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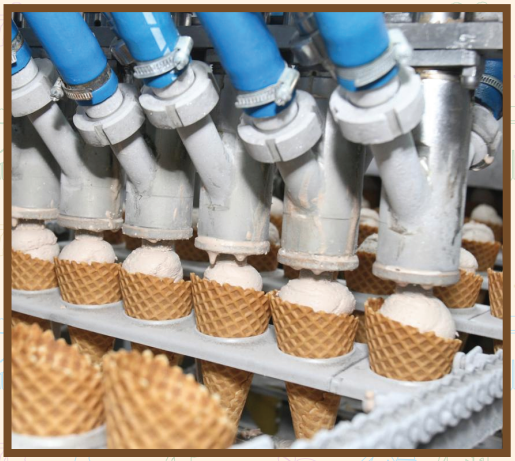
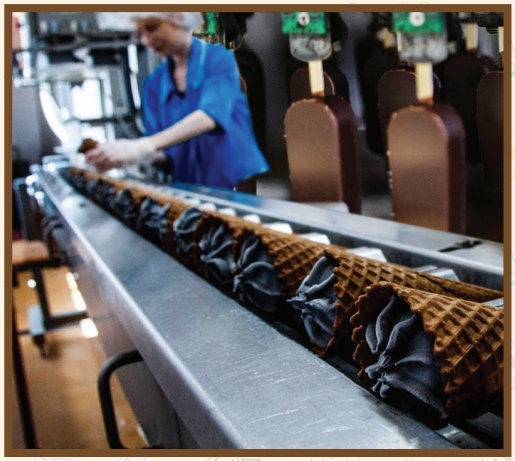
Food Industry Capacity and Skill Initiative

Facilitator Guide





Sector
Food Processing

Sub-Sector
Dairy Products

Occupation
Processing- Dairy Products

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Ice Cream Processing Technician

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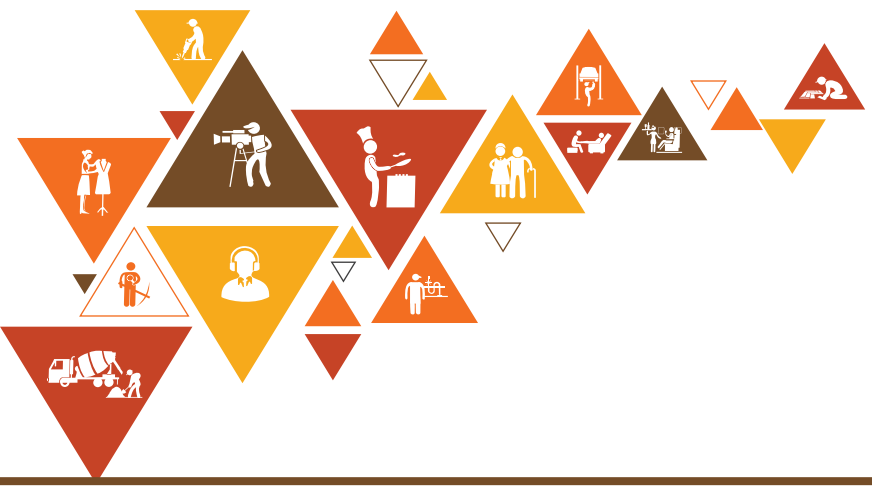

> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi
Prime Minister of India

Acknowledgements

FICSI is thankful to all organizations and individuals who have helped us in preparation of this practical guide.

We extend our special thanks to Ministry of Food Processing Industries (MOFPI) for providing their unequivocal support for developing and reviewing the content through National Institute of Food Technology Entrepreneurship and Management (NIFTEM).

We also wish to extend our gratitude to all authors who reviewed the content and provided valuable inputs for improving the quality, coherence, and content presentation in chapters.

The preparation of this participant Handbook would not have been possible without the support of the Food Processing Industries. The Industry feedback has been extremely encouraging from inception to conclusion & it is with their inputs that we have tried to bridge the skill gaps existing today in the Industry.

This participant handbook is dedicated to all the aspiring youth who desire to achieve special skills which would be a lifelong asset for their future endeavors and help them make a bright career in the Food Processing Sector.

About this Guide

The Facilitator Guide for Ice Cream Processing Technician has been developed to guide the trainees on how to impart training on industry-related skills. The Facilitator Guide is aligned to the Qualification Pack (QP) and the National Occupational Standards (NOS) drafted by the 'Food Processing' sector and ratified by National Skill Development Corporation.

It includes the following National Occupational Standards (NOS):

- FIC/N2013: Prepare and maintain work area and process machineries for production of ice cream
- FIC/N2014: Prepare for production of ice cream
- FIC/N2015: Produce ice cream
- FIC/N2016: Complete documentation and record keeping related to production of ice cream
- FIC/N9001: Ensure food safety, hygiene and sanitation for processing food products
- DGT/VSQ/N0101: Employability Skills (30 Hours)

Post this training, the participant will be able to perform tasks as an Grain Mill Operator. We hope that this Facilitator guide provides sound learning support to the aspiring trainers and the trainees.

Symbols Used

Ask


Explain


Elaborate


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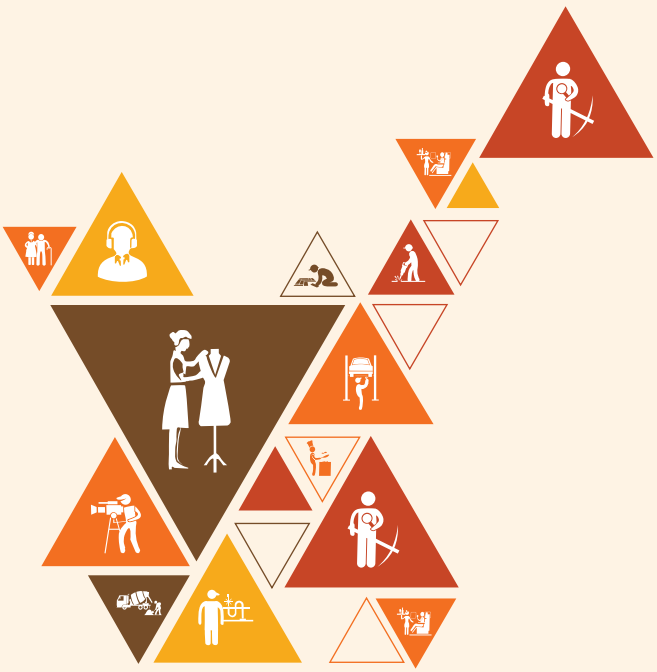
1. Introduction

Unit 1.1 - Introduction to the Training Programme

Unit 1.2 - Introduction to the Food Processing Industry

Unit 1.3 - Introduction to the Dairy Industry in India

Unit 1.4 - Attributes of an Ice Cream Processing Technician



FIC/N2013

Key Learning Outcomes

At the end of this module, the students will be able to:

1. Explain the purpose of training
2. Discuss the National Occupational Standards and Qualification Pack
3. Define food processing
4. List the various sectors of the food processing industry
5. Describe the various stages of food processing for converting raw materials to food products
6. State the need for processing milk
7. List the various units within a dairy processing plant
8. State the roles and responsibilities of an ice cream processing technician

Unit 1.1: Introduction to the Training Programme

Unit Objectives

At the end of this unit, students will be able to:

1. Explain the purpose of training
2. Discuss the National Occupational Standards and Qualification Pack

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Ice-cream Processing, Images and videos of Ice-cream Processing.

Say

Good morning, participants and a very warm welcome to this training program on “Ice cream processing technician”.

Do

- Thank all the participants for joining and being a part of this training program
- Introduce yourself briefly to the participants, your name and background, and your role in the training program
- Tell them that you will put them at ease by playing a game. This game is meant to break the ice between everyone and get the trainees interested in the class.
- Explain the game rules you will play as an “Ice Breaker.”

Activity

1. **Activity Name:** Name Game (Ice Breaker)
2. **Objective:** This activity is focused on breaking the ice between the participants so that they can come up confidently in putting forward their opinion
3. **Type of activity:** Group activity
4. **Resources:** Participant Handbook, Pen, Notebook, Writing Pad, etc.
5. **Duration of the activity:** 60 minutes
6. **Steps involved:**
    - Arrange the class in a semi-circle/circle
    - Say your name aloud and start playing the game with your name.
    - Say, “Now, each of you shall continue with the game with your names till the last person in the circle/ semi-circle participates”.

- Listen to and watch the trainees while they play the game.
- Ask questions and clarify if you cannot understand or hear a trainee.
- Discourage any queries related to one's financial status, gender orientation or religious bias during the game
- Try recognising each trainee by their name because it is not recommended for a trainer to ask the name of a trainee during every interaction

7. **Outcome:** This activity has focused on breaking the ice between the participants so that they can come up confidently, putting forward their opinion.

Ask

- What is QP and NOS?
- What is the importance of QP and NOS?

Elaborate

- Purpose and Benefits of the Training Programme:

  The training programme is based upon the National Occupational Standards for the food processing sector. The National Occupational Standards have been described in the following subsection of this chapter.

- Introduction to QP and NOS:

  A QP consists of a set of National Occupational Standards (NOS). NOS specify the standard competency a worker must achieve when carrying out a function at the workplace.

Activity

1. **Activity Name:** Group Discussion
2. **Objective:** This activity is focused on encouraging trainees to share their views and experiences related to the topics covered in the session.
3. **Resources:** Flipchart paper and markers
4. **Duration of the activity:** 20 minutes
5. **Steps involved:**
   - Divide the trainees into groups of 4.
   - Provide each group with a flipchart paper and markers.
   - Ask each group to discuss the either one of the following questions:
     - How do you think the topics covered are relevant to your job roles?
     - How can you apply the knowledge gained from this session in your work?
   - Ask each group to write down their answers on the flipchart paper.
   - After 10 minutes, ask each group to present their answers to the rest of the class.
6. **Outcome:** Trainees will be able to share their views and experiences related to the topics covered in the session, and will gain a better understanding of how the topics are relevant to their job roles.

Notes for Facilitation

- Create a positive learning environment by encouraging trainees to participate and express their views.
- Ensure that the session is interactive and engaging by using a variety of teaching methods such as presentations, discussions and activities.
- Encourage trainees to ask questions and clarify their doubts about training program, QP, NOS and others.
- Provide feedback and positive reinforcement to trainees to encourage their learning and development.

Unit 1.2: Introduction to the Food Processing Industry

Unit Objectives

At the end of this unit, students will be able to:

1. Define food processing
2. List the various sectors of the food processing industry
3. Describe the various stages of food processing for converting raw materials to food products

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Food Processing, Images and Videos related to Food Processing.

Say

Good morning, participants and a very warm welcome to this training program on “Ice cream processing technician”. Today we will discuss about the topic Introduction to the Food Processing Industry.

Do

- Start the session by presenting a brief overview of the food processing industry, its significance, and how it contributes to the economy.
- Discuss the journey of food from harvest to consumer, highlighting the various stages involved in food processing, including sorting, cleaning, packaging, and distribution.
- Use real-life examples to illustrate the importance of food processing and how it affects our daily lives.

Ask

- What do you know about the food processing industry?
- How do you think food gets from the farm to your plate?
- Why is it important to process food before it is consumed?

Elaborate

- Food Processing: Define food processing and explain why it is necessary. Discuss the various types of food processing, including preservation, packaging, and transportation. Emphasize the importance of food safety, quality, and sustainability in the food processing industry.

- Journey of Food from Harvest to Consumer: Explain the stages involved in food processing, including sorting, cleaning, packaging, and distribution. Discuss the various technologies and techniques used in each stage, including refrigeration, freezing, canning, and dehydration. Provide examples of different types of food processing, such as meat processing, dairy processing, and bakery processing.

Activity

1. **Activity Name:** Food Journey Map
2. **Objective:** To understand the journey of food from harvest to consumer.
3. **Resources:** Whiteboard or flipchart, marker pens
4. **Duration of the activity:** 30 minutes
5. **Steps involved:**
   - Draw a large map of the journey of food from harvest to consumer on the whiteboard or flipchart.
   - Divide the participants into groups of 3-4 and provide them with different colored markers.
   - Instruct each group to choose a specific food product (e.g., apple, bread, milk) and plot the journey of that product on the map using their colored markers.
   - Encourage the groups to include all the steps involved in the journey of their chosen food product.
   - Once all the groups have completed their food journey maps, bring everyone together to share their findings and discuss the commonalities and differences between the different food products.
6. **Outcome:** Participants will have a visual representation of the journey of food and a deeper understanding of the complexity of the food processing industry.

Notes for Facilitation

- Encourage participation and discussion throughout the session.
- Create a comfortable and open learning environment for participants to ask questions and share their experiences.
- Provide real-life examples and case studies to illustrate the concepts covered in the class.
- Emphasize the importance of food safety and quality in the food processing industry.
- Highlight the various career opportunities available in the food processing industry.

Unit 1.3: Introduction to the Dairy Industry in India

Unit Objectives

At the end of this unit, students will be able to:

1. State the need for processing milk
2. List the various units within a dairy processing plant.

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Dairy Industry in India Images and Videos of Dairy Industry in India.

Say

Good morning, participants, today we will discuss about the topic Introduction to the Dairy Industry in India.

Do

- Start with a brief introduction of the dairy industry and its significance in the Indian economy.
- Discuss the need for processing milk and the importance of quality control in the dairy industry.
- Introduce the different units of a dairy processing plant and their functions.
- Explain the current status and future prospects of the dairy industry in India.
- Provide examples of different dairy products and their uses.

Ask

- What are the dairy products that you consume on a daily basis and of which brands?
- What do you know about the dairy industry in India?
- Have you ever visited a dairy processing plant?

Elaborate

- Need for Processing Milk: Milk processing involves treating raw milk to make it safe for consumption and to increase its shelf life. Processing milk also helps to improve the taste and texture of dairy products. The main processes involved in milk processing include pasteurization, homogenization, and separation. Pasteurization involves heating the milk to kill harmful bacteria, while homogenization

involves breaking down the fat particles in milk to prevent separation. Separation involves separating the cream from the milk to produce various dairy products such as butter, cheese, and yogurt.

- Dairy Industry in India: India is one of the largest milk-producing countries in the world and has a thriving dairy industry. The dairy industry in India is mostly composed of small-scale farmers who produce milk in their own farms. The industry has been growing rapidly, and the government has been providing support to farmers and dairy processors through various schemes and subsidies. The industry is dominated by cooperatives, which are responsible for procuring and processing milk.
- Units of a Dairy Processing Plant: A dairy processing plant typically consists of several units, including milk reception and storage, pasteurization, homogenization, separation, packaging, and refrigeration. Milk reception and storage unit involves receiving and storing the raw milk before it is processed. Pasteurization unit involves heating the milk to a specific temperature to kill harmful bacteria. Homogenization unit involves breaking down the fat particles in milk to prevent separation. Separation unit involves separating the cream from the milk to produce various dairy products. Packaging unit involves packaging the processed products, and refrigeration unit involves storing the finished products at a low temperature to increase their shelf life.

