively honey in accordance with honey extraction methods and procedures.
3. Describe adequately honey straining methods as used in honey processing
4. Strain appropriately honey referring to honey straining methods and procedures.
5. Filtrate properly honey according to honey filtration methods and procedures.
6. Identify correctly the organoleptic properties of honey according to honey quality specifications.
7. Check effectively the quality of honey as per honey quality specifications.



Resources

Equipment	Tools	Materials
<ul style="list-style-type: none">• Bee blower• Honey containers• Heating jacket• Honeycomb uncapping knife• Uncapping tank• Honey extractor• Wax press• Honey filtering machine• Honey tank• Cooking stove	<ul style="list-style-type: none">• Buckets• Bowls,• Sieves• Straining cloths,• Refractometer• Uncapping knives• Stirrers• Sauce pan• Spoons• pH meter• Thermometer	<ul style="list-style-type: none">• Honey combs• Soaps• Gas• Gloves



Indicative content 2.1: Uncapping the honeycombs



Duration: 10 hrs



Practical Activity 2.1.1: Uncapping honeycombs

Task:

You are requested to go to the honey processing workshop to uncap honeycombs for honey extraction.

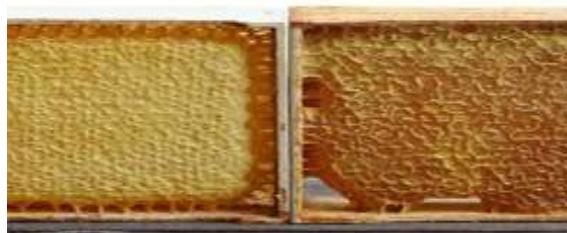
- 1: Apply safety precautions.
- 2: Follow the trainer while demonstrating how to uncap honeycombs with different tools.
- 3: Referring to the honeycomb uncapping methods, uncap honeycombs using different tools.
- 4: Present your work to the trainer and whole class. Ask clarification where necessary
- 5: Read key reading 2.1.1
- 6: Perform the task provided in application of learning 2.1



Key readings 2.1.1: Uncapping honeycombs

- **Definition of uncapping honeycomb**

Uncapping honeycombs is the process of removing the wax cappings that seal the honey-filled cells. This is done before the honey can be extracted from the honeycomb.



- ✓ **Purpose:**

The purpose of uncapping honeycombs is to allow the honey to flow freely from the cells. This makes the honey extraction process easier and more efficient.

- ✓ **Methods:**

There are two (2) main methods of uncapping honeycombs:

- **Manual uncapping**

Manual uncapping is done using an uncapping fork, uncapping knife, hot air blower uncapping roller



Uncapping fork

An uncapping fork is a tool used to remove the wax cappings that seal the honey-filled cells in a honeycomb frame. This is done before the honey can be extracted from the honeycomb.

Uncapping forks typically have multiple sharp tines that are used to pierce and remove the wax cappings. The tines on an uncapping fork can be made of stainless steel or plastic. Stainless steel tines are more durable, but plastic tines are less likely to damage the honeycomb.

Tips for using an uncapping fork:

- ⊕ Use a sharp uncapping fork. This will make the uncapping process easier and faster.
- ⊕ Be careful not to damage the honeycomb while uncapping it.
- ⊕ Uncap the honeycombs in a well-ventilated area. This will help to remove the fumes from the melted wax.
- ⊕ Sanitize your uncapping fork before and after using it to prevent the spread of disease.

✓ **Safety precautions when using uncapping fork**

- ⊕ Wear gloves and eye protection to protect yourself from the hot wax.
- ⊕ Be careful not to cut yourself on the sharp tines of the uncapping fork.

✓ **Advantages of using an uncapping fork:**

- ⊕ Inexpensive
- ⊕ Easy to use
- ⊕ Portable
- ⊕ Versatile
- ⊕ Less likely to damage the honeycomb than other uncapping methods, such as flailing uncapping

✓ **Disadvantages of using an uncapping fork**

- ⊕ Slower than other uncapping methods, such as hot air blowers and flailing uncapped
- ⊕ More labour-intensive than other uncapping methods

- ⊕ Requires some skill to use effectively



Uncapping knife

An uncapping knife is a tool used to remove the wax cappings that seal the honey-filled cells in a honeycomb frame. It is a long, thin blade with a serrated edge. The serrated edge helps to cut through the wax cappings without damaging the honeycomb.

Uncapping knives are an essential tool for any beekeeper who extracts their own honey. They are relatively inexpensive and easy to use. Uncapping knives can also be used to remove wax cappings from brood frames before they are placed in a honey super.

✓ **Safety tips for using an uncapping knife:**

- ⊕ Wear gloves and eye protection to protect yourself from the hot wax.
- ⊕ Be careful not to cut yourself on the sharp blade of the uncapping knife.
- ⊕ Uncap the honeycombs in a well-ventilated area to remove the fumes from the melted wax.
- ⊕ Sanitize your uncapping knife before and after using it to prevent the spread of disease.

✓ **Advantages of using an uncapping knife:**

- ⊕ Inexpensive
- ⊕ Easy to use
- ⊕ Produces a clean cut.

✓ **Disadvantages of using uncapping knife**

- ⊕ Can be slow and time-consuming
- ⊕ requires some skill to use without damaging honeycomb.

Uncapping using hot air blower



A hot air blower is a tool that produces a hot stream of air. It can be used to melt the wax cappings off of a honeycomb frame. This is a faster and easier way to uncaps honeycomb frames than using an uncapping knife, but it is important to be careful not to overheat the honey, as this can damage its flavour and quality.

- ✓ **Advantages of using an uncapping hot air blower:**
 - ✚ Faster and easier than using an uncapping knife.
 - ✚ Does not damage the honeycomb.
- ✓ **Disadvantages of using an uncapping hot air blower:**
 - ✚ Can overheat the honey, damaging its flavour and quality.
 - ✚ Can be expensive.



Uncapping roller

An uncapping roller is a tool with multiple small pins that are used to pierce and remove the wax cappings from a honeycomb frame. It is rolled over the frame to remove the cappings.

Uncapping rollers are a faster and easier way to uncap honeycomb frames than using an uncapping knife or a hot air blower. However, they can be more expensive than other uncapping methods.