Activity

1. **Activity Name:** Milk Processing Simulation
2. **Objective:** To demonstrate the process of milk processing
3. **Resources:** Milk, pasteurizer, homogenizer, containers
4. **Duration of the activity:** 30 minutes
5. **Instructions:**
   - Divide participants into groups of four.
   - Give each group a container of milk and ask them to simulate the process of milk processing using a pasteurizer and a homogenizer.
   - Each group will have to present their process to the class.
6. **Outcome:** Participants will gain practical knowledge of milk processing.

Field Visit

Dairy Processing Plant Tour

1. **Objective:** To give trainees a hands-on experience of a dairy processing plant and its different units.
2. **Time Duration:** 2 hours
3. **Steps Involve:**
   - Divide the trainees into groups of 5-6.
   - Provide safety gear to each group and explain safety procedures.
   - Take the groups on a tour of the dairy processing plant, explaining the different units and their functions.
   - Allow the trainees to ask questions and take pictures.
   - Conclude the activity by debriefing and asking the trainees what they learned during the tour.
4. **Outcome:** Trainees will have a better understanding of the different units involved in a dairy processing plant and how they work together to produce various dairy products.

Notes for Facilitation

- Arrive early and set up the room with the necessary resources, such as the presentation slides, handouts, and milk and dairy product samples.
- Make sure to engage the trainees in discussions and encourage them to ask questions.
- Ensure that safety procedures are followed during the activity.
- Be prepared to handle any questions or concerns related to the dairy industry in India.

Unit 1.4: Attributes of an Ice Cream Processing Technician

Unit Objectives

At the end of this unit, students will be able to:

1. State the roles and responsibilities of an ice cream processing technician

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Roles And Responsibilities of An Ice Cream Processing Technician, Images and Videos of Roles And Responsibilities Of An Ice Cream Processing Technician.

Say

Good morning, participants today we will discuss about the topic Attributes of an Ice Cream Processing Technician.

Do

- Begin the session by introducing yourself and the objectives of the session.
- Start the session with an icebreaker or any activity to set the tone for the rest of the session.
- Introduce the topic of the session, and share the learning outcomes with the participants.

Ask

- What do you think are the roles and responsibilities of an Ice Cream Processing Technician?
- Why do you think it is essential to have Ice Cream Processing Technicians in the production process?

Elaborate

- Roles of an Ice Cream Processing Technician: An ice cream processing technician is responsible for operating and maintaining the equipment used in the production of ice cream. They are also responsible for monitoring the production process, ensuring that the ice cream meets quality standards, and troubleshooting any issues that may arise during production.
- Responsibilities of an Ice Cream Processing Technician: The responsibilities of an ice cream processing technician include setting up and operating production equipment, monitoring the production process to ensure quality and efficiency, performing routine maintenance on equipment, troubleshooting and repairing equipment issues, ensuring that safety and sanitation standards are met, and maintaining accurate records of production data.

- Essential Skills of an Ice Cream Processing Technician: Essential skills for an ice cream processing technician include knowledge of food safety and sanitation practices, technical knowledge of production equipment, the ability to troubleshoot and repair equipment issues, attention to detail, strong communication skills, the ability to work in a team, and the ability to work in a fast-paced environment. They should also have a basic understanding of math, science, and computer systems.

Activity

1. **Activity Name:** Quality Control Check
2. **Objective:** To demonstrate the importance of conducting quality control checks to ensure that the ice cream is of high quality.
3. **Resources:** A sample batch of ice cream, quality control checklist
4. **Duration of the activity:** 20 minutes
5. **Steps involve:**
   - Divide participants into 4 groups.
   - Provide each group with a sample batch of ice cream and a quality control checklist.
   - Ask each group to conduct a quality control check and record their findings on the checklist.
   - Ask each group to present their findings and discuss their observations.
6. **Outcome:** Participants will understand the importance of conducting quality control checks and how to ensure that the ice cream is of high quality.

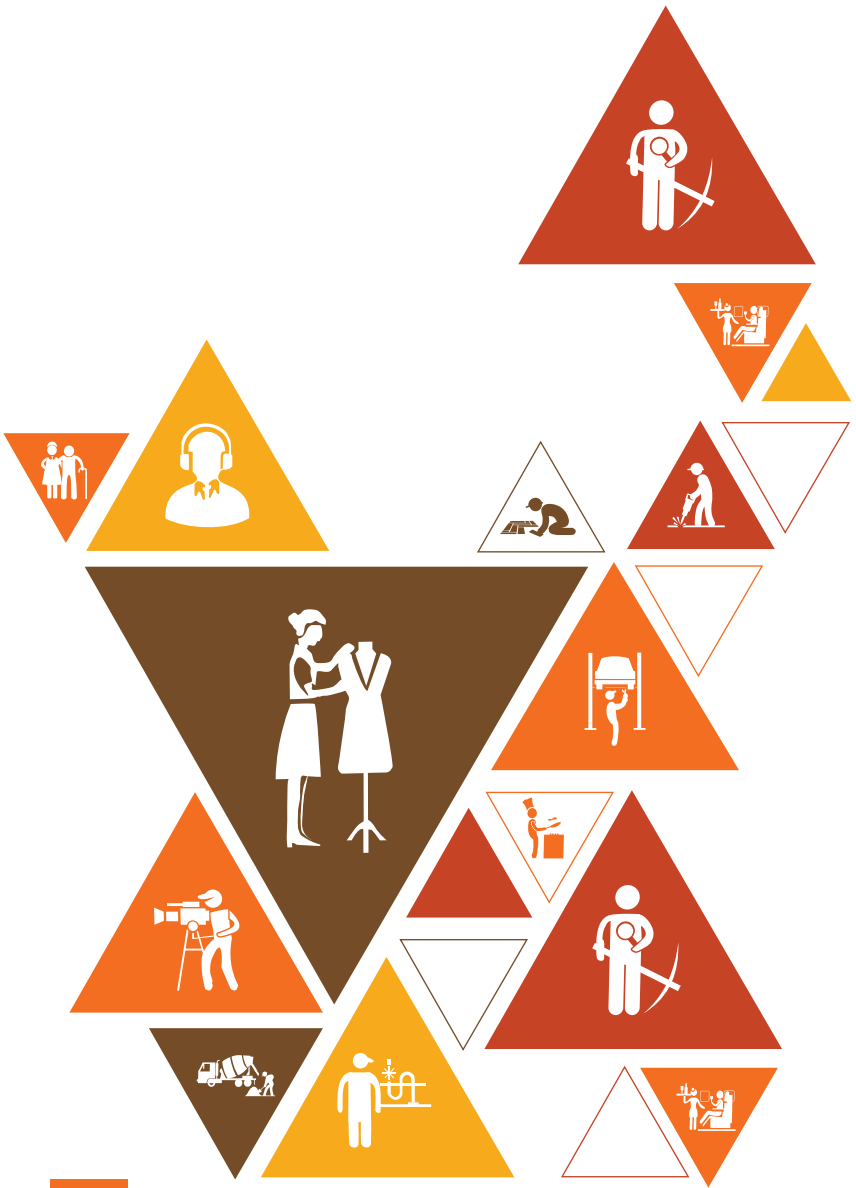
Notes for Facilitation

- Encourage participants to ask questions and share their experiences.
- Use real-life examples to illustrate the roles and responsibilities of an ice cream processing technician.
- Highlight the importance of teamwork and communication in this role.
- Emphasize the importance of maintaining cleanliness and following safety protocols.
- Keep the session engaging by asking participants for their inputs and conducting interactive activities.

Answers to Exercises for PHB

1. Answer the following questions by choosing the correct option:

a. iii. receipt
b. ii. preservation
c. i. consumers
d. iii. receipt
e. i. Agriculture
f. iv. Fruit and Vegetable processing
g. iv. standards
h. ii. food safety norms
i. iv. Dairy
j. ii. quality



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2. Food Safety, Hygiene and Sanitation for Processing Food Products

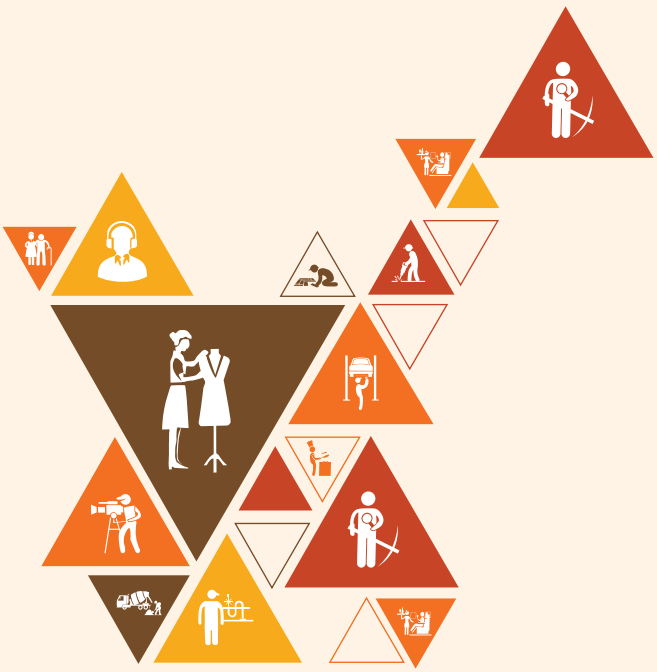
Unit 2.1 - Sanitation and Hygiene

Unit 2.2 - Safety Practices

Unit 2.3 - Good Manufacturing Practices (GMP)

Unit 2.4 - Hazard Analysis and Critical Control Point (HACCP)

Unit 2.5 - Introduction to Food Safety



FIC/N9001

Key Learning Outcomes

At the end of this module, the students will be able to:

1. State the personal hygiene and sanitation guidelines
2. State the food safety and hygiene standards to follow in a work environment
3. List the different sanitisers used in the process area and equipment
4. Follow health and safety practices in the work area
5. State the importance of safety, hygiene, and sanitation in the dairy processing industry
6. Follow the industry standards to maintain a safe and hygiene workplace
7. Follow HACCP principles to eliminate food safety hazards in the process and products

Unit 2.1: Sanitation and Hygiene

Unit Objectives

At the end of this unit, students will be able to:

1. State the personal hygiene and sanitation guidelines;
2. State the food safety hygiene standards to follow in a work environment.

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Sanitation and Hygiene, Images and Videos of Sanitation and Hygiene, Soap, Water, Hand Sanitizer and Clean Towels.

Say

- Good morning trainees today, we will learn about personal sanitation, personal hygiene, hand washing, and how good personal hygiene can prevent food poisoning.
- This session is important for everyone to understand and practice, especially those who handle food in their work environment.

Do

- Introduce the topic of personal sanitation and cover topics such as washing hands with soap and water, avoiding smoking, spitting, and coughing, and seeking timely medical treatment.
- Cover personal hygiene and the importance of showering and bathing regularly, keeping hair clean and covered or tied back, keeping clean clothing and footwear that is used only at work, and hand washing regularly.
- Discuss hand washing, including methods of washing hands, usage of sanitizer, and the times to wash and sanitize hands.
- Emphasize how good personal hygiene can prevent food poisoning.

Ask

- What do you know about personal hygiene and sanitation?
- Why is personal hygiene important in the food industry?
- How can good personal hygiene practices prevent food poisoning?

Elaborate

- Personal Sanitation: Personal sanitation refers to the practices and measures taken to maintain cleanliness and hygiene in one's body, clothes, and surroundings. This includes maintaining good personal hygiene, such as taking regular showers, wearing clean clothes, and keeping the living and working areas clean and sanitary.
- Importance of Personal Hygiene: Personal hygiene is essential for preventing the spread of diseases and infections. Maintaining good personal hygiene can help prevent the transmission of germs and bacteria from one person to another. It also helps prevent the development of skin infections, body odor, and other health issues that may arise from poor hygiene practices.
- Hand Washing: Hand washing is one of the most important aspects of personal hygiene, particularly in preventing the spread of foodborne illnesses. It involves washing hands thoroughly with soap and water for at least 20 seconds, especially before handling food, after using the toilet, after sneezing or coughing, and after touching any contaminated surfaces.
- Good Personal Hygiene to Prevent Food Poisoning: Good personal hygiene practices to prevent food poisoning include washing hands thoroughly before handling food, wearing clean clothes and aprons while cooking, tying back long hair, avoiding touching the face or hair while cooking, and avoiding smoking, chewing gum, or eating while preparing food. Additionally, using separate cutting boards and utensils for raw and cooked foods, cooking food to the proper temperature, and refrigerating leftover food promptly can help prevent the growth of harmful bacteria and reduce the risk of foodborne illnesses.

Demonstrate

- Demonstrate how to wash hands effectively using soap and water, focusing on areas around nails and wrists.
- Demonstrate the usage of hand sanitizer when soap and water are not available.

Activity

1. **Activity Name:** Hand Washing Relay Race
2. **Objective:** To reinforce the importance of hand washing and proper techniques.
3. **Resources:** Hand washing station with soap and water, clean towels
4. **Duration of the activity:** 15-20 minutes
5. **Steps involve:**
    - Divide the participants into 4 teams.
    - Mark a starting and finishing line.
    - Place the handwashing station and clean towels at the finishing line.
    - Ask the first player of each team to run to the starting line, wash their hands with soap and water, and dry them with a clean towel.
    - Once they have completed washing their hands, they should run back to their team and tag the next player.
    - The game continues until all players have washed their hands.
    - The team that completes the relay race first wins.

6. **Outcome:** This activity helps reinforce the importance of hand washing and proper techniques in a fun and engaging way.

Notes for Facilitation

- Encourage active participation and engagement throughout the session.
- Use examples and scenarios relevant to the participants' work environment to make the session more relatable.
- Emphasize the importance of practicing good personal hygiene practices.

Unit 2.2: Safety Practices

Unit Objectives

At the end of this unit, students will be able to:

1. Follow the fire safety practices in the work area.

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Safety Practices, Images and Videos of Safety Practices, Fire extinguisher and Fire Bucket.

Say

- Good morning trainees and welcome to our session on Safety Practices.
- Today, we will learn about Safety symbols, Emergency Measures, Fire Safety Measures .

Do

- Introduce the topic of safety symbols and emergency measures by presenting a PowerPoint on safety symbols commonly used in workplaces and explaining their meanings.
- Discuss the emergency evacuation plan and the trainees' roles and responsibilities during emergency situations.
- Discuss fire safety measures, including how to prevent fires, types of fires, and how to use fire extinguishers and fire buckets.
- Distribute handouts on emergency evacuation plans and fire safety measures, and encourage trainees to review them and ask any questions they may have.
- Demonstrate the use of a fire extinguisher and fire bucket.

Elaborate

- Safety Symbols:

  Safety symbols are used to convey important information related to hazards, precautions, and actions to take to avoid danger. Some common safety symbols include the "Biohazard" symbol, which indicates the presence of a biological hazard that can cause harm to human health; the "High Voltage" symbol, which warns of the presence of high voltage electrical equipment or lines; and the "Flammable" symbol, which warns of flammable materials that can ignite and cause fire. It is important to understand and recognize these symbols to ensure safety in the workplace and in daily life.