- ✓ **Advantages of using an uncapping roller:**
 - ✚ Faster and easier than using an uncapping knife or a hot air blower.
 - ✚ Does not damage the honeycomb.
 - ✚ Can be used to uncap a large number of honeycomb frames quickly and easily.
- ✓ **Disadvantages of using an uncapping roller:**
 - ✚ Can be expensive.
 - ✚ May not remove all of the wax cappings, especially from deep honeycomb frames.

- **Uncapping machine**



An uncapping machine is a device that uses a heated blade or roller to remove the wax cappings from honeycomb frames. This is a faster and more efficient way to uncap honeycomb frames than using an uncapping knife or a hot air blower.

Uncapping machines come in a variety of sizes and styles, but they all work on the same basic principle. The honeycomb frames are placed in the uncapping machine and the heated blade or roller is rotated. The heat melts the wax cappings, which are then removed by the blade or roller.

✓ **Advantages of using an uncapping machine:**

- ⊕ Faster and more efficient than using an uncapping knife or a hot air blower.
- ⊕ Can uncaps a large number of honeycomb frames quickly and easily.
- ⊕ Less likely to damage the honeycomb than other uncapping methods.

✓ **Disadvantages of using an uncapping machine:**

- ⊕ Can be expensive to purchase and maintain.
- ⊕ May require some training to use effectively.
- ⊕ Can overheat the honey, which can damage its flavour and quality.

• **Procedures for honeycomb uncapping**

✓ **Honeycomb uncapping using a knife procedure:**

- ⊕ Place the honeycomb frame on a flat surface.
- ⊕ Hold the uncapping knife at a 45-degree angle and insert it into the wax cappings.
- ⊕ Draw the uncapping knife across the frame to remove the wax cappings.
- ⊕ Repeat this process until all of the wax cappings have been removed.



✓ **Honeycomb uncapping using a fork procedure:**

- ⊕ Place the honeycomb frame on a flat surface
- ⊕ Hold the fork at a 45-degree angle.
- ⊕ Insert the fork into the wax cappings and draw it across the frame to remove them
- ⊕ Repeat this process until all of the wax cappings have been removed.



✓ **Honeycomb uncapping using a roller procedure**

- ❖ Place the honeycomb frame on a flat surface.
- ❖ Place the uncapping roller on top of the frame and align the pins with the wax cappings.
- ❖ Roll the uncapping roller over the frame, applying pressure as needed.
- ❖ The pins on the roller will pierce and remove the wax cappings



Practical Activity 2.1.2: Extracting honey



Task:

You are requested to go to the honey processing workshop to extract honey.

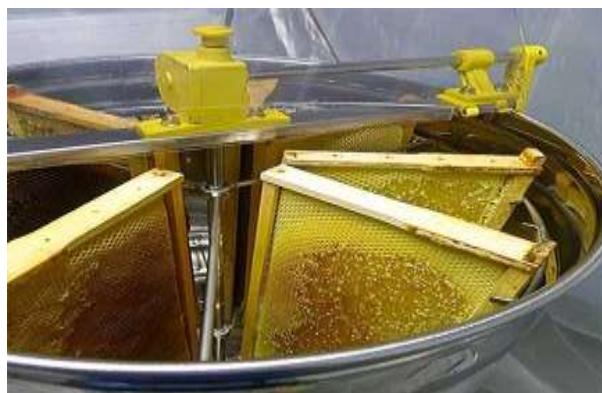
- 1: Apply safety precautions
- 2: Referring to the methods and procedures of honey extraction, extract honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 2.1.2
- 5: Perform the task provided in application of learning 2.1



Key readings 2.1.2: Extracting honey

- **Extraction methods**

There are two techniques to remove honey from the cells of the honeycomb



- **Centrifugal honey extraction**

Centrifugal honey extraction is a process of using a centrifuge to remove honey from honeycomb frames. It is a fast and efficient method of honey extraction, but it can be more damaging to the honeycomb than other methods, such as gravity draining.

To extract honey using a centrifuge, the uncapped honeycomb frames are placed in a rotating basket inside the centrifuge. The centrifuge is then spun at high speed, which forces the honey out of the honeycomb cells and into a container at the bottom of the centrifuge.

The speed of the centrifuge and the time it takes to extract the honey will vary depending on the type of centrifuge and the amount of honey being extracted. However, most centrifugal honey extractors can extract honey from a full set of honeycomb frames in a few minutes.

- ✓ **Advantages of centrifugal honey extraction**
 - ⊕ Fast and efficient
 - ⊕ Can extract honey from a large number of honeycomb frames at once
 - ⊕ Less labour-intensive than other methods, such as gravity draining
- ✓ **Disadvantages of centrifugal honey extraction**
 - ⊕ Can be more damaging to the honeycomb than other methods
 - ⊕ Requires a centrifuge, which can be expensive
 - ⊕ There are two main varieties of centrifugal extractor: tangential and radial.

- **Tangential centrifugal extraction**



In tangential centrifugal extraction, the uncapped honeycomb frames are placed in the centrifuge basket with the sidebars facing outwards. The centrifuge is then spun at high speed, which forces the honey out of the honeycomb cells and into a container at the bottom of the centrifuge.

- **Radial centrifugal extraction**

In radial centrifugal extraction, the uncapped honeycomb frames are placed in the centrifuge basket with the top bars facing outwards. The centrifuge is then spun at high speed, which forces the honey out of the honeycomb cells and into a container at the bottom of the centrifuge.

✓ **Advantages and disadvantages of tangential and radial centrifugal extraction**

Tangential centrifugal extraction is generally faster than radial centrifugal extraction, but it can be more damaging to the honeycomb. Radial centrifugal extraction is



gentler on the honeycombs, but it can take longer to extract the honey.

2. Crush and drain (Drip or Squeeze)

Crush and drain (drip or squeeze) extraction methods of honey are traditional methods of honey extraction that are still used by some beekeepers today. These methods are relatively simple and inexpensive, but they can be time-consuming and labour-intensive.

Crush and drain methods involve crushing the honeycomb to release the honey. This can be done using a variety of tools, such as a honey press, a honey crusher, or even a rolling pin. Once the honeycomb has been crushed, the honey is allowed to drip or squeeze out of the honeycomb and into a container.

Drip extraction is a gentle method of honey extraction that is less likely to damage the honeycomb. To extract honey using the drip method, the crushed honeycomb is placed on a rack over a container. The honey is then allowed to drip out of the honeycomb and into the container over time. Drip extraction can take several hours or even overnight to complete.