- Emergency Measures:

  During emergency situations, it is important to have a well-defined evacuation plan and know what to do. The emergency evacuation plan should be reviewed regularly and all employees should be familiar with it. The plan should include exit routes, designated meeting points, and emergency contact information. It is also important to know how to respond to different emergency situations, such as fire, earthquake, or severe weather, and to know the appropriate actions to take.

- Fire Safety Measures:

  Fires can be caused by various factors, including electrical faults, smoking, cooking, and heating appliances. To prevent fires, it's crucial to follow proper safety measures, such as keeping flammable materials away from heat sources, turning off appliances when not in use, and avoiding smoking near combustible materials. Knowing the different types of fires and the appropriate type of fire extinguisher for each is also crucial. There are four types of fires: A, B, C, and D, each requiring a specific type of extinguisher. It's important to learn how to use a fire extinguisher and fire bucket, and to practice using them in simulated emergency situations.

Demonstrate

Demonstrate the use of a fire extinguisher and fire bucket, showing how to hold and aim the extinguisher and how to use a fire bucket to put out a fire.

Activity

1. **Activity Name:** Fire Extinguisher Training
2. **Objective:** Train trainees on how to use a fire extinguisher safely and effectively.
3. **Resources:** Fire extinguisher, fire bucket, training fire simulator
4. **Duration of the activity:** 30 minutes
5. **Steps involve:**
   - Divide the trainees into groups of 3.
   - Provide each group with a fire extinguisher and a fire bucket.
   - Have them practice using the fire extinguisher to put out a fire on the training fire simulator.
   - Monitor each group and provide feedback on their technique.
   - After each group has practiced, conduct a debriefing session, discussing the strengths and areas for improvement.
6. **Outcome:** Trainees will have gained practical experience in using a fire extinguisher and feel more confident in their ability to use one in an emergency situation.

Notes for Facilitation

- Emphasize the importance of safety in the workplace and encourage trainees to take safety seriously.
- Use examples and anecdotes to illustrate the importance of safety practices.
- Be clear and concise in your instructions, and use visual aids to help trainees understand the concepts.
- During the fire extinguisher demonstration, ensure that the area is safe and free of any potential hazards.

- Encourage trainees to ask questions and participate actively in the training session
- Be clear and concise in your instructions, and use visual aids to help trainees understand the concepts.
- During the fire extinguisher demonstration, ensure that the area is safe and free of any potential hazards.
- Encourage trainees to ask questions and participate actively in the training session.

Unit 2.3: Good Manufacturing Practices (GMP)

Unit Objectives

At the end of this unit, students will be able to:

1. State the importance of safety, hygiene, and sanitation in the food processing industry
2. Follow the industry standards to maintain a safe and hygienic workplace

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Good Manufacturing Practices (GMP), Images and Videos of Good Manufacturing Practices (GMP), Handouts on Personnel Hygiene, Pen and Paper For Note-Taking.

Say

- Good morning trainees today, we will learn about Good Manufacturing Practices, Personnel hygiene, Sanitation of the work area.
- We will also discuss the importance of GMP, the regulatory requirements, and how to implement GMP in your workplace.

Do

- Start the session by discussing the basics of GMP, followed by personnel hygiene, sanitation of work area, equipment maintenance, and process validation.
- Use PowerPoint presentations and handouts to explain the topics and engage the participants in discussions.
- Provide relevant case studies to help participants understand the practical implementation of GMP.

Ask

- What is your understanding of GMP?
- What are the regulatory requirements for GMP?
- How can you implement GMP in your workplace?

Elaborate

- Good Manufacturing Practices (GMP): GMP refers to the procedures and practices that ensure that food products are safe, of high quality, and meet the regulatory standards. It includes personnel hygiene, sanitation of work area, equipment maintenance, and process validation.
- Personnel hygiene: Personnel hygiene is an essential component of GMP. It includes maintaining personal hygiene, following strict hygiene and sanitation guidelines, being in good health during working hours, following high standards of cleanliness, and having adequate facilities for toilets and wash stations.
- Sanitation of the work area: The work area should be located in a clean, pollution-free area, well ventilated with adequate lighting, follow high standards of cleaning and sanitisation, and have a designated area for keeping utensils and equipment, which should be kept clean and pest-free at all times.
- Equipment maintenance: The equipment used for processing foods should be protected against contamination from lubricants, metal fragments, fuel, and contaminated water. Cleaning and maintenance of tools, materials, and equipment should be an easy process, and organisations should follow a cleaning and sanitising drill as per daily, weekly, and monthly schedules.
- Process validation: All processes of production, such as raw material procurement, execution, storage, packaging, and logistics, should follow strict organisational parameters. Quality checks should be conducted at each step of production to ensure that food quality is maintained as per prescribed norms and standards. The stock rotation of finished products should follow the FEFO and FIFO methods to ensure minimum chances of food spoilage and retain the taste of processed foods.

Activity

1. **Activity Name:** Equipment Inspection and Maintenance
2. **Objective:** To reinforce the importance of equipment maintenance
3. **Resources:** Sample equipment, cleaning and sanitizing agents, inspection checklist
4. **Duration of the activity:** 30 minutes
5. **Steps involved:**
    - Divide the trainees into four groups.
    - Provide each group with a sample equipment and inspection checklist.
    - Instruct the groups to inspect the equipment, identify any defects or issues, and discuss the maintenance procedures required to address them.
    - Instruct the groups to clean and sanitize the equipment using the cleaning and sanitizing agents provided.
    - Instruct the groups to complete the inspection checklist and discuss their findings and recommendations with the entire group.
6. **Outcome:** The trainees will learn the importance of equipment inspection and maintenance to prevent contamination and ensure safe production.

Notes for Facilitation

- Provide a safe and comfortable learning environment.
- Encourage participation and engagement from all trainees.

- Ensure that the trainees understand the importance of equipment inspection and maintenance in the manufacturing process.
- Emphasize the need for regular equipment inspection and maintenance to ensure that the equipment is functioning optimally and to prevent contamination.
- Address any questions or concerns that the trainees may have during the session and provide additional information as needed.

Unit 2.4: Hazard Analysis and Critical Control Point (HACCP)

Unit Objectives

At the end of this unit, students will be able to:

1. Follow HACCP principles to eliminate food safety hazards in the process and products.

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Hazard Analysis and Critical Control Point (HACCP), Images and Videos of Hazard Analysis and Critical Control Point (HACCP).

Say

- Good morning trainees today, we will be learning about the principles and guidelines of HACCP, and how it is used to ensure food safety.
- Emphasize that this session will cover the basics of HACCP and provide examples of how it is applied in real life.

Do

- Use the PowerPoint presentation to explain the principles of HACCP.
- Discuss the case studies to demonstrate how HACCP is applied in different industries.
- Provide an example HACCP plan and explain how it is developed.

Ask

- Have you heard of HACCP before? What do you know about it?
- Why do you think HACCP is important?
- Can you think of any industries where HACCP might be used?

Elaborate

- What is HACCP?

  HACCP (Hazard Analysis and Critical Control Point) is a systematic approach used to identify, assess, and control hazards that may pose a risk to food safety throughout the production and processing stages.

- Example of an HACCP Plan

  An example of an HACCP plan is a practical demonstration of how the HACCP principles are applied in a specific food production or processing scenario, including the identification of critical control points and the implementation of control measures.

- Food Safety Hazard and Risk

  Food safety hazards refer to biological, chemical, or physical agents that can contaminate food and cause harm to consumers. Understanding these hazards and assessing their associated risks is crucial for implementing effective control measures.

Activity

1. **Activity Name:** HACCP Plan Development
2. **Objective:** To apply the principles of HACCP to develop a plan
3. **Resources:** Case study, flipchart and markers, handouts
4. **Duration of the activity:** 45 minutes
5. **Instructions:**
   - Divide the participants into 4 groups.
   - Provide each group with a case study related to food safety hazards and risks.
   - Ask each group to identify the hazards and risks, assess the likelihood and severity of harm, and determine the appropriate control measures.
   - After completing the risk assessment, ask each group to present their findings to the rest of the class.
6. **Outcome:** Trainees will have a better understanding of how to develop an HACCP plan.

Notes for Facilitation

- Encourage participation and discussion from all trainees.
- Ensure that everyone has an opportunity to ask questions and provide input.
- Emphasize the importance of HACCP and the potential consequences of not using it.
- Stress the need for a systematic approach to hazard identification and control.
- Provide real-life examples to illustrate the principles of HACCP.

Unit 2.5: Introduction to Food Safety

Unit Objectives

At the end of this unit, students will be able to:

1. Identify types of hazards and risks at work place

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Introduction to Food Safety, Images and Videos of Introduction to Food Safety.

Say

- Good morning trainees in this session, we will learn about the importance of food safety, different types of hazards and risks in the workplace, and how to prevent contamination and cross-contamination.
- We will go through a presentation on food safety and discuss different scenarios to understand the concepts better.

Do

- Use the PowerPoint presentation to explain the following topics:
  - Food Safety
  - Food Safety Hazard and Risk
  - Types of hazards and risks at the workplace
  - Microbiological hazards
  - Physical hazards
  - Chemical hazards
  - Allergen
  - Contamination, Cross Contamination and Prevention
- Use whiteboard and markers to emphasize the key points and examples.
- Distribute handouts and discuss the content.
- Use case studies to engage the trainees and stimulate discussion.
- Conduct interactive activities to enhance understanding.
- Assess trainee knowledge through quizzes or assessments.

Ask

- Why is food safety important?
- What are the common types of hazards in the workplace?
- How can we prevent food contamination?

Elaborate

- Food Safety: Food safety refers to the measures and practices taken to ensure that food is free from harmful contaminants, such as pathogens, chemicals, and physical objects, and is safe for human consumption.
- Microbiological Hazards: Microbiological hazards are a type of food safety hazard that can cause illness or disease when consumed. They include bacteria, viruses, parasites, and fungi, and can be found in raw or undercooked meats, unpasteurized dairy products, and contaminated fruits and vegetables.
- Chemical Hazards: Chemical hazards are another type of food safety hazard that can cause illness or disease when consumed. They include natural toxins, food additives, pesticides, and cleaning agents, and can be introduced into food through improper use or handling.
- Allergen: An allergen is a type of food safety hazard that can cause severe allergic reactions in some individuals. Common allergens include peanuts, tree nuts, shellfish, milk, eggs, wheat, and soy.
- Contamination, Cross Contamination, and Prevention: Contamination refers to the presence of harmful substances or contaminants in food, while cross-contamination occurs when harmful substances are transferred from one food to another. To prevent contamination and cross-contamination, it is important to follow proper food handling and storage practices, such as washing hands regularly, using separate cutting boards and utensils for raw and cooked foods, and storing food at proper temperatures.

Demonstrate

Show samples of physical, chemical, and allergen hazards and discuss their identification and prevention.

Activity

1. **Activity Name:** Hazard waste identification
2. **Objective:** To identify and prevent hazards at the workplace
3. **Resources:** Examples of physical, chemical, and allergen hazards, handouts on identification and prevention
4. **Duration of the activity:** 30 minutes
5. **Instructions:**
    - Divide trainees into groups of 4-5.
    - Provide each group with a set of examples of physical, chemical, and allergen hazards.
    - Ask the groups to identify and discuss the hazards and suggest preventive measures.
    - Allocate 10 minutes for the activity.
    - Ask each group to present their findings and recommendations.

- Discuss the results as a group and emphasize the importance of hazard identification and prevention.

6. **Outcome:** Trainees will be able to identify hazards and suggest preventive measures.

Notes for Facilitation

- Encourage participation and engagement throughout the session.
- Provide clear and concise explanations of the concepts.
- Use real-world examples to help the trainees understand the importance of food safety.
- Emphasize the importance of following food safety guidelines and regulations.
- Address any concerns or questions the trainees may have regarding food safety practices.

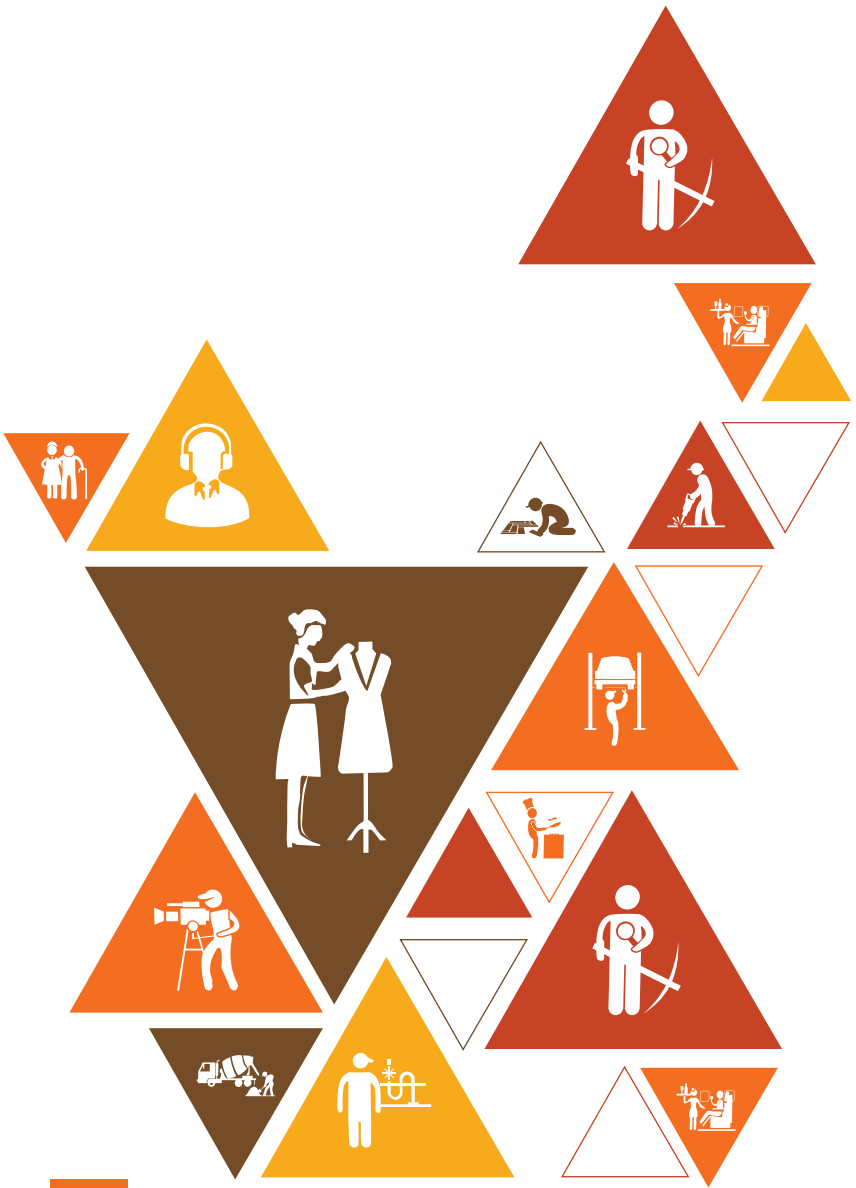
Answers to Exercises for PHB

1. Identify the correct focus area of GMP from the list given below. Mark the correct option:

b. Personnel hygiene
c. Sanitation of the work area
d. Equipment maintenance
e. Process validation
f. Sanitation of the work area
g. Personnel hygiene
h. Equipment maintenance
i. Process validation