Squeeze extraction is a faster method of honey extraction, but it can be more damaging to the honeycomb. To extract honey using the squeeze method, the crushed honeycomb is placed in a honey press or other device that can compress the honeycomb and squeeze out the honey. Squeeze extraction can be completed in a few minutes, but it is important to be careful not to over-squeeze the honeycomb, as this can damage the honeycomb and reduce the quality of the honey.

✓ **Advantages of crush and drain (drip or squeeze) extraction methods:**

Relatively simple and inexpensive

Less likely to damage the honeycomb than centrifugal extraction

✓ **Disadvantages of crush and drain (drip or squeeze) extraction methods**

Time-consuming and labour-intensive

Can be difficult to extract all of the honey from the honeycomb

• **Procedure of extracting honey**

✓ **Centrifugal honey extraction procedure:**

- ⊕ Uncap the honeycomb frames. This can be done with an uncapping knife, uncapping fork, or uncapping roller.
- ⊕ Place the uncapped frames in the centrifuge basket. Be sure to space the frames evenly and avoid overlapping them, as this can prevent the honey from flowing freely.
- ⊕ Secure the centrifuge basket in place. Most centrifuges have a locking mechanism that prevents the basket from spinning while the extractor is running.
- ⊕ Start the centrifuge and spin the frames at a low speed. Gradually increase the speed until the honey starts to flow out of the frames.
- ⊕ Allow the centrifuge to run until all of the honey has been extracted. This can take a few minutes or up to 10 minutes, depending on the type of centrifuge and the amount of honey being extracted.
- ⊕ Stop the centrifuge and remove the frames. Be careful not to drip honey on the outside of the frames, as this can attract pests.
- ⊕ Strain the honey through a cheesecloth or other fine mesh strainer to remove any wax or other impurities.

- ⊕ Store the honey in clean, airtight containers. Honey can be stored at room temperature or in the refrigerator.

Crush and Drain (Drip or Squeeze) Procedure:

To use a crush and drain (drip or squeeze) honey extraction method, follow these steps:

- ⊕ Crushing the honeycomb:
- ⊕ Uncap the honeycomb frames. This can be done with an uncapping knife, uncapping fork, or uncapping roller.
- ⊕ Place the uncapped frames on a cutting board or other flat surface.
- ⊕ Use a rolling pin, honey crusher, or other heavy object to crush the honeycomb. Be careful not to over-crush the honeycomb, as this can damage the honeycomb and reduce the quality of the honey.
- ⊕ Drip or squeeze the honey out of honeycombs

To drip or squeeze the honey out of honeycombs pass through the following :

Drip extraction:

- ⊕ Place crushed honeycombs on a rack over a container.
- ⊕ Cover honeycombs with a cheesecloth or other fine mesh strainer to prevent dust and insects from contaminating the honey.
- ⊕ Allow the honey to drip out of the honeycombs and into the container over time. This can take several hours or even overnight to complete.

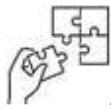
Squeeze extraction:

- ⊕ Place the crushed honeycomb in a honey press or other device that can compress the honeycomb and squeeze out the honey.
- ⊕ Apply pressure to the honeycomb to squeeze out the honey. Be careful not to over-squeeze the honeycomb, as this can damage the honeycomb and reduce the quality of the honey.



Points to Remember

- If using a hot knife, maintain proper temperature to avoid overheating the honey it can affects its quality.
- Avoid uncapping on windy days to prevent bees from dispersing and increasing sting risk.
- Avoid overheating the honey, especially with centrifugal extraction. Aim for moderate temperatures (70-80°F).
- Prioritize techniques like gravity draining or slow spinning when preserving delicate flavours and enzymes is important.
- Choose a method suitable for your volume and desired extraction speed



Application of learning 2.1.

You are asked to go to the honey processing workshop to uncap and extract honey from the honeycombs.



Duration:10 hrs

**Theoretical Activity 2.2.1: Description of straining and filtration methods for honey****Tasks:**

1: Answer the following questions related to description straining and filtration methods for honey:

- I. According to your experience, how do you think honey could be strained?
- II. How do you think honey could be filtered?

2: Provide the answers to asked questions by writing them on papers, flip chart, Blackboard or white board.

3: Present the findings/answers to the whole class.

4: For more clarification, read the key readings 2.2.1

**Key readings 2.2.1: Description of straining and filtration methods for honey**

- **Purpose of straining honey**

The main purpose of straining honey is to remove suspended solids (including large wax particles)

Straining methods of honey

- ✓ **Manual straining (press cloth):**

Manual straining (press cloth) is a traditional method of honey extraction that is still used by some beekeepers today. This method is relatively simple and inexpensive, but it can be time-consuming and labour-intensive.

To manually strain honey using a press cloth, follow these steps:

- ⊕ Uncap the honeycomb frames. This can be done with an uncapping knife, uncapping fork, or uncapping roller.
- ⊕ Place the uncapped frames on a rack over a container.
- ⊕ Place a press cloth over the honeycomb frames. A press cloth is a thick, durable cloth that is used to strain honey.
- ⊕ Place a heavy object, such as a plate or weight, on top of the press cloth. This will help to press the honey out of the honeycomb and through the press cloth.
- ⊕ Allow the honey to drip through the press cloth and into the container. This can take several hours or even overnight to complete.

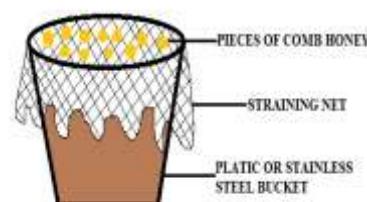
1. Once all of the honey has dripped through the press cloth, remove the press cloth and the honeycomb frames.
2. Strain the honey through a cheesecloth or other fine mesh strainer to remove any wax or other impurities.
3. Store the honey in clean, airtight containers. Honey can be stored at room temperature or in the refrigerator.

✓ **Advantages of manual straining (press cloth):**

- ✚ Relatively simple and inexpensive
- ✚ Less likely to damage the honeycomb than other methods, such as centrifugal extraction
- ✚ Produces a high-quality honey with less wax and other impurities

✓ **Disadvantages of manual straining (press cloth):**

- ✚ Time-consuming and labour-intensive
- ✚ Can be difficult to extract all of the honey from the honeycomb



✓ **Mechanical straining (jacketed tank)**

Mechanical straining (jacketed tank) is a honey extraction method that uses a jacketed tank to heat the honey and a strainer to remove the wax and other impurities. This method is faster and more efficient than traditional honey extraction methods, such as crush and drain (drip or squeeze) methods.

To use mechanical straining (jacketed tank), follow these steps:

- ⊕ Place the uncapped honeycomb frames in the jacketed tank.
- ⊕ Close the jacketed tank and turn on the heating system. Heat the honey until it is fluid, but not so hot that it damages the honey.
- ⊕ Once the honey is fluid, open the valve on the jacketed tank and allow the honey to flow through the strainer. The wax and other impurities will remain behind in the strainer, while the honey will flow through into a container.
- ⊕ Continue draining the honey from the jacketed tank until all of the honey has been extracted.
- ⊕ Once all of the honey has been extracted, close the valve on the jacketed tank and turn off the heating system.
- ⊕ Remove the honeycomb frames from the jacketed tank and clean the strainer.

✓ **Advantages of mechanical straining (jacketed tank)**

- ⊕ Faster and more efficient than traditional honey extraction methods
- ⊕ Produces a high-quality honey with less wax and other impurities
- ⊕ Easier to clean and sanitize than traditional honey extraction equipment

✓ **Disadvantages of mechanical straining (jacketed tank)**

- ⊕ More expensive than traditional honey extraction equipment
- ⊕ Can be difficult to find and purchase
- ⊕ Requires a power source to operate

● **Filtrating the honey**

Filtration of honey is the process of removing impurities from honey, such as wax particles, pollen, and propolis. This is done by passing the honey through a filter with a very fine mesh.

✓ **Purposes of filtration of honey:**

- ⊕ Improve the appearance of honey

Filtration can remove wax particles, pollen, and other impurities from honey, resulting in a clearer and more consistent product. This is especially important for honey that is sold in clear containers, as impurities can make the honey look cloudy or discoloured.

Improve the taste of honey

Filtration can also improve the taste of honey by removing pollen and propolis, which can have a bitter or astringent taste. This is especially important for honey that is used in baking or cooking, as these impurities can interfere with the flavour of the food.

Extend the shelf life of honey

Filtration can extend the shelf life of honey by killing yeast and bacteria. This is especially important for honey that is stored for long periods of time, as yeast and bacteria can cause honey to ferment and spoil.

Reduce the risk of honey crystallization

Filtration can reduce the risk of honey crystallization by removing impurities that can act as nucleation points for crystallization. This is especially important for honey that is sold in cold climates, as honey is more likely to crystallize in cold temperatures.

Various types of filtration are used to produce different types of honey, each with its own advantages and disadvantages. Here is a summary of some of the most common types of honey filtration and the types of honey they are typically used to produce:

Type of filtration	Description	Types of honey produced
Hot filtration	Honey is heated to a temperature of 140-160°F and then passed through a filter to remove impurities.	This type of filtration is commonly used to produce commercial honey, which is honey that has been heated and pasteurized. Hot filtration kills yeast and bacteria, which can extend the shelf life of honey, but it can also destroy some of the natural enzymes and nutrients in honey.

Ultrafiltration	Honey is passed through a semipermeable membrane that allows smaller molecules to pass through while trapping larger molecules, such as pollen and yeast.	This type of filtration is commonly used to produce clarified honey, which is honey that has been filtered to remove pollen and other impurities. Clarified honey is often used in food processing and manufacturing, as it has a consistent colour and flavour.
Microfiltration	Honey is passed through a semipermeable membrane that allows even smaller molecules to pass through than ultrafiltration membranes.	This type of filtration is commonly used to produce sterile honey, which is honey that has been filtered to remove all microorganisms, including yeast and bacteria. Sterile honey is often used in medical and pharmaceutical applications.



Practical Activity 2.2.2: Straining and filtration of honey



Task:

You are requested to go in the honey processing workshop to strain and filtrate honey.

- 1: Apply safety precautions.
- 2: Referring to the straining and filtration methods and procedures, strain and filtrate honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 2.2.2
- 5: Perform the task provided in application of learning 2.2.



Key readings 2.2.2: Straining and filtration of honey

- **Importance of straining and filtration of honey**
 - ✓ **Straining** removes larger particles, such as wax and bee parts, from the honey. It is a simple process that can be done with a food-grade strainer and a food-grade bucket.
 - ✓ **Filtration** removes smaller particles, such as pollen and dust, from the honey. It is a more complex process that requires the use of a food-grade filter.
- **Straining procedure:**
 - ➡ Place a food-grade strainer over a food-grade bucket.

- Pour the honey slowly into the strainer.
- Use a spoon or spatula to gently press on the honey to help it pass through the strainer.
- Once all of the honey has passed through the strainer, you can discard the larger particles that were left in the strainer.
- The strained honey is now ready to be filtered (if desired) or bottled.

✓ **Filtration procedure**

- Line a food-grade strainer with a food-grade filter.
- Place the strainer over a food-grade bucket.
- Pour the strained honey slowly into the strainer.
- The filter will remove smaller particles from the honey.
- Once all of the honey has passed through the filter, you can discard the filter and the particles that were removed from the honey.
- The filtered honey is now ready to be bottled.

✓ **Tips for effective honey filtration**

- If the honey is crystallized, you can warm it gently in a water bath to help it liquefy before straining and filtering.
- Be careful not to over-press on the honey when straining, as this can cause the strainer or filter to clog.
- Rinse the strainer and filter thoroughly with water after use.
- Store the strained or filtered honey in a clean food-grade jar or bucket at room temperature.

✓ **Safety precautions when filtering honey**

- Wear appropriate safety gear, such as gloves and goggles, when working with honey. Honey is a sticky and viscous substance, so it is important to take precautions to avoid spills and accidents.
- Be careful not to splash honey in your eyes. If you do get honey in your eyes, rinse them immediately with water.
- Be careful not to overfill the bucket when straining or filtering the honey. If the bucket overflows, the honey could spill on the floor and create a slip hazard.
- Clean up any spills immediately to avoid accidents.