2. Match the column:

c. vii. Establish corrective measures
d. vi. Identify critical control points
e. iii. Establish critical limits
f. ii. State verification procedures
g. i. Follow record-keeping procedures
h. v. Conduct a hazard analysis
i. iv. Establish a monitoring system



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Food Industry Capacity and Skill Initiative

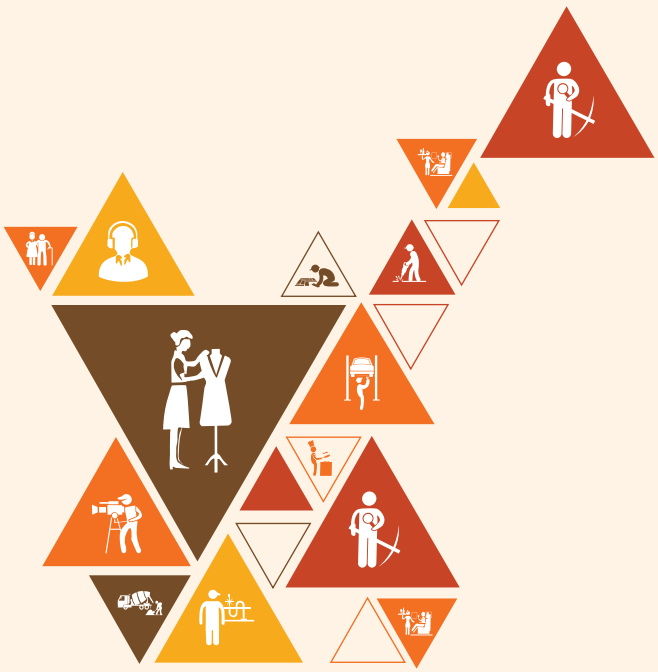
3. Prepare and Maintain Work Area and Process Machineries for Production of Ice Cream

Unit 3.1 - Usage and Maintenance of Equipment in Dairy Processing Plant

Unit 3.2 - Sanitisation of Work Area

Unit 3.3 - Cleaning Processes

Unit 3.4 - Waste Management in Dairy Industry



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Key Learning Outcomes 

At the end of this module, the students will be able to:

1. List the machineries used in a dairy processing plant
2. Explain the functions to be carried out before starting production
3. Explain the maintenance procedure to be followed for dairy processing machineries before
4. starting production
5. Explain the lubrication system followed in the dairy industry
6. State the different types of maintenance procedures
7. State the materials and equipment used in the cleaning and maintenance of the work area
8. State the common detergents and sanitisers used in cleaning work area and machineries
9. State the properties of cleaning agents used
10. State the methods of cleaning and sanitisation
11. Describe the CIP method of cleaning
12. Describe the SIP method of cleaning
13. Explain the method of managing and disposing waste material

Unit 3.1: Usage and Maintenance of Equipment in Dairy Processing Plant

Unit Objectives

At the end of this unit, students will be able to:

1. List the machineries used in a dairy processing plant
2. Explain the functions to be carried out before starting production
3. Explain the maintenance procedure to be followed for dairy processing machineries before starting production
4. Explain the lubrication system followed in the dairy industry
5. State the different types of maintenance procedures

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Usage and Maintenance of Equipment in Dairy Processing Plant, Images and Videos of Usage and Maintenance of Equipment in Dairy Processing Plant, Milk cans, Milk Cooling Equipment.

Say

Good morning trainees in this session, we will discuss the various types of equipment used in dairy processing and the importance of maintenance checks to ensure smooth operation of the equipment.

Do

- Discuss each equipment in detail, highlighting their functions and importance in the dairy processing plant.
- Provide examples and anecdotes from your experience to make the session more relatable and engaging.
- Demonstrate the use of the different equipments listed, including milk cans, milk cooling equipment, milk separator, butter churn, milk pumps, plate heat exchanger, packaging machine, and lubrication system.
- Discuss the different types of maintenance checks - reactive, predictive, proactive, and preventative, and explain how each type helps in identifying and fixing equipment issues.

Ask

- What are some common issues you have faced with equipment maintenance in the dairy processing plant?
- How do you ensure that the equipment is always in good working condition?

Elaborate

- Equipment Used in Dairy Processing: Dairy processing requires various types of equipment, such as milk storage tanks, homogenizers, pasteurizers, separators, and packaging machines. These machines are designed to handle specific tasks in the dairy processing plant, such as raw milk handling, milk processing, product packaging, and storage.
- Preparation of Machineries for Production: Before starting the production process, it is essential to prepare the machinery and equipment. This includes cleaning and sanitizing the equipment, checking for any damage or wear and tear, and ensuring that all parts are working correctly. Additionally, it is important to verify that the machines are calibrated and set up according to the production specifications.
- Maintenance and Check of Basic Equipments in Dairy Processing Plant: Proper maintenance and regular checks of basic equipment in the dairy processing plant, such as pumps, valves, and pipes, can help prevent breakdowns and ensure that the equipment operates efficiently. Maintenance tasks may include cleaning, lubrication, and replacement of worn or damaged parts. Regular checks can help identify potential problems before they cause a production delay or food safety issue.
- Maintenance and Check: Regular maintenance and checks of all equipment in the dairy processing plant, from the largest to the smallest, is crucial for the smooth operation of the plant. This can include preventative maintenance, such as cleaning, lubrication, and replacement of parts, as well as corrective maintenance to address unexpected breakdowns or malfunctions. Proper maintenance and checks can help extend the life of the equipment, reduce production downtime, and ensure the safety and quality of the final dairy products.

Demonstrate

Demonstrate the use of milk cans, milk cooling equipment, milk separator, butter churn, and lubrication system.

Activity

1. **Activity Name:** Equipment Maintenance Checklist
2. **Objective:** To familiarize trainees with the process of creating maintenance checklists for different equipment
3. **Resources:** Sample maintenance checklists and procedures, whiteboard and markers
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide the trainees into 4 groups.
   - Provide each group with a sample maintenance checklist for a different equipment.

- Ask the groups to review the checklist and identify any missing items or steps.
- Ask each group to present their findings to the rest of the class.
- Facilitate a discussion on the importance of creating comprehensive maintenance checklists for different equipment.

6. **Outcome:** Trainees will be able to identify the key components of a maintenance checklist and understand the importance of maintaining equipment in the dairy processing plant

Notes for Facilitation

- Encourage trainees to ask questions and participate actively in the session.
- Emphasize the importance of maintaining the equipment properly to ensure efficient and safe production.
- Make sure to address any concerns or queries related to the maintenance and usage of equipment in the dairy processing plant.
- Ensure that the session is conducted in a timely and organized manner, covering all the topics mentioned in the facilitator guide.

Unit 3.2: Sanitisation of Work Area

Unit Objectives

At the end of this unit, students will be able to:

1. State the materials and equipment used in the cleaning and maintenance of the work area
2. State the common detergents and sanitisers used in cleaning work area and machineries
3. State the properties of cleaning agents used
4. State the methods of cleaning and sanitisation

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Sanitisation of the Work Area, Cleaning Agents, Sanitizers, Cleaning Equipment and PPE.

Say

- Good morning trainees today, we will discuss how to effectively clean and sanitize your work area, machinery, tools, and equipment.
- Proper sanitisation is important to maintain the quality and safety of the products we produce.
- By the end of this session, you will be able to understand the importance of sanitisation and how to conduct it effectively.

Do

- Begin by discussing the importance of sanitisation and its impact on product quality and safety.
- Discuss the different cleaning agents and sanitizers used in the industry and their properties.
- Explain the correct methods of cleaning and sanitizing the work area, machinery, tools, and equipment.
- Conduct a practical demonstration of the correct cleaning and sanitizing techniques using the provided resources.

Ask

- What is the importance of sanitisation in the food industry?
- What are some common cleaning agents and sanitizers used in the industry?

Elaborate

- Cleaning and sanitizing are two different processes. Cleaning involves removing visible dirt, debris, and grease, while sanitizing involves killing microorganisms that cannot be seen.
- Different cleaning agents and sanitizers have different properties that make them suitable for different purposes. For example, some sanitizers require a certain contact time to be effective, while others are more effective against certain types of microorganisms.
- It is important to follow the correct procedure for cleaning and sanitizing to ensure effectiveness. This includes preparing the cleaning solution, applying it correctly, allowing sufficient contact time, and rinsing and drying the surface.
- Some areas, machinery, tools, and equipment may require special attention or cleaning agents to ensure proper sanitisation. For example, areas that come in direct contact with food require a higher level of sanitisation.
- Proper PPE should always be worn when handling cleaning agents and sanitizers to prevent any harm.

Demonstrate

Conduct a demonstration of the correct cleaning and sanitizing techniques, highlighting the importance of the correct cleaning agents and the correct methods of application.

Activity

1. **Activity Name:** Sanitisation Station
2. **Objective:** To provide hands-on experience to the trainees on conducting proper sanitisation of the work area, machinery, tools, and equipment
3. **Resources:** Cleaning equipment and supplies, personal protective equipment, work area, machinery, tools, and equipment to be sanitized
4. **Duration of the activity:** 45-60 minutes
5. **Steps Involve:**
    - Divide the trainees into 2 groups and assign each group a work area, machinery, tools, or equipment to sanitize.
    - Provide the necessary cleaning supplies and PPE to each group.
    - Instruct each group on how to conduct the cleaning and sanitizing process using the correct cleaning agents and methods.
    - Evaluate the results of each group's cleaning and sanitizing process and provide feedback on areas for improvement.
6. **Outcome:** Trainees will be able to recognize the importance of sanitisation and develop the knowledge more effectively.

Notes for Facilitation

- Ensure that all trainees are properly trained in the safe handling of cleaning agents and sanitizers before beginning the activity.
- Monitor the use of PPE throughout the activity to ensure that trainees are using it properly.
- Emphasize the importance of following proper cleaning and sanitizing procedures to prevent food contamination.

Unit 3.3: Cleaning Processes

Unit Objectives

At the end of this unit, students will be able to:

1. Describe the CIP method of cleaning
2. Describe the SIP method of cleaning

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Cleaning Processes, Images and Videos of Cleaning Processes, Cleaning equipment and PPE.

Say

- Good morning trainees today we will be discussing the different types of cleaning processes used in the food industry and their importance in maintaining food safety and quality.
- Throughout the session, we will be demonstrating and discussing various cleaning processes and techniques, so please feel free to ask any questions you may have.

Do

- Start the session by introducing the topic and providing an overview of the different cleaning processes that will be covered.
- Use presentation slides and video demonstrations to explain the different cleaning processes, including CIP, COP, and SIP.
- Discuss the cleaning sequence and importance of following it to ensure effective cleaning and prevent cross-contamination.
- Explain the advantages of CIP and how it helps to save time and resources.
- Provide tips on conducting an effective COP process and discuss the food processing equipment and units that undergo the COP process.
- Discuss the process of sterilising-in-place and its importance in maintaining hygiene.
- Demonstrate the process of cleaning the work area, tools, and equipment, and provide instructions for the activity.

Ask

- What are some of the challenges you have faced in cleaning food processing equipment and tools?
- How do you ensure that cleaning processes are conducted effectively and efficiently?
- What are some of the benefits of using CIP over COP cleaning methods?

Elaborate

- Clean-In-Place (CIP): This is a method of cleaning food processing equipment without disassembling it. CIP is an automated system that uses a combination of detergents, water, and high-pressure pumps to clean and sanitize the equipment. The process is efficient, saves time and labor, and reduces the risk of cross-contamination.
- Cleaning Sequence: The cleaning sequence is a step-by-step process that outlines the order in which different cleaning steps should be followed. This is important to ensure that all areas are cleaned and sanitized effectively and to prevent cross-contamination.
- Clean-Out-Of-Place (COP): This method of cleaning involves removing the equipment from its location and cleaning it in a separate area. COP is labor-intensive and time-consuming but allows for a more thorough cleaning of the equipment.
- Sterilising-In-Place (SIP): This method involves using high temperatures to sterilize the equipment in place. SIP is commonly used in the pharmaceutical industry and is essential for maintaining hygiene and preventing contamination.
- Process of Cleaning the Work Area: Cleaning the work area involves removing all debris and cleaning and sanitizing surfaces. This is important to prevent the spread of contaminants and ensure a clean and safe work environment.
- Process of Cleaning Machineries, Tools, and Equipment: The process of cleaning equipment involves disassembling the equipment, cleaning the parts, and then reassembling it. Tools and small equipment can be cleaned manually, while larger equipment requires automated cleaning systems.

Activity

1. **Activity Name: COP Cleaning**
2. **Objective:** : To provide hands-on experience to the trainees on conducting a COP cleaning process
3. **Resources:** Cleaning equipment and supplies, food processing equipment and units that require COP cleaning, PPE
4. **Duration of the activity:** 45-60 minutes
5. **Steps Involve:**
    - Divide the trainees into groups and assign each group a piece of food processing equipment or unit that requires COP cleaning.
    - Provide the necessary cleaning supplies and PPE to each group.
    - Instruct each group on how to conduct a COP cleaning process, including the proper order of cleaning, cleaning techniques, and safety precautions.
    - Monitor each group's progress and provide guidance or assistance as needed.
    - Once each group has completed their cleaning process, have them present their results and explain their techniques to the rest of the class.
    - Conduct a group discussion to identify any common challenges or best practices for conducting effective COP cleaning.
6. **Outcome:** The trainees will have a practical understanding of how to conduct a COP cleaning process and will be able to identify best practices for effective cleaning.

Notes for Facilitation

- Prioritize safety throughout the activity and ensure that all participants are wearing appropriate PPE.
- Provide clear instructions and guidelines for conducting the cleaning process, including the proper order of cleaning and cleaning techniques.
- Encourage collaboration and communication among the groups to identify common challenges and best practices.
- Monitor the progress of each group and provide guidance or assistance as needed.
- Allow time for reflection and discussion at the end of the activity to identify key takeaways and areas for improvement.

Unit 3.4: Waste Management in Dairy Industry

Unit Objectives

At the end of this unit, students will be able to:

1. Explain the method of managing and disposing waste material

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Sanitisation of the Work Area, Cleaning Agents, Sanitizers, Cleaning Equipment and PPE.

Say

Good morning trainees today, we will be discussing about different types of waste generated in dairy industry and how to manage them in a sustainable manner.

Do

- Start the session by introducing the topic and the learning objectives.
- Present the different types of waste generated in dairy industry and their characteristics.
- Discuss the challenges faced by the industry in managing the waste and the regulatory framework that governs it.
- Present the best practices in waste management in dairy industry, including reduction, reuse, and recycling of waste.
- Share case studies of successful waste management practices in the industry.

Ask

- What are the different types of waste generated in the dairy industry?
- What are the challenges faced by the industry in managing the waste?
- How can we address these challenges and manage the waste sustainably?