Points to Remember

- Wash your hands thoroughly with soap and water before and after handling combs.
- Disinfect all uncapping tools (knives, forks) with a food-grade sanitizer before and after use.
- Maintain a clean workspace to prevent contamination of honey and equipment.
- For safety and hygiene issues, wear PPE before straining and filtering honey.
- Honey is a sticky and viscous substance, it is important to take precautions to avoid spills and accidents.
- Be careful not to splash honey in your eyes. If you do get honey in your eyes, rinse them immediately with water.
- When straining or filtering the honey, be careful not to overfill the bucket. If the bucket overflows, honey could spill on the floor and create a slip hazard.
- Clean up any spills immediately to avoid accidents.
- There are three (3) types of honey filtration namely, hot filtration, ultrafiltration and microfiltration.
- Be careful not to splash honey in your eyes. If you do get honey in your eyes, rinse them immediately with water.



Application of learning 2.2.

You are asked to go in honey processing workshop to strain and filtrate honey.



Indicative content 2.3: Checking the quality of honey



Duration:10 hrs



Practical Activity 2.3.1: Checking the quality of honey



Task:

You are asked to go in the honey processing workshop to check the quality of honey.

- 1: Apply safety precautions.
- 2: Referring to the methods and procedures of straining and filtering honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 2.3.1
- 5: Perform the task provided in application of learning 2.3.



Key readings 2.3.1: Checking the quality of honey

- **Tests used to check the quality of the honey:**

To test the quality of honey using the following tests:

✓ **Water content test:**

Place a spoonful of honey in a glass of water. If the honey dissolves in the water, it has a high water content and is of low quality. If the honey remains in a ball, it has a low water content and is of high quality.

✓ **Flame test:**

Dip a match or toothpick in the honey and try to light it. If the honey burns, it is pure. If the honey does not burn, it may be adulterated.

✓ **Sugar test:**

Use a refractometer to measure the refractive index of the honey. The refractive index is a measure of the sugar content of the honey. A higher refractive index indicates a higher sugar content. Pure honey typically has a refractive index between 1.448 and 1.485.

✓ **Moisture content:**

Use a moisture meter to measure the moisture content of the honey. The moisture content of honey should be between 17% and 21%. Honey with a higher moisture content is more likely to ferment.

✓ **Crystallization test:**

Place a small amount of honey in a jar and heat it in a microwave or over a low flame until it is melted. Once the honey is melted, let it cool to room temperature. If the honey crystallizes within a few days, it is pure. If the honey does not crystallize, it may be adulterated.

✓ **pH test:**

The pH of honey is a measure of its acidity. Honey is naturally acidic, with a pH typically between 3.5 and 5.5. The pH of honey is influenced by a number of factors, including the floral source, the processing method, and the storage conditions.

Honey with a pH below 3.5 is considered to be too acidic. This can be caused by fermentation, which is a process that breaks down the sugars in honey into acids. Honey with a pH above 5.5 is considered to be too alkaline. This can be caused by the addition of alkaline substances to the honey, such as baking soda.

Both acidic and alkaline honey can be of lower quality and have a shorter shelf life. They may also have a less desirable flavour and aroma.

To test the pH of honey, you can use a pH meter or a pH strip kit.

 **To use a pH meter:**

1. Dip the pH electrode into the honey sample.
2. Stir the honey gently to ensure that the electrode is fully submerged.
3. Wait for the reading to stabilize.
4. Record the pH reading.

 **To use a pH strip kit:**

1. Dip the pH strip into the honey sample.
2. Remove the pH strip from the honey sample and compare it to the colour chart provided with the kit.
3. Record the pH reading.
4. Interpretation of results

The pH of honey should be between 3.5 and 5.5. Honey with a pH outside of this range may be of lower quality or adulterated.



Points to Remember

- Common tests used to check quality of honey include; water content test, crystallization test, pH test, sugar test and flame test
- Different factors that affect honey quality are the floral source, the processing method, and the storage conditions
- Beware that, the quality requirements of honey vary depending on the region or country where it is produced or sold.



Application of learning 2.3

You are requested to go in the honey processing workshop to check the quality of honey



Learning outcome 2 end assessment

Theoretical assessment

1. In the table below, match the advantages with the uncapping method by writing a letter in the corresponding uncapping method column.

Advantages	Manual uncapping	Machine uncapping
a) Less likely to damage the honeycombs.
b) Faster and more efficient
c) Can uncaps a large number of honeycomb frames quickly and easily.
d) Inexpensive
e) Versatile

2. The following are steps for extracting honey using a centrifugal honey extractor. Logically rearrange them.

- I. Start the centrifuge and spin the honeycomb frames at high speed.
- II. Secure the centrifuge basket in place.
- III. Uncap the honeycomb frames.
- IV. Place the uncapped honeycomb frames in the centrifuge basket.
- V. Once the honey has stopped flowing, stop the centrifuge and remove the honeycomb frames.
- VI. Allow the centrifuge to run for a few minutes, or until the honey has stopped flowing out of the honeycomb frames.

3. Write an essay of not more than 200 words on honey straining.

4. The following table indicates the description of filtration type and the honey product from that filtration. Fill in the blank within the table using these types of honey filtration (**Ultrafiltration, Microfiltration and hot filtration**)

Product from filtration type	Description of filtration type	Type of filtration
a) This type of filtration is commonly used to produce commercial honey, which is honey that has been heated and pasteurized.	1. Honey is heated to a temperature of 140-160 degrees Fahrenheit and then passed through a filter to remove impurities.
b) This type of filtration is commonly used to produce sterile honey, which is honey that has been filtered to remove all microorganisms, including yeast and bacteria.	2. Honey is passed through a semipermeable membrane that allows even smaller molecules to pass through.
c) This type of filtration is commonly used to produce clarified honey, which is honey that has been filtered to remove pollen and other impurities	3. Honey is passed through a semipermeable membrane that allows smaller molecules to pass through while trapping larger molecules, such as pollen and yeast.

4. Read the following statements and answer by **True** if the statement is correct and **False** if the statement is wrong.

- The moisture content of honey should be between 17% and 21%.
- The pH of honey should be between 3.5 and 5.5. Honey with a pH outside of this range may be of lower quality or adulterated.
- The water content of honey exceeds 18%. This is to prevent fermentation and to ensure that the honey has a thick, syrupy texture
- Honey from different flowers can have different flavours, ranging from mild and sweet to strong and complex.
- Pure honey typically has a refractive index between 14.48 and 14.85.