Elaborate

- Solid waste: This includes all the solid waste generated in the dairy industry, such as packaging material, expired products, and other waste generated during processing. The industry can reduce the amount of solid waste generated by optimizing the production process and reducing packaging materials. Recycling and composting can also be used to manage solid waste in a sustainable way.
- Liquid waste: This includes all the liquid waste generated during processing, such as wash water and wastewater. The industry can manage liquid waste by implementing efficient water management practices and treating the wastewater before discharging it into the environment.
- Oily waste: This includes all the waste generated from the equipment that uses oils, such as lubricants and hydraulic oils. The industry can manage oily waste by implementing best practices for handling and storage of oils, as well as by recycling and disposing of the waste in a safe and sustainable manner.
- Gaseous waste/water vapours: This includes all the emissions generated during processing, such as steam and odours. The industry can manage gaseous waste by implementing efficient ventilation systems and odour control measures.

Demonstrate

Demonstrate the use of different waste management techniques, such as recycling and composting.

Activity

1. **Activity Name: Waste Management Plan**
2. **Objective:** To develop a waste management plan for a dairy industry
3. **Resources:** Whiteboard and markers, case studies on successful waste management practices in dairy industry
4. **Duration of the activity:** 60 minutes
5. **Steps Involve:**
    - Divide the trainees into 4 groups.
    - Assign each group a scenario of a dairy industry with different waste management challenges.
    - Ask each group to develop a waste management plan for the scenario assigned to them.
    - Provide guidance and support to the groups as needed.
    - Ask each group to present their waste management plan to the rest of the class.
6. **Outcome:** The trainees will be able to develop a comprehensive waste management plan for a dairy industry and present it effectively.

Activity

1. **Activity Name:** Waste Management Best Practices
2. **Objective:** To enable trainees to apply best practices in waste management in the dairy industry
3. **Resources:** Case studies on successful waste management practices, whiteboard, and markers
4. **Duration of the activity:** 30-45 minutes

5. **Steps Involve:**
   - Divide the trainees into groups of 3-4.
   - Provide a case study on successful waste management practices in the dairy industry to each group.
   - Ask each group to identify the best practices in the case study and list them on the whiteboard.
   - Facilitate a discussion on the best practices identified by each group and ask the trainees to share their thoughts.
6. **Outcome:** Trainees will be able to identify the best practices for waste management in the dairy industry and apply them in their work.

Notes for Facilitation

- Emphasize the importance of sustainable waste management practices in the dairy industry.
- Encourage participation and interaction among the trainees during the session.
- Provide real-life examples and case studies to make the session more engaging.
- Remind the trainees about the regulatory framework governing waste management in the dairy industry.
- Highlight the benefits of effective waste management, such as cost savings and environmental sustainability.

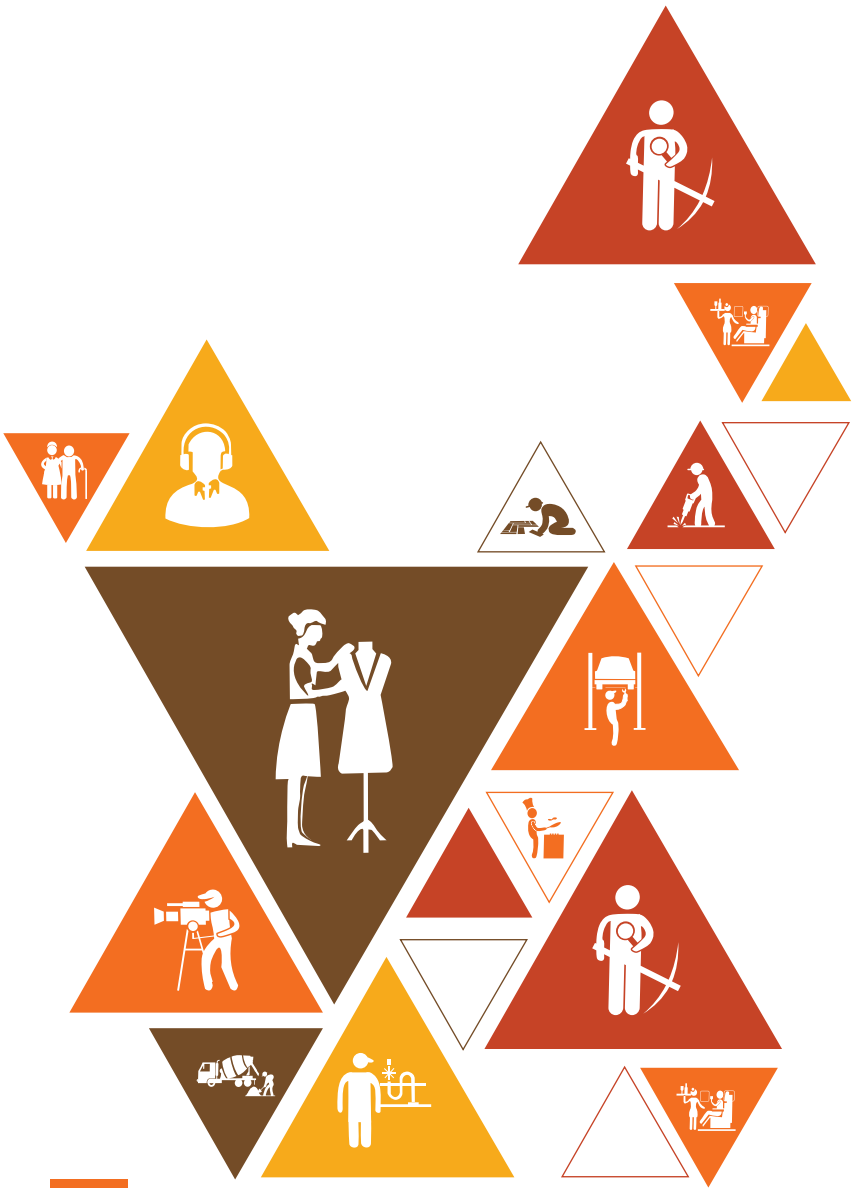
Answers to Exercises for PHB

1. Match the columns.

a. Disinfestation iii. Using chlorine solution
b. Detergent ii. Process of sterilisation, disinfection, and sanitation
c. SIP iv. Water softener
d. CIP i. Internal cleaning of machineries
e. Fill in the blanks with the correct option.
f. ii. biological, chemical
g. ii. destruction
h. i. SIP
i. i. Sanitisation-in-place
j. c. Raw Milk Reception Dock

2. Match the columns.

a. Raw Milk Reception Dock v. Arrival and receiving milk after grading for acceptance
b. Milk Chiller i. Rapid cooling of milk
c. Milk Separator vi. Separates milk into cream and skimmed milk
d. Homogeniser ii. Uniform mixture of two mutually non-soluble liquids
e. Storage Tanks iii. Short or long term storage
f. Pasteuriser iv. Process of heating milk to a specific temperature



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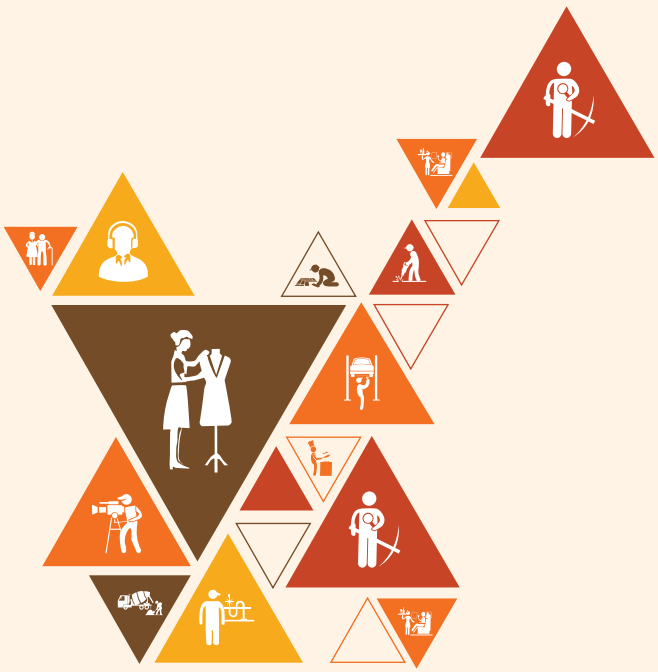
4. Prepare for Production of Ice Cream

Unit 4.1 - Ingredients for Production

Unit 4.2 - Factors Affecting Efficiency during Production

Unit 4.3 - Plan Production Sequence

Unit 4.4 - Raw Material and Manpower Estimation



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Key Learning Outcomes 

At the end of this module, the students will be able to:

1. Explain the standard operating procedures followed in the dairy industry
2. List the ingredients required for production
3. State the factors affecting operation efficiency during production
4. Describe the process of planning production sequence to maximize capacity utilisation of resources
5. Demonstrate the process of production planning

Unit 4.1: Ingredients for Production

Unit Objectives

At the end of this unit, students will be able to:

1. List the ingredients required for production

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Ingredients for ice cream Production, Ice cream making ingredients, Ice cream maker or blender.

Say

- Good morning trainees today, we will be discussing about Dairy Products, Sweetening Agents, Stabilizers, Added Flavors, Colors, Fruits, and Nuts.

Do

- Start the session by asking the trainees to introduce themselves and share their experience with ice cream making.
- Show the presentation slides and explain each ingredient in detail, including its role in ice cream making, its benefits, and its recommended usage.
- Use the handouts to supplement the presentation and provide more detailed information about each ingredient.
- Encourage trainees to ask questions and clarify any doubts they may have.

Ask

- What is your favorite ice cream flavor, and what ingredients do you think are used to make it?
- Have you ever tried making ice cream at home? If yes, what ingredients did you use?
- What do you think are the benefits of using different ingredients in ice cream making?

Elaborate

- Dairy Products: Dairy products are food items made from milk or cream, such as cheese, butter, yogurt, ice cream, and milk powder. They are rich in nutrients such as protein, calcium, and vitamins and are consumed all over the world.
- Sweetening Agents: Sweetening agents are substances used to add sweetness to dairy products. Common sweetening agents include sugar, high fructose corn syrup, honey, and artificial sweeteners such as aspartame, saccharin, and stevia. The choice of sweetening agent can affect the taste, texture, and shelf life of dairy products.
- Emulsifiers: Emulsifiers are substances that help to mix two immiscible liquids, such as oil and water, in dairy products. They are added to dairy products such as ice cream, cheese, and margarine to create a smooth and stable texture. Common emulsifiers used in dairy products include lecithin, mono- and diglycerides, and polysorbate.
- Stabilizers: Stabilizers are substances used to maintain the texture and consistency of dairy products during storage and transportation. They are added to dairy products such as ice cream, yogurt, and whipped cream to prevent the separation of liquids and solids. Common stabilizers used in dairy products include carrageenan, xanthan gum, and pectin.
- Added Flavors, Colors, Fruits, and Nuts: Dairy products can be enhanced with added flavors, colors, fruits, and nuts to create a more diverse range of products. These ingredients are added to products such as ice cream, yogurt, and cheese to create unique and appealing flavors and textures. Examples include strawberry yogurt, chocolate ice cream, and nutty cheese.

Demonstrate

Conduct a demo of making ice cream using the Ice Cream Making Kit, including all the ingredients covered in the session.

Activity

1. **Activity Name:** Ice Cream Making Challenge
2. **Objective:** To give trainees hands-on experience in making ice cream using the ingredients covered in the session.
3. **Resources:** Ice Cream Making Kit, bowls, spoons, measuring cups, and ingredients listed in the kit
4. **Duration of the activity:** 30-40 minutes
5. **Steps Involve:**
   - Divide the trainees into groups of four.
   - Ask each group to identify and prioritize the factors that affect production efficiency.
   - Set a time limit of 10 minutes for this activity.
   - Each group should present their findings and recommendations to the rest of the class.
   - Use the remaining time to discuss the action plans and identify areas of improvement.
6. **Outcome:** Trainees will learn how to identify the key factors that affect production efficiency and develop an action plan for improvement.

Notes for Facilitation

- Encourage active participation from all trainees throughout the session.
- Use real-life examples and anecdotes to make the session more engaging and relatable.
- Provide clear and concise instructions during the ice cream making activity and ensure that each group has all the necessary ingredients and equipment.

Unit 4.2: Factors Affecting Efficiency during Production

Unit Objectives

At the end of this unit, students will be able to:

1. State the factors affecting operation efficiency during production

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Factors Affecting Efficiency during Production, Images and Videos related to Factors Affecting Efficiency during Ice cream Production.

Say

- Good morning trainees today, we are going to discuss the factors affecting efficiency during production.
- During this session, we will explore the key factors that can impact production efficiency and how to improve them.
- We will learn how to identify the factors that influence efficiency, and how to assess their impact on production processes.

Do

- Introduce the topic and objectives of the session.
- Discuss the various factors affecting production efficiency and explain their importance.
- Use examples and case studies to illustrate the importance of each factor.

Ask

- What are the factors that influence production efficiency?
- How can we improve production efficiency?
- What are some common challenges that companies face when trying to improve production efficiency?

Elaborate

- Services and utilities: Uninterrupted supply of services and utilities is crucial for smooth production. Without a reliable supply of water, electricity, refrigeration, and steam, production can come to a halt.

- Supply of raw material: Adequate supply of raw material is essential for uninterrupted production. Scheduling the arrival of raw materials can help to minimize delays and downtime.
- Quality of raw material: Quality checks for milk used for production are important to ensure consistency in the final product.
- Work schedule: Wastage of working hours can impact productivity, and proper planning and scheduling can help to optimize the use of time.
- Efficient labour: Skilled labour can help to improve production efficiency by reducing errors, minimizing downtime, and optimizing processes.
- Proper processing units: Proper utilization of floor space, minimizing the distance between the machines and optimizing the layout of the production line can help to improve production efficiency.

Activity

1. **Activity Name:** Efficiency Improvement Brainstorming
2. **Objective:** To identify and prioritize factors affecting production efficiency and develop an action plan for improvement.
3. **Resources:** Whiteboard and markers, handouts with key points, stopwatch or timer.
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide the participants into small groups.
   - Provide each group with a worksheet or ask them to use the whiteboard.
   - Ask each group to brainstorm and write down potential strategies, ideas, or improvements that can enhance efficiency in dairy production.
   - Encourage them to think about different factors discussed during the session and come up with practical solutions.
   - After the allotted time, ask each group to share their ideas with the rest of the participants.
   - Facilitate a group discussion to analyze and evaluate the proposed solutions, highlighting the effectiveness and feasibility of each suggestion.
   - Summarize the key findings and emphasize the importance of continuous improvement in enhancing efficiency during production.
6. **Outcome:** Participants will develop a deeper understanding of the factors affecting efficiency and generate practical ideas to improve productivity in dairy processing.

Notes for Facilitation

- Encourage active participation and discussion among the trainees.
- Use real-life examples and case studies to illustrate the importance of each factor.
- Emphasize the importance of teamwork and collaboration in improving production efficiency.
- Use a variety of teaching methods to keep the trainees engaged.
- Encourage the trainees to develop their own action plans for improving production efficiency.

Unit 4.3: Plan Production Sequence

Unit Objectives

At the end of this unit, students will be able to:

1. Describe the process of planning production sequence to maximise capacity utilisation of resources
2. Demonstrate the process of production planning

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Plan Production Sequence.