Practical assessment

DUKUNDINZUKI cooperative located in Rutsiro district, Mukura sector received an order of supplying 20 Kg of honey to Great Kivu hotel located in Karongi district. Previously, another cooperative supplied honey but it contained physical contaminants mainly bees and insects, its it smelled strange and fermented earlier than indicated on the label. As a qualified food processing worker the production manager of DUKUNDINZUKI cooperative requests you to extract honey sample for Great Kivu hotel.

Task:

1. To extract 2 Kg of honey from honeycombs.
2. Filtrate 1 kg of extracted honey.
3. To test the quality of honey prior delivering.

The task should be completed in 2 hours.

END



Reference

Chepkemoi, M. (2021). Development of an extractor to improve the processing of quality honey harvested from Indigenous hives and natural colonies (Doctoral dissertation, University of Eldoret).

CODEX STANDARD FOR HONEY CODEX STAN 12-1981, Adopted in 1981, Revisions 1987 and 2001.

Setiawan, M. D., Herdiman, L., & Rochman, T. (2022). Selection of Non-Thermal Technology for Honey Pasteurization Machine Using Multi-Criteria Decision Making. *Jurnal Ilmiah Teknik Industri*, 21(2), 196-204.

Learning Outcome 3: Store Honey



Indicative contents

- 3.1 Packaging of honey**
- 3.2 Labelling the packaged honey**
- 3.3 Monitoring of storage conditions of packaged honey**

Key Competencies for Learning Outcome 3 : Store honey

Knowledge	Skills	Attitudes
<ul style="list-style-type: none">• Description of types of honey packaging material• Identification of labelling types• Identification of Label information• Description of storage techniques for honey• Explanation of storage conditions for honey	<ul style="list-style-type: none">• Packaging honey• Labelling honey• Storing honey	<ul style="list-style-type: none">• Paying attention while filling honey• Being a good time manager when filling honey• Being effective communicator in the workshop• Being careful in sealing honey packages• Being precise in filling honey into packages



Duration:15 hrs



Learning outcome 2 objectives:

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

1. Describe adequately the types of honey packaging materials.
2. Package properly the honey according to honey packaging techniques
3. Identify correctly the types of labelling used in honey processing.
4. Identify adequately labelling information for honey.
5. Label clearly the honey as per labelling techniques
6. Store adequately honey in accordance with honey storage conditions.



Resources

Equipment	Tools	Materials
<ul style="list-style-type: none">● Packaging machine● Labelling machine● Balance	<ul style="list-style-type: none">● Funnel● Cup● Bucket● Pallet● Shelves● Thermometer● Paper cutter	<ul style="list-style-type: none">● Packaging materials● Labels● Scotch● Glue● Papers● Pens● Gloves● Recording books



Duration: 5 hrs

**Theoretical Activity 3.1.1: Description of packaging materials****Tasks:**

- 1: Answer the following questions related to the description of honey packaging materials.
 - I. According to you, what do you think can be the honey packaging materials?
 - II. Based on list of honey packaging materials provided, what are the characteristics of those packaging materials?
 - III. What could be the factors to consider when choosing a suitable honey packaging material?
- 2: Provide the answers to asked questions by writing them on papers, flip chart, blackboard or white board.
- 3: Present the findings/answers to the whole class.
- 4: For more clarification, read the key readings 3.1.1

**Key readings 3.1.1.: Description of packaging materials****● Types of packaging materials**

There are a variety of types of packaging materials used for packing honey, each with its own advantages and disadvantages. Here is a description of some of the most common types:

**✓ Glass jars**

Glass jars are a popular choice for honey packaging because they are transparent, allowing consumers to see the honey inside. Glass is also a non-porous material, which

means it will not absorb any flavours or aromas from the honey. However, glass jars can be fragile and heavy, making them more expensive to ship and more likely to break.



✓ **Plastic jars**

Plastic jars are a lighter and more durable option than glass jars. They are also less expensive to ship. However, plastic is a porous material, so it can absorb some of the flavour and aroma of the honey over time. Additionally, some types of plastic can release harmful chemicals into the honey, so it is important to choose food-grade plastic jars.



✓ **Squeeze bottles**

Squeeze bottles are a convenient option for consumers who want to be able to dispense honey easily. Squeeze bottles are typically made of plastic, but there are also glass squeeze bottles available. However, squeeze bottles can be more difficult to clean and sanitize than jars.

Other packaging materials: Other packaging materials that can be used for honey include:



✓ **Metal tins**

- ❖ Metal tins are a durable and lightweight option, but they can be more expensive than other types of packaging.

✓ **Tetra Pak cartons**



Tetra Pak cartons are a sustainable option that is made from renewable resources. They are also lightweight and easy to ship. However, Tetra Pak cartons cannot be reused or recycled in all areas.



✓ **Pouch packaging**

Pouch packaging is a lightweight and flexible option that is easy to ship. However, pouch packaging can be difficult to open and reclose, and it may not protect the honey from sunlight as well as other types of packaging.

The best type of packaging material for honey will depend on a number of factors, including the **type of honey, the target market, and the budget**. It is important to choose a packaging material that will protect the honey from spoilage and preserve its quality.

- **Considerations when choosing packaging materials for honey:**
 - ✓ **Food safety:** The packaging material must be food-grade and safe for contact with honey. This means that it should not contain any harmful chemicals that could leach into the honey.
 - ✓ **Airtightness:** The packaging material must be airtight to prevent moisture from entering. This will help to prevent spoilage and preserve the quality of the honey.
 - ✓ **Durability:** The packaging material should be durable enough to protect the honey from damage during shipping and handling.
 - ✓ **Attractiveness:** The packaging material should be attractive and appealing to consumers. This will help to increase sales.
 - ✓ **Sustainability:** If possible, it is best to choose a sustainable packaging material that can be reused or recycled.

- **Purpose of filling and sealing honey**

The purpose of filling and sealing honey is to preserve its quality and freshness. Honey is a hygroscopic substance, meaning that it attracts moisture from the air. If honey is not properly sealed, it can absorb moisture from the air, which can cause it to ferment and spoil.

Filling and sealing honey also helps to protect it from contamination. Honey can be contaminated by bacteria, yeast, and molds. If honey is not properly sealed, these contaminants can enter the honey and cause it to spoil.

In addition, filling and sealing honey helps to prevent it from leaking. Honey is a sticky liquid, and it can be messy if it spills. Filling and sealing honey in containers makes it easier to store and transport.

- ✓ **Here are some specific benefits of filling and sealing honey:**

- ➊ **Prevents fermentation and spoilage:**

Honey is naturally acidic, but it can still ferment and spoil if it is not properly sealed. Sealing honey helps to keep out microorganisms that can cause fermentation and spoilage.

 **Preserves freshness:**

Honey is a natural product, and it will eventually lose its freshness over time. However, filling and sealing honey helps to preserve its freshness by preventing it from being exposed to air and other contaminants.

 **Protects from contamination:**

Honey can be contaminated by bacteria, yeast, and molds. Sealing honey helps to keep out these contaminants and protect the honey from spoilage.

 **Prevents leaks:**

Honey is a sticky liquid, and it can be messy if it spills. Filling and sealing honey in containers makes it easier to store and transport without worrying about leaks.



Practical Activity 3.1.2: Packaging the honey.



Task:

You are asked to go in the honey processing workshop to package honey.

- 1: Apply safety precautions (wear PPE).
- 2: Referring to the filling and sealing procedures, package the honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 3.1.2
- 5: Perform the task provided in application of learning 3.1.



Key readings 3.1.2: Packaging the honey

- **Steps of filling and sealing honey**

To fill and seal honey in a commercial honey processing unit, follow these steps:

1. **1. Prepare the honey.**
2. Strain the honey to remove any impurities. If the honey is thick, warm it in a warm water bath to make it easier to pour.
3. **2. Prepare the containers.**
4. Wash and sanitize all of the honey containers that you will be using. Make sure that the containers are dry before filling them.
5. **3. Fill the containers.**

6. Place a funnel in the opening of the container and carefully pour the honey into the container, being careful not to overfill it.

7. 4. Seal the containers.

8. Use a heat sealer or a cap sealer to seal the containers according to the manufacturer's instructions.

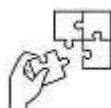
5. Inspect the containers.

Inspect the sealed containers to make sure that there are no leaks.



Points to Remember

- It is strictly recommended to wear gloves and eye protection when handling honey.
- Always choose the suitable packaging material considering the following criteria: food safety, airtightness, durability, attractiveness and sustainability.
- Be careful not to overfill the containers. Leave about 1/2 inch of space at the top of the container to allow for expansion.
- Tightly seal the lids on the containers to prevent leakage.



Application of learning 3.1.

You are requested to go to the honey processing workshop to package the honey



Duration: 5 hrs

**Practical Activity 3.2.: Labelling the packaged honey****Task:**

You are requested to go in the honey processing workshop to label packaged honey.

- 1: Apply safety precautions (wear PPE).
- 2: Referring to the labelling types, label packaged the honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 3.2.
- 5: Perform the task provided in application of learning 3.2

**Key readings 3.2.: Labelling the packaged honey**

- **Definition of Labelling**

Labelling is the process of attaching a label to a product, package, or container. Labels provide information about the product, including its name, purpose, ingredients, nutritional value, and instructions for use.

- **The purposes of labelling**

- ✓ **Identify the product:** Labels help consumers to identify the product they are buying and to distinguish it from other products.
- ✓ **Provide information about the product:** Labels provide consumers with important information about the product, such as its ingredients, nutritional value, and instructions for use. This information helps consumers to make informed choices about the products they purchase.
- ✓ **Promote the product:** Labels can be used to promote the product and to highlight its key features and benefits. This can help to increase sales and brand awareness.
- ✓ **Comply with regulations:** In many countries, there are laws and regulations that require certain information to be included on product labels. For example, food labels must include information about the product's ingredients and nutritional value.

- **Types of labelling**

There are many different types of honey labelling, but the most common include:

- ✓ **Product labelling:** This type of labelling provides information about the honey, such as its type, floral source, and country of origin. It may also include information about the honey's nutritional value and how to use it.

Nutrition Facts Servings: 16, **Serv. size: 1 Tbsp (21g)**,

Amount per serving: **Calories 60**, **Total Fat** 0g (0% DV), **Sat. Fat** 0g (0% DV), **Trans Fat** 0g, **Cholest.** 0mg (0% DV), **Sodium** 0mg (0% DV), **Total Carb.** 17g (6% DV), **Fiber** 0g (0% DV), **Total Sugars** 17g (, 34% DV¹), **Protein** 0g, **Vit. D** (0% DV), **Calcium** (0% DV), **Iron** (0% DV), **Potas.** (0% DV).

¹One serving adds 17g of sugar to your diet and represents 34% of the Daily Value for Added Sugars.

- **Honey product labelling**

The following are types of honey product labelling

- ✓ **Brand labelling:** This type of labelling identifies the brand of honey, such as "Clover Honey" or "Manuka Honey." It may also include the brand's logo and other



branding elements.

- ✓ **Descriptive labelling:** This type of labelling provides more detailed information about the honey, such as its flavour profile, texture, and colour. It may also compare the honey to other types of honey.
- ✓ **Nutritional labelling:** This type of labelling provides information about the honey's nutritional content, such as its calories, sugar content, and vitamin and mineral content.

- ✓ **Organic labelling:** This type of labelling indicates that the honey is certified organic. This means that it was produced without the use of synthetic pesticides,



herbicides, or fertilizers.

- ✓ **Fair trade labelling:** This type of labelling indicates that the honey was produced in accordance with fair trade principles. This means that the beekeepers who produced the honey were paid a fair price for their product and that they were treated with respect.
- ✓ **Eco-friendly labelling:** This type of labelling indicates that the honey was produced in a sustainable and environmentally friendly manner.

- **Labelling information**

Labelling of honey is important to ensure that consumers have accurate information about the product they are purchasing. Honey labels must comply with all applicable food safety and labelling regulations.

Here is a description of the information that is typically included on a honey label:

- ✓ **Product name:** The product name must be "honey" or a descriptive name that includes the word "honey."
- ✓ **Net quantity:** The net quantity of honey in the container must be declared in both metric and US units.
- ✓ **Ingredients:** If any ingredients other than honey are used, they must be listed on the label. For example, if the honey is flavoured with vanilla, the label must declare that it contains natural vanilla flavour.
- ✓ **Country of origin:** The country of origin of the honey must be declared on the label.
- ✓ This is important for consumers who want to support local honey producers or

who are concerned about the environmental impact of imported honey.