Say

- Good morning trainees today, we are going to discuss Plan Production Sequence.
- In this class, we will learn about the different factors that need to be considered while planning the production sequence, which include optimum utilisation of resources, manpower, and machineries, better control over inventory, and quality control.

Do

- Start the session by introducing the concept of production sequence and its significance.
- Discuss the factors that influence production sequence, such as optimum utilisation of resources, manpower, and machineries, better control over inventory, and quality control.
- Explain how these factors can be optimized to improve production efficiency and reduce costs.
- Show examples of production process flowcharts to illustrate the production sequence.
- Discuss the importance of production schedules and timelines in ensuring efficient production sequence.

Ask

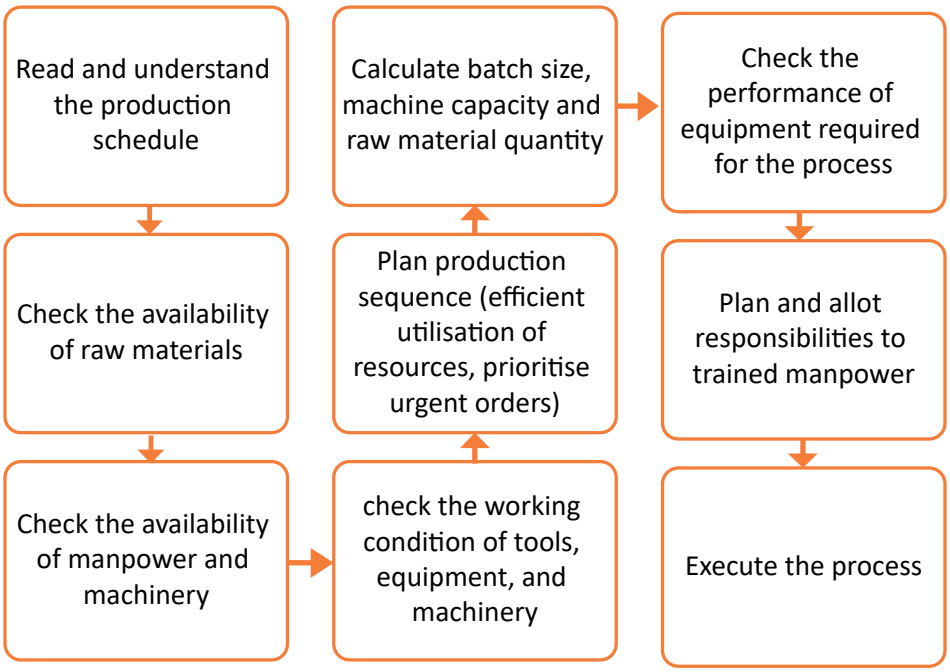
- What are the factors that need to be considered while planning the production sequence?
- Why is it important to optimize the use of resources, manpower, and machineries in the production process?
- How can production schedules and timelines help in improving the production sequence?

Elaborate

- Production Sequence: Understanding the order in which products should be manufactured to optimise production processes.
  - Optimum Utilisation of Resources: Proper allocation of resources to maximise efficiency.
  - Optimum Utilisation of Manpower: Assigning tasks to workers based on their skills and experience to achieve maximum productivity.
  - Optimum Utilisation of Machineries: Identifying the right machines for the job and scheduling their use to reduce downtime and increase output.
  - Better Control Over Inventory: Monitoring stock levels to prevent stockouts and reduce waste.
  - Better Quality Control: Implementing quality control measures throughout the production process to ensure consistency and reduce defects.

Demonstrate

Show the production process flowchart and explain how it reflects the production sequence.



Activity

1. **Activity Name:** Group Discussion
2. **Objective:** To discuss the challenges and solutions related to resource utilization in the production process.
3. **Resources:** Whiteboard and markers
4. **Duration of the activity:** 30 minutes
5. **Instructions:**
   - Divide participants into 2 groups.

- Ask 2 groups to discuss the challenges they face in optimizing resource utilization in the production process.
- Encourage participants to share their experiences and brainstorm potential solutions.
- Ask each group to present their findings to the larger group.

6. **Outcome:** Participants will gain a deeper understanding of the challenges and solutions related to resource utilization in the production process.

Notes for Facilitation

- Encourage active participation from all participants.
- Ensure that the participants understand the importance of each factor in the production process.
- Use visual aids and practical examples to illustrate the concepts and principles of the production sequence.
- Encourage participants to share their own experiences and insights related to production sequencing to enrich the learning experience.

Unit 4.4: Raw Material and Manpower Estimation

Unit Objectives

At the end of this unit, students will be able to:

1. Discuss the capacity utilisation of machinery with respect to the processing time, production time, production order and batch size for each product

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Raw Material and Manpower Estimation and Calculator.

Say

- Good morning trainees today, we will be discussing Raw Material and Manpower Estimation.
- In this session, we will learn about capacity utilization and process loss and how to estimate raw material and manpower requirements based on these factors.

Do

- Begin the session by introducing the topics of capacity utilization and process loss.
- Use presentation slides and whiteboard to explain key concepts and provide examples.
- Encourage participants to take notes and ask questions for clarification.
- Conduct an activity to allow participants to practice applying these concepts to real-world scenarios.

Ask

- What challenges have you faced in estimating raw materials and manpower in the past?
- How does capacity utilization affect your production planning?

Elaborate

- Capacity Utilization: The measure of how much of a factory's production capacity is being utilized.
- Process Loss: The amount of raw material that is lost during the manufacturing process.
- Raw Material and Manpower Estimation: The process of estimating the amount of raw material and manpower required for a production process.

Activity

1. **Activity Name:** Raw Material and Manpower Estimation Simulation
2. **Objective:** To allow participants to practice estimating raw materials and manpower based on capacity utilization and process loss concepts
3. **Resources:** Whiteboard, markers, handouts with simulation scenario
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide participants into small groups of 4 people.
   - Provide each group with a simulation scenario that includes production capacity, raw material requirements, and process loss rates.
   - Instruct participants to calculate the required amount of raw materials and manpower needed to meet production targets while taking into account capacity utilization and process loss.
   - Allow time for groups to work together to complete the task.
   - Ask each group to present their findings to the rest of the class.
6. **Outcome:** Participants will gain hands-on experience in applying capacity utilization and process loss concepts to real-world scenarios.

Notes for Facilitation

- Encourage active participation from all participants.
- Use real-life examples and scenarios to make the concepts more relatable.
- Provide feedback and guidance during the activity to help participants optimize their estimates.
- Emphasize the importance of accurate raw material and manpower estimation in production planning.
- Encourage participants to share their own experiences and insights.

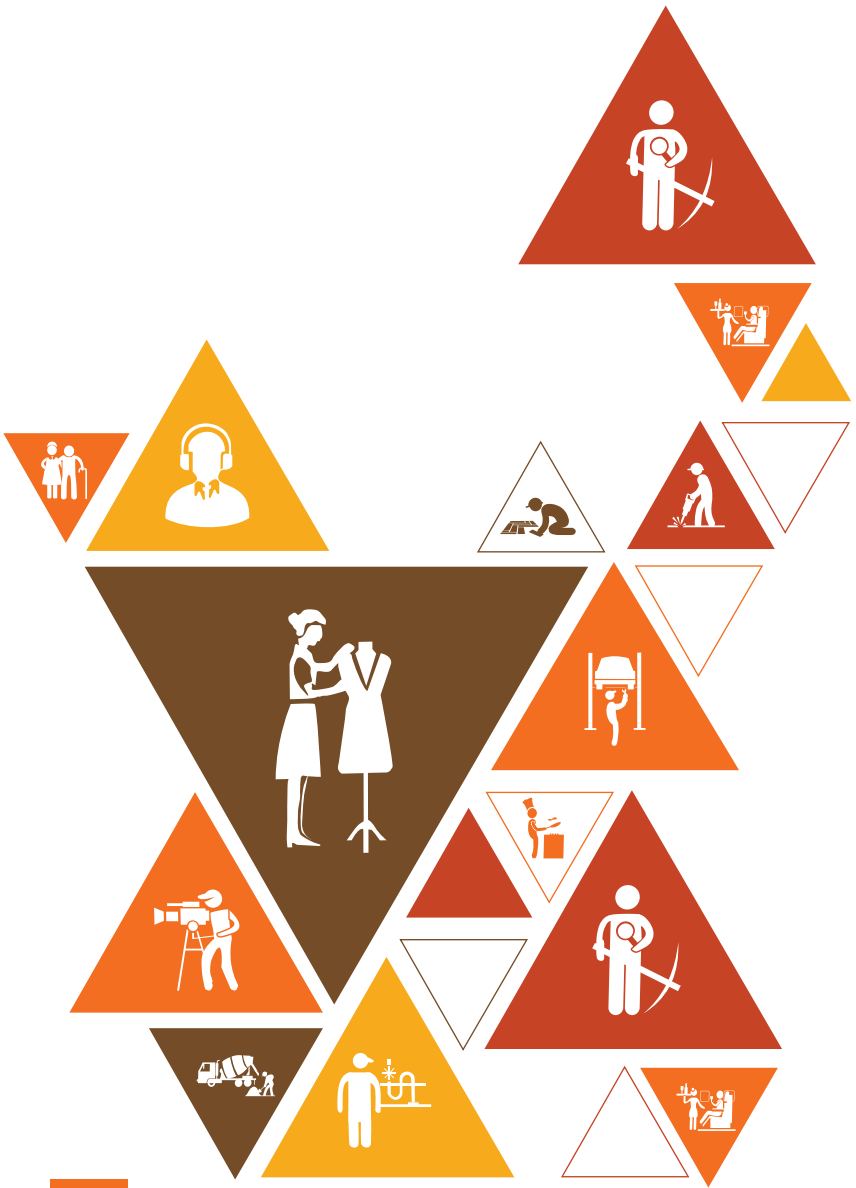
Answers to Exercises for PHB

1. Arrange the production sequence in the right order.

a. Check the availability of raw material
b. Read and understand the production schedule
c. Plan and allot responsibilities to trained manpower
d. Check the availability of manpower and machinery
e. Check the working condition of tools, equipment, and machinery
f. Check the performance of equipment required for the process
g. Plan production sequence (efficient utilization of resources, prioritize urgent orders)
h. Calculate batch size, machine capacity, and raw material quantity
i. Execute the process of making dairy products

2. Match the columns.

a. Utilities v. Easy availability of water, electricity, refrigeration and steam
b. Efficient labour vi. Employ skilled labour
c. Work schedule iv. No wastage of working hours
d. Quality of raw material iii. Quality checks for milk used for production
e. Processing units i. Using floor space efficiently
f. Supply of raw material ii. Proper scheduling of raw material



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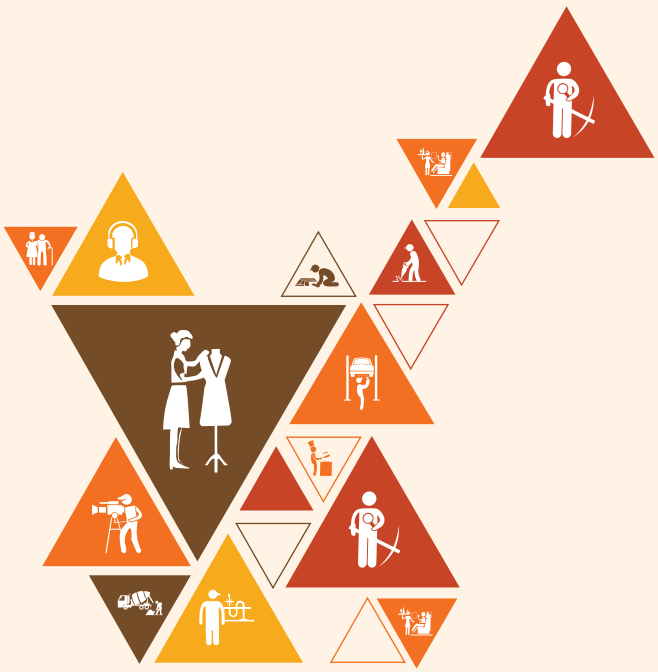
5. Produce Ice Cream



Key Learning Outcomes

At the end of this module, the students will be able to:

1. Describe milk
2. State the composition of milk
3. List the different types of milk products
4. State the composition and nutritive value of the milk products
5. Explain the process of testing milk for accepted quality standards
6. Demonstrate the test for checking the quality of milk
7. Describe the procedure for organoleptic test of milk
8. Describe the procedure for COB test of milk
9. State the production process of pasteurization
10. Explain the process of separation and bactofugation
11. State the method of standardisation of milk
12. State the method of homogenisation of milk
13. State the method of heat exchange during pasteurisation
14. State the method of standardisation of milk
15. Explain the process of HTST pasteurisation
16. Demonstrate the process of HTST pasteurisation
17. State the composition of ice-cream
18. List the different types of ice-cream
19. Explain the process of producing ice-cream
20. Demonstrate the process of producing plain ice-cream
21. Demonstrate the process of producing frozen desserts
22. Demonstrate the process of producing premium ice-cream
23. Demonstrate the process of producing kulfi
24. List the composition of different types of ice-cream
25. Demonstrate the process of making the mix
26. State the method of pre-heating ice-cream mix
27. State the method of blending
28. State the process of filtration
29. State the method of homogenisation of ice-cream mix
30. State the method of pasteurisation of ice-cream mix
31. State the method of cooling the ice-cream mix
32. State the method of ageing the ice-cream mix
33. State the method of freezing the ice-cream mix
34. State the method of estimating overrun in ice-cream
35. Arrange for proper cleaning of production area, equipment, and tools used
36. Organise periodic maintenance of all production machineries

Unit 5.1: Introduction to Milk

Unit Objectives

At the end of this unit, students will be able to:

1. Describe milk and state the composition of milk
2. List the different types of milk products
3. State the composition and nutritive value of the milk products

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Different Milk and its products.

Say

- Good morning trainees today, we will be discussing the nutritional value and energy content of milk.
- By the end of the session, you will have a better understanding of how milk contributes to a healthy diet and how to interpret nutrition labels on milk products.

Do

- Start by introducing yourself and asking the participants to do the same.
- Provide an overview of the session and the topics that will be covered.
- Use handouts or presentation slides to facilitate the session.
- Encourage participation and questions throughout the session.
- End the session by summarizing the key points covered and asking for feedback.

Ask

- What are some benefits of drinking milk?
- What types of milk products do you consume on a regular basis?

Elaborate

Milk: Milk is a nutritious food that is a rich source of calcium, vitamin D, and other nutrients. It has varying energy content depending on the fat content and is a good source of protein for building and repairing muscles and tissues.

Activity

1. **Activity Name:** Milk Nutrition Label Scavenger Hunt
2. **Objective:** To familiarize participants with nutrition labels on milk products and how to interpret them.
3. **Resources:** Nutrition labels from various milk products, handouts, pens/pencils
4. **Duration of the activity:** 30-45 minutes
5. **Steps involved:**
   - Divide participants into groups of 3.
   - Provide each group with a different nutrition label from a milk product.
   - Ask the groups to identify and write down the amounts of calories, fat, protein, and calcium per serving.
   - Once all groups have completed the task, discuss the differences in the nutrition labels and what they mean for the nutritional value of each product.
6. **Outcome:** Participants will have a better understanding of how to interpret nutrition labels on milk products and the nutritional value of different types of milk.

Notes for Facilitation

- Encourage active participation and questions throughout the session.
- Be aware of any dietary restrictions or allergies among the participants when selecting milk samples or planning the activity.
- Provide examples of different types of milk products, such as whole milk, skim milk, almond milk, etc.
- Emphasize the importance of including milk in a balanced diet and the potential health benefits of doing so.
- Make sure to cover any additional topics or questions that arise during the session.

Unit 5.2: Quality Control in Milk Processing Plant

Unit Objectives

At the end of this unit, students will be able to:

1. Explain the process of testing milk for accepted quality standards
2. Demonstrate the test for checking the quality of milk
3. Describe the procedure for organoleptic test of milk
4. Describe the procedure for COB test of milk

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Quality Control in Milk Processing Plant, Clot On Boiling (COB) Test kit, thermometer, and pH meter.

Say

- In this session, we will discuss the importance of quality control in milk processing and how to ensure that the milk we process is of high quality.
- Quality control measures help to ensure that the milk we produce is safe, nutritious, and of consistent quality.

Do

- Begin the session by asking the trainees if they are familiar with milk testing and quality control procedures. Briefly discuss their responses and clarify any misconceptions.
- Introduce the topics of milk sampling, organoleptic tests, and the COB test. Provide a brief overview of each topic and its importance in ensuring milk quality.
- Demonstrate each of the procedures to the trainees, using the equipment and samples provided.

Ask

- What are some of the factors that can affect the quality of milk?
- How do milk testing and quality control procedures help to ensure that the milk we produce is safe and of consistent quality?

Elaborate

- Milk Testing and Quality Control: Milk testing and quality control refer to the process of evaluating the quality of milk to ensure that it meets specific standards and is safe for consumption. It involves various tests and inspections to check for any abnormalities or impurities that could affect the quality of milk.
    - Milk Sampling: Milk sampling is the process of collecting milk samples for testing and analysis. It is an essential part of milk testing and quality control and involves taking representative samples from different sources, such as individual cows, bulk tanks, or milk trucks, to ensure that the samples are representative of the milk being produced.
    - Organoleptic Tests: Organoleptic tests refer to sensory evaluations of milk to assess its quality based on its appearance, flavor, aroma, and texture. It is a subjective test and is typically conducted by trained panelists who evaluate the milk based on specific criteria, such as sweetness, bitterness, acidity, or off-flavors.
    - Clot on Boiling (COB) Test: The COB test is a quick and simple test used to detect the presence of mastitis in cows. It involves boiling a small sample of milk and observing whether it forms a clot or not. If the milk forms a clot, it indicates the presence of somatic cells, which are a sign of mastitis.

Demonstrate

Milk Sampling: Demonstrate how to take a milk sample from different stages of production using a sterile container and ensure that the sample is properly labeled.

Activity

1. **Activity Name:** "Fat-Rich Dairy Product Tasting"
2. **Objective:** To practice the milk sampling, organoleptic tests, and COB test procedures
3. **Resources:** Samples of milk with different quality levels, equipment for milk testing and quality control, COB test kit
4. **Duration of the activity:** 30-45 minutes
5. **Steps Involve:**
    - Divide the trainees into small groups and provide each group with a set of milk samples and equipment.
    - Instruct each group to practice the milk sampling, organoleptic tests, and COB test procedures using the samples provided.
    - Provide guidance and feedback to each group as they practice the procedures.
    - After the activity, have each group present their findings and discuss any issues or challenges they encountered during the practice session.
6. **Outcome:** Trainees will have a better understanding of milk testing and quality control procedures, and will have had the opportunity to practice these procedures themselves.

Activity

1. **Activity Name:** Milk Quality Control Testing
2. **Objective:** To provide hands-on experience in milk quality control testing procedures
3. **Resources:** Samples of milk with different quality levels, equipment for milk testing and quality control, COB test kit
4. **Duration of the activity:** 60-90 minutes
5. **Steps Involve:**
   - Divide participants into small groups and distribute samples of different types of milk to each group.
   - Provide the necessary milk testing equipment and handouts on milk quality control and testing procedures to each group.
   - Instruct each group to perform milk sampling, organoleptic tests, and COB test procedures on their samples under your guidance and supervision.
   - Encourage participants to share their observations and results with the group and discuss any discrepancies or issues they may have encountered.
   - Conclude the activity by reviewing the key takeaways from the session and emphasizing the importance of milk quality control in the milk processing industry.
6. **Outcome:** Trainees will have a better understanding of milk testing and quality control procedures.

Notes for Facilitation

- Ensure that all equipment and samples are properly sanitized and labeled.
- Emphasize the importance of proper sampling techniques and hygienic practices.
- Provide feedback and guidance to participants as needed to ensure accurate and reliable testing results.
- Encourage participants to share their observations and insights with the group and participate in group discussions.

Unit 5.3: Processing Milk

Unit Objectives

At the end of this unit, students will be able to:

1. State the production process of pasteurisation
2. Explain the process of separation and bactofugation
3. State the method of standardisation of milk
4. State the method of homogenisation of milk
5. State the method of heat exchange during pasteurisation
6. State the method of standardisation of milk
7. Explain the process of HTST pasteurisation
8. Demonstrate the process of HTST pasteurisation

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Processing Milk, Sample of milk.

Say

Good morning trainees, today we will be learning about the processing of milk, particularly the pasteurization of milk.

This session will cover the different types of pasteurization, pasteurization requirements, and the equipment used in pasteurization.

Ask

- What do you already know about milk processing and pasteurization?
- What are some reasons for pasteurizing milk?
- How does pasteurization affect the quality of milk?

Elaborate

- Pasteurisation of Milk: Pasteurisation is a process of heating milk to a specific temperature for a set amount of time to kill harmful bacteria and pathogens, thereby making it safe for consumption. The process involves heating raw milk to a temperature of 72°C to 75°C for 15 to 20 seconds and then rapidly cooling it down to below 10°C.
- Separation of Milk and Bactofugation: Separation of milk involves the separation of cream from milk using centrifugal force. The cream is removed from the milk and used to make butter or cream, while the remaining milk is used for other dairy products. Bactofugation is a process used to remove bacteria from milk by subjecting it to high centrifugal force.
- Standardisation of Milk: Standardisation of milk involves adjusting the fat content of milk to a specific level. It is done by adding or removing cream or milk to achieve the desired fat content. This is important in ensuring that dairy products have consistent fat levels and flavor.
- Homogenisation of Milk: Homogenisation is a process that involves breaking down fat globules in milk to ensure that they are evenly distributed throughout the milk. This is done by passing milk through a small nozzle under high pressure, causing the fat globules to break down into smaller particles.
- HTST Pasteurisation: HTST (High-Temperature Short-Time) pasteurisation is a process of heating milk to a temperature of 72°C to 75°C for 15 to 20 seconds to kill harmful bacteria and pathogens. It is a commonly used method of pasteurising milk.
- LTLT Pasteurisation: LTLT (Low-Temperature Long-Time) pasteurisation is a process of heating milk to a temperature of 63°C for 30 minutes or 72°C for 15 seconds to kill harmful bacteria and patho-gens. It is a less common method of pasteurising milk, but it is still used in some countries.

Demonstrate

Conduct a demonstration of the pasteurization equipment, including the different operations involved in the process.

Activity

1. **Activity Name:** Pasteurization Experiment
2. **Objective:** To demonstrate the effects of pasteurization on milk quality and shelf life.
3. **Resources:** Samples of pasteurized and unpasteurized milk, thermometer, and sterilized jars.
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide the trainees into groups of 3.
   - Provide each group with a sample of pasteurized and unpasteurized milk.
   - Ask each group to pour the milk into separate sterilized jars and label them accordingly.
   - Using a thermometer, ask the trainees to measure the temperature of both samples of milk.
   - Store the jars of milk in a cool place and observe the changes over the next few days.
   - Ask the trainees to record their observations and note any changes in smell, taste, and appearance.
6. **Outcome:** The Pasteurization Experiment activity will help trainees to understand the effects of pasteurization on milk quality and shelf life. By observing and comparing the changes in the samples of pasteurized and unpasteurized milk over time, trainees will be able to see the benefits of pasteurization in reducing the risk of spoilage and improving the shelf life of milk.

Notes for Facilitation

- Ensure that all necessary resources are available before starting the activity.
- Encourage trainees to work collaboratively and share their observations and ideas.
- Provide guidance and support as needed, but allow trainees to take ownership of the experiment.
- Emphasize the importance of proper pasteurization techniques and the need to follow the recommended temperature and time requirements.
- Discuss the potential risks associated with consuming unpasteurized milk and the benefits of pasteurization in reducing the risk of foodborne illness.
- Encourage trainees to ask questions and share their observations throughout the activity to facili-tate discussion and enhance learning.

Unit 5.4: Introduction to Ice Cream

Unit Objectives

At the end of this unit, students will be able to:

1. State the composition of ice cream
2. List the different types of ice cream
3. Explain the process of producing ice cream

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Introduction to Ice Cream, Sample of milk.

Say

Good morning trainees, today, we will learn about the production of ice cream, different varieties of ice cream, and the composition of ice cream.

We will discuss the steps involved in the manufacturing process of ice cream and also demonstrate how to make ice cream.

Do

- Begin by introducing the topic and the learning objectives of the class.
- Present the information on the composition and production of ice cream through the use of visual aids and handouts.
- Conduct a demonstration on how to make ice cream and invite participants to follow along or observe.
- Conduct an activity where participants can make their own ice cream using the ingredients provided.

Ask

- Have you ever made ice cream before? If so, what was your experience like?
- How do you think the composition of ice cream affects its taste and texture?

Elaborate

- Production of Ice Cream: The process of ice cream production involves a series of steps, including mixing the ingredients, pasteurization, homogenization, aging, freezing, packaging, and hardening.

- Varieties of Ice Cream: There are many varieties of ice cream, including regular ice cream, soft-serve ice cream, gelato, sorbet, sherbet, and frozen yogurt. Each variety has its own unique com-position and texture.
- Composition of Ice Cream: Ice cream is typically composed of milk, cream, sugar, flavorings, and stabilizers. The exact proportions and ingredients can vary depending on the type of ice cream be-ing produced.
- Overview of the Process of Ice Cream Manufacturing: The process of ice cream manufacturing in-volves mixing the ingredients, pasteurizing the mixture, homogenizing the mixture, aging the mix-ture, freezing the mixture, packaging the ice cream, and hardening the ice cream. Each step is carefully controlled to ensure the production of high-quality ice cream.

Demonstrate

Demonstrate how to make ice cream using an ice cream maker or blender. Emphasize the im-portance of measuring ingredients accurately and following the recipe carefully.

Activity

1. **Activity Name:** Making Ice Cream
2. **Objective:** To demonstrate the process of making ice cream and to allow participants to make their own ice cream.
3. **Resources:** Measuring cups and spoons, blender or ice cream maker, ingredients (milk, cream, sugar, stabilizers/emulsifiers), timer.
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide participants into small groups of 2-3 people.
   - Provide each group with the necessary ingredients, measuring cups and spoons, and a blender or ice cream maker.
   - Instruct participants to follow the recipe provided and measure the ingredients accurately.
   - Ask participants to blend or churn the ice cream mixture for the appropriate amount of time, as specified in the recipe.
   - Set a timer for the hardening time and ask participants to place their ice cream in the freezer to harden.
   - While the ice cream is hardening, ask participants to clean up their workspaces and return the equipment.
   - After the hardening time, ask participants to retrieve their ice cream from the freezer and scoop it into individual cups or bowls.
   - Encourage participants to taste their creations and share their thoughts and feedback with the group.
   - Lead a discussion on the process of making ice cream, including the use of stabilizers and emulsifi-ers, and the importance of accurate measurements and blending time.
   - Ask participants to reflect on their experience and what they learned from making their own ice cream.

- Provide an opportunity for participants to ask any questions they may have about the ice cream-making process.

6. **Outcome:** Participants will have a hands-on experience making their own ice cream and will gain a better understanding of the process of ice cream production, including the importance of accurate measurements and blending time. They will also learn about the role of stabilizers and emulsifiers in ice cream and have an opportunity to reflect on their learning.

Notes for Facilitation

- Ensure that participants handle the equipment safely and follow instructions for the safe handling of the ingredients. Remind participants to wash their hands before handling any equipment or ingredients.
- Depending on the time available and the interest of the group, you can provide variations of the basic recipe, such as adding different flavors or mix-ins.
- During the activity, monitor the participants' progress to ensure that they are following the recipe accurately and achieving the desired results. If needed, provide additional guidance to help participants achieve their goals.
- Once the ice cream has hardened, allow participants to taste their creations. Encourage partici-pants to discuss the different flavors and textures and compare their results with others in the group.
- Encourage participants to think about the sustainability of the ice cream production process. Dis-cuss ways to reduce waste and ensure that the ingredients used are sourced sustainably.

Unit 5.5: Production Process of Ice Cream and Syrup

Unit Objectives

At the end of this unit, students will be able to:

1. Demonstrate the process of producing plain ice cream
2. Demonstrate the process of producing frozen desserts
3. Demonstrate the process of producing premium ice cream
4. Demonstrate the process of producing kulfi

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Production Process of Ice Cream and Syrup, Ice Cream Making Equipment And Ingredients.

Say

- Good morning trainees, today, we will learn about Production Process of Ice Cream and Syrup.
- In this session, we will learn about the process of making plain ice cream, frozen desserts, premi-um ice cream, kulfi, and syrup.

Do

- Start the session by asking the questions in the “Ask” section to stimulate the learning process.
- Use the presentation slides to explain the different production processes and the key steps in-volved in each.
- Demonstrate the ice cream making process to the participants, using the equipment and ingredi-ents provided.
- Conduct the activity, where participants will have the opportunity to make their own ice cream us-ing the recipe provided.

Ask

What do you think are the key ingredients in making ice cream?