- ✓ **Best by date:** The best by date is not a safety date, but it does indicate the date after which the honey may not be at its best quality.
- ✓ **Type of honey:** The type of honey can be declared on the label, such as clover honey, buckwheat honey, or Manuka honey.
- ✓ **Floral source:** If the honey is made from a single floral source, the label may declare the floral source, such as "orange blossom honey" or "lavender honey."
- ✓ **Nutritional information:** The nutritional information for honey may be declared on the label. Honey is a good source of natural sugars and antioxidants.
- ✓ **Health claims:** Honey has many health benefits, but honey labels should not make any misleading or unsubstantiated health claims.

Honey labels should be clear and easy to read. The information on the label should be truthful and accurate. Consumers should be able to rely on the information on the label to make informed choices about the honey they purchase.

- **Procedures of labelling honey**

The procedures of labelling honey vary depending on the country or region where it is being produced and sold. However, there are some general steps that are commonly followed:

- ✓ **Design the label**

The label should be designed to be clear, concise, and informative. It should include the required information, such as the product name, net quantity, ingredients, country of origin, and best by date. The label may also include other information, such as the type of honey, floral source, and nutritional information.

- ✓ **Print the label**

The label can be printed in-house or by a professional printer. It is important to use high-quality materials to ensure that the label is durable and easy to read.

- ✓ **Apply the label to the container**

The label can be applied to the container manually or using a labelling machine. It is important to make sure that the label is applied evenly and securely.

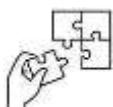
- ✓ **Inspect the labeled containers**

The labeled containers should be inspected to ensure that the labels are applied correctly and that there are no errors.



Points to Remember

- Avoid using any jargon or technical terms that consumers may not understand.
- Make sure that the information on the label is accurate and up-to-date.
- Highlight the key features of your honey, such as its type, floral source, and nutritional value.
- Use attractive and eye-catching designs to make your honey stand out on the shelf
- The label should be designed to be clear, concise, and informative
- Honey is allergic to some people, make sure to indicate it on the label.



Application of learning 3.2.

You are requested to go in honey processing workshop to label packaged honey.



Indicative content 3.3: Storing packaged honey



Duration: 5 hrs



Practical Activity 3.3.: Store packaged honey

Task:

You are requested to go in the honey processing workshop to store packaged honey.

- 1: Apply safety precautions.
- 2: Referring to the honey storage conditions, store packaged honey.
- 3: Present your work to the trainer and whole class. Ask clarification where necessary
- 4: Read key reading 3.3.
- 5: Perform the task provided in application of learning 3.3



Key readings 3.3.: Store packaged honey

- **Best storage techniques for honey**

- ✓ Store honey in a cool, dark place. Avoid storing honey near heat sources, such as stoves or ovens.
- ✓ Store honey in an airtight container. This will help to prevent moisture from entering the honey, which can cause it to ferment or spoil.

- **Ideal storage conditions for honey**

The ideal storage temperature for honey is between 55 and 70 degrees Fahrenheit. Honey stored at higher temperatures will crystallize more quickly. Honey stored at lower temperatures will thicken and become more difficult to pour.

- ✓ **Factors contributing to honey crystallization**

Honey crystallization is a natural process that is caused by the formation of glucose crystals. The following factors can contribute to honey crystallization:

- ❖ **Type of honey**

Some types of honey, such as buckwheat honey, are more prone to crystallization than others.

 **Storage temperature**

Honey stored at warmer temperatures will crystallize more quickly.

 **Storage time**

Honey will eventually crystallize over time, regardless of the storage temperature



Points to Remember

- Store honey in a cool and dark place
- The ideal storage temperature for honey is between 55 and 70°F (13°C and 21°C).
- Honey stored at higher temperatures will crystallize more quickly. Honey stored at lower temperatures will thicken and become more difficult to pour.



Application of learning 3.3.

You are asked to go in honey processing workshop to store packaged honey.



Learning Outcome 3 end Assessment

Theoretical assessment

1. From the table below, match the description of the honey packaging material with the type package by simply matching the corresponding letter with the digit in the provided space.

Answer	Description	Type of packaging material
A.....	<p>A. It is a lighter and more durable. It is also less expensive to ship. However, it is a porous material, so it can absorb some of the flavour and aroma of the honey over time. Additionally, some types can release harmful chemicals into the honey, so it is important to choose food-grade jars.</p>	1.Glass
B.....	<p>B. They are a popular choice for honey packaging because they are transparent, allowing consumers to see the honey inside. It is also a non-porous material, which means it will not absorb any flavours or aromas from the honey. However, they can be fragile and heavy, making them more expensive to ship and more likely to break</p>	2.Squeeze bottle
C.....	<p>C. They are a convenient option for consumers who want to be able to dispense honey easily and are typically made of plastic, but glass is also available. However, they can be more difficult to clean and sanitize than jars.</p>	3.Plastic

2. Read the following statements and answer by **True** for the correct statement and **False** for the wrong statement.

- a. The purpose of filling and sealing honey is to preserve its quality and freshness
- b. Honey is naturally acidic reason why it cannot ferment and spoil even if it is not properly sealed.
- c. The ideal storage temperature for honey is between 55 and 70 degrees Celsius.
- d. The honey label should be designed to be clear, concise, and informative.
- e. Organic labelling provides information about the honey's nutritional content, such as its calories, sugar content, vitamin and mineral content.

Practical assessment

BMC honey processing company located in Burera district made 50 Kg of honey packaged in different packing materials and stored in their storeroom. However, after two (2) weeks Rwanda FDA inspection team found that stored honey deteriorated before the expected date and does not meet minimum honey quality requirements.

As a qualified food processing worker, the BMC quality manager requests you to demonstrate how to package and store honey in the following manner:

1. 5Kg of honey should be packaged in glass jars of 500 ml
2. 5 Kg of honey should be packaged in plastic jars of 250 ml
3. Honey should be stored in favourable conditions

The task should be completed in 2 hours.

END



Reference

CODEX STANDARD FOR HONEY CODEX STAN 12-1981, Adopted in 1981, Revisions 1987 and 2001.

Mouhoubi-Tafinine, *et al* (2018) Effect of storage on hydroxymethylfurfural (HMF) and color of some Algerian honey. International Food Research Journal; 25(3): 1044-1050

Turhan, k. (2009) Effects of thermal treatment and storage on hydroxymethylfurfural (HMF) content and diastase activity of honey collected from middle Anatolia in Turkey. In Innovations in chemical biology.; Sener, b., eds.; springer: New York city; pp. 233-239



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