Elaborate

- Production for Plain Ice Cream: This involves procuring raw milk, cooling the mixture, pre-heating milk, aging the mix, adding sugar and SMP, adding color and flavors, adding sugar, stabilizer, and emulsifier,

undertaking the mechanical agitation process, adding fat content, conducting continu-ous freezing, heating and mixing the content, filling and packing the mixture, undergoing the filtra-tion process, homogenizing, hardening, and storing in cold storage. (refer this fig. no. 5.5.1 of PH)

- Production of Frozen Desserts: This involves using a mix of milk, cream, sugar, and flavorings, which is frozen while being stirred, to create a smoother and lighter texture. (refer this fig. no. 5.5.2 of PH)
- Production of Premium Ice Cream: This involves using higher-quality ingredients, such as organic milk, cream, and eggs, to create a richer and creamier ice cream. (refer this fig. no. 5.5.3 of PH)
- Production of Kulfi: This is a traditional Indian ice cream that is made by boiling milk until it reduces by half, adding sugar and flavorings, and freezing it in molds. (refer this fig. no. 5.5.4 of PH)
- Production of Syrup: This involves mixing sugar and water, heating the mixture until the sugar dis-solves, and adding flavorings. (refer this fig. no. 5.5.5 of PH)
- Production for Plain Ice Cream: This involves procuring raw milk, cooling the mixture, pre-heating milk, aging the mix, adding sugar and SMP, adding color and flavors, adding sugar, stabilizer, and emulsifier, undertaking the mechanical agitation process, adding fat content, conducting continu-ous freezing, heating and mixing the content, filling and packing the mixture, undergoing the filtra-tion process, homogenizing, hardening, and storing in cold storage. (refer this fig. no. 5.5.1 of PH)
- Production of Frozen Desserts: This involves using a mix of milk, cream, sugar, and flavorings, which is frozen while being stirred, to create a smoother and lighter texture. (refer this fig. no. 5.5.2 of PH)
- Production of Premium Ice Cream: This involves using higher-quality ingredients, such as organic milk, cream, and eggs, to create a richer and creamier ice cream. (refer this fig. no. 5.5.3 of PH)
- Production of Kulfi: This is a traditional Indian ice cream that is made by boiling milk until it reduces by half, adding sugar and flavorings, and freezing it in molds. (refer this fig. no. 5.5.4 of PH)
- Production of Syrup: This involves mixing sugar and water, heating the mixture until the sugar dis-solves, and adding flavorings. (refer this fig. no. 5.5.5 of PH)

Demonstrate

Demonstrate the ice cream making process using the equipment and ingredients provided, while explaining the key steps involved in each stage.

Activity

1. **Activity Name:** Making Homemade Ice Cream
2. **Objective:** To provide participants with a hands-on experience of making ice cream and reinforce their learning on the production process.
3. **Resources:** Ice cream making equipment and ingredients, handouts with recipe and process steps.
4. **Duration of the activity:** 60-90 minutes
5. **Steps Involve:**
   - Divide the participants into groups of 3-4.
   - Provide each group with the ice cream making equipment and ingredients, along with the recipe and process steps.
   - Instruct the participants to follow the recipe and process steps to make their own ice cream.
   - Provide guidance and assistance as needed.
   - After the ice cream is made, ask each group to present their ice cream and share their experience.

6. **Outcome:** Participants will have a better understanding of the ice cream production process and be able to make their own ice cream using the recipe provided.

Notes for Facilitation

- Encourage participants to ask questions and share their observations throughout the session.
- Ensure that the ice cream making equipment and ingredients are set up and ready to use before the start of the session.
- Remind participants to follow the recipe and process steps carefully during the activity.
- Emphasize the importance of food safety and hygiene during the ice cream making process.

Unit 5.6: Producing Ice Cream

Unit Objectives

At the end of this unit, students will be able to:

1. List the composition of different types of ice cream
2. Demonstrate the process of making the mix
3. State the method of pre-heating ice cream mix
4. State the method of blending
5. State the process of filtration
6. State the method of homogenisation of ice cream mix
7. State the method of pasteurisation of ice cream mix
8. State the method of cooling the ice cream mix
9. State the method of ageing the ice cream mix
10. State the method of freezing the ice cream mix
11. State the method of estimating overrun in ice cream

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Producing Ice Cream, Ice Cream Making Equipment And Ingredients, Thermometers, Homogenizer, Filtration equipment, Freezer.

Say

- Good morning trainees, today, we will learn about the different ingredients and steps involved in producing ice cream.
- By the end of the session, you will be able to understand the importance of each step and ingredi-ent, and learn how to make ice cream from scratch.

Do

- Introduce the topic by discussing the history of ice cream and its popularity in different parts of the world.
- Use the PowerPoint presentation to explain each step involved in producing ice cream, including figuring the mix, pre-heating, blending, filtration, homogenization, cooling and ageing, and freez-ing the ice cream mix.
- Demonstrate each step using the ice cream maker and other equipment, and encourage trainees to ask questions and participate in the process.

Ask

What do you think are the most important steps and ingredients in making ice cream?

Elaborate

- Figuring the mix: The first step in producing ice cream is figuring out the mix. The ice cream mix is the foundation of the ice cream and consists of different ingredients in varying quantities depend-ing on the type of ice cream being made. The mix must be carefully calculated to achieve the de-sired flavor and texture. The ingredients are weighed out and mixed together in the correct pro-portions. The ingredients for each type of ice cream, such as plain or premium, have specific measurements that must be followed.
- Pre-heating: The mix is then heated to a specific temperature to dissolve the ingredients and sta-bilize the mix. This helps to prevent the ingredients from separating during the freezing process. Heating the mix also helps to improve the texture and flavor of the ice cream.
- Blending: Once the mix has been heated, it is blended to achieve a uniform consistency and en-sure that all the ingredients are evenly distributed. Blending helps to create a smooth and creamy texture in the ice cream. It is essential to blend the mix thoroughly to ensure that there are no lumps or clumps in the final product.
- Filtration: The mix is then filtered to remove any impurities and ensure a smooth texture. Filtration is an essential step to achieve a smooth and creamy texture in the ice cream. Any impurities or sol-ids in the mix can cause an uneven texture in the final product. Filtration can be done using a fine mesh sieve or a filtration machine.
- Homogenization: The mix is homogenized to break down the fat particles and create a smoother texture. Homogenization helps to create a uniform and creamy texture in the ice cream. This pro-cess breaks down the fat particles to create smaller particles that are more evenly distributed throughout the mix.
- Cooling and ageing: The mix is then cooled and aged to develop the flavor and texture of the ice cream. Cooling the mix helps to stabilize the mix and prevent any further separation of the ingre-dients. Aging the mix allows the flavors to develop and intensify, resulting in a richer and more complex flavor profile.
- Freezing: The mix is finally frozen to create the final product. The mix is placed in a freezer or ice cream machine to freeze it to the desired temperature and texture. As the mix freezes, it expands and incorporates air into the mix, resulting in a lighter and fluffier texture. The amount of air that is incorporated into the ice cream is known as overrun. The overrun can be adjusted to create dif-ferent textures in the ice cream, such as light and airy or dense and creamy.

Activity

1. **Activity Name:** Making Ice Cream
2. **Objective:** To provide hands-on experience in making ice cream from scratch and reinforce the concepts learned in the session.
3. **Resources:** Ingredients for making ice cream mix, ice cream maker, thermometer, filtration equipment, homogenizer, freezer
4. **Duration of the activity:** 1 hour
5. **Steps Involve:**
   - Divide the trainees into small groups and provide each group with the ingredients for making ice cream mix.
   - Instruct each group to measure and add the ingredients, pre-heat the mix, blend the mix, filter the mix, homogenize the mix, cool and age the mix, and freeze the ice cream mix.
   - Provide guidance and assistance as needed, and encourage trainees to ask questions and participate in the process.
   - Once the ice cream is ready, have the trainees taste and compare their creations.
6. **Outcome:** Trainees will have hands-on experience in making ice cream from scratch and reinforce the concepts learned in the session.

Activity

1. **Activity Name:** Flavor Experimentation
2. **Objective:** To encourage trainees to experiment with different ingredient ratios to achieve different flavors and textures.
3. **Resources:** Different flavorings, measuring cups and spoons, ice cream mix.
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
   - Divide trainees into groups of 3-4.
   - Provide each group with a base ice cream mix.
   - Provide each group with different flavorings (e.g. chocolate chips, strawberry syrup, vanilla ex-tract, etc.).
   - Instruct trainees to experiment with different flavor combinations and ratios to create their own unique ice cream flavors.
   - Encourage trainees to take notes on their flavor experiments.
6. **Outcome:** Trainees will gain experience in creating new and unique ice cream flavors and will learn about the impact of different flavorings on the final product.

Notes for Facilitation

- Emphasize the importance of accurately measuring the ingredients to produce a consistent prod-uct.
- Encourage trainees to experiment with different ingredient ratios to achieve different flavors and textures.
- Explain the purpose of each step in the process and demonstrate each step.
- Encourage trainees to take notes and ask questions throughout the process.

- Explain the concept of overrun and its effect on the final product.
- Encourage trainees to experiment with different freezing techniques to achieve different overrun levels.
- Create a positive learning environment by being welcoming and approachable.
- Be flexible and adaptable to the needs of the trainees.

Unit 5.7: Packaging, Hardening and Storage of Ice Cream

Unit Objectives

At the end of this unit, students will be able to:

1. List the factors to consider during the packing of ice- ream
2. List the materials used for packaging ice cream
3. State the method of hardening and storage in ice cream

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation Packaging, Hardening and Storage of Ice Cream, Ice Cream Making Equipment And Ingredients, Thermometers, Homogenizer, Filtration equipment, Freezer.

Say

- Good morning trainees, today, we will learn about Packaging, Hardening and Storage of Ice Cream.
- In this session, we will cover the different types of packaging materials used for ice cream, how to harden and store ice cream, and the factors that affect the quality of the final product.
- By the end of this session, you will be able to understand the importance of packaging and harden-ing of ice cream, and apply the knowledge to your own ice cream making process.

Do

- Use presentation slides to explain the importance of packaging, hardening, and storage of ice cream, and the different types of packaging materials used for ice cream.
- Demonstrate the process of hardening and storage of ice cream in a freezer or hardening room, and explain the factors that affect the quality of the final product.
- Conduct an activity related to the topic, such as packaging ice cream in different types of contain-ers and comparing the results, or testing the effectiveness of different hardening conditions on the final product.
- End the session with a recap of the key takeaways and a Q&A session.

Ask

- What are some of the factors that affect the quality of ice cream packaging?
- Why is it important to harden and store ice cream properly?

Elaborate

- Packaging: Packaging is an important aspect of the food industry, as it provides protection, con-tainment, and convenience for food products. In the case of ice cream, packaging is essential to prevent freezer burn, control moisture, and maintain the quality of the product.
- Packaging materials: The packaging materials used for ice cream can vary depending on the type of product and the manufacturer's preferences. Common packaging materials include plastic con-tainers, paper cups, cardboard cartons, and flexible pouches. The choice of packaging material can affect the product's shelf life, appearance, and cost.
- Hardening and Storage: After packaging, ice cream is typically hardened in a blast freezer or a hardening room to reach the desired consistency and temperature. Hardening helps to stabilize the ice cream, prevent melting, and improve its texture. Once hardened, ice cream is stored in a freezer at a temperature of -18°C or lowers to maintain its quality until it is ready for distribution and sale. Proper storage conditions are essential to prevent quality deterioration and ensure the safety of the product.

Activity

1. **Activity Name:** Design Your Own Ice Cream Package
2. **Objective:** To encourage creativity and critical thinking in designing an ice cream package that meets the requirements of protection, attractiveness, ease of use, and environmental sustainability.
3. **Resources:** Paper, colored pencils, markers, glue, scissors
4. **Duration of the activity:** 30 minutes
5. **Instructions:**
   - Divide the trainees into groups of four.
   - Provide each group with the resources.
   - Ask each group to design an ice cream package that meets the requirements of protection, attrac-tiveness, ease of use, and environmental sustainability.
   - Encourage the groups to be creative and think outside the box.
   - After 25 minutes, ask each group to present their design to the class.
   - Have the class vote on the best design.
6. **Outcome:** The activity will encourage creativity, critical thinking, and collaboration among the trainees, while also reinforcing the importance of packaging in the ice cream industry.

Notes for Facilitation

- Ensure that all the necessary resources are available before starting the session.
- Encourage trainees to ask questions and provide feedback throughout the session.
- Emphasize the importance of proper packaging, hardening, and storage in the ice cream industry.
- Be mindful of any food allergies or dietary restrictions when providing ice cream samples.
- Remind trainees of the environmental impact of packaging and encourage them to think of sus-tainable solutions.

Unit 5.8: Post Production Cleaning and Maintenance

Unit Objectives

At the end of this unit, students will be able to:

1. Arrange for proper cleaning of production area, equipment, and tools used
2. Organise periodic maintenance of all production machineries

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Post Production Cleaning and Maintenance, Sponges, Brushes, Towels Gloves, and Goggles.

Say

- Good morning trainees, today, we will be discussing the importance of cleaning and maintaining your production equipment after use.
- We will go through the different cleaning methods and practices to ensure that your equipment is kept in good condition and ready for use the next time you need it.

Do

- Begin by introducing the importance of post-production cleaning and maintenance to the partici-pants. Emphasize the importance of maintaining equipment to ensure product quality, worker safety, and compliance with regulations.
- Provide a detailed explanation of the post-production cleaning method that includes the following steps:
  - Preparing the equipment for cleaning
  - Disassembling the equipment
  - Cleaning the equipment components with appropriate cleaning solutions
  - Rinsing the equipment components
  - Sanitizing the equipment components
  - Reassembling the equipment
  - Performing a final inspection of the equipment
- Provide examples of different cleaning protocols that can be used for various types of equipment and cleaning situations.
- Demonstrate how to properly disassemble and clean equipment, emphasizing the importance of following the cleaning checklist or protocol and using personal protective equipment.

Ask

- What are the consequences of not properly cleaning and maintaining equipment after use?
- What are some common cleaning solutions and sanitizers used in post-production cleaning?

Elaborate

Post Production Cleaning Method:

Post-production cleaning involves a series of steps to ensure that the equipment used in production is thoroughly cleaned and sanitized to prevent contamination and maintain product quality. It is important to follow a cleaning checklist or protocol to ensure that all equipment components are cleaned and sanitized properly.

Demonstrate

Demonstrate the disassembly and cleaning process of a piece of equipment, emphasizing the im-portance of following the cleaning checklist or protocol and using personal protective equipment. Show participants how to properly clean each component and provide them with guidance and feedback as needed.

Activity

1. **Activity Name:** Cleaning and Maintenance Simulation
2. **Objective:** To practice post-production cleaning and maintenance uses a simulated piece of equipment.
3. **Resources:** Cleaning supplies (such as cleaning solutions, sponges, brushes, towels), personal protective equipment (such as gloves, goggles, masks), simulated equipment, cleaning checklists or protocols
4. **Duration of the activity:** 30 minutes
5. **Steps Involve:**
    - Divide participants into groups of three to four people.
    - Provide each group with a simulated piece of equipment and a cleaning checklist or protocol.
    - Instruct participants to disassemble the equipment, clean each component with appropriate cleaning supplies, and reassemble the equipment according to the cleaning checklist or protocol.
    - Remind participants to wear appropriate personal protective equipment, such as gloves and goggles, during the cleaning process.
    - Set a time limit of 20 minutes for participants to complete the cleaning and reassembly process.
    - After the allotted time, ask each group to present their cleaned and reassembled equipment to the rest of the class.
    - Ask the class to evaluate each group's cleaning and reassembly process based on the cleaning checklist or protocol provided.
    - Debrief the activity by discussing any challenges or successes participants experienced during the cleaning and reassembly process, and reinforce the importance of post-production cleaning and maintenance for equipment longevity and product quality.

6. **Outcome:** The participants will be able to practically apply the knowledge and skills learned in the session by completing a simulated post-production cleaning and maintenance task. This activity will also reinforce the importance of following cleaning checklists or protocols and using appropriate personal protective equipment during the cleaning process.

Notes for Facilitation

- Encourage participants to work together and communicate effectively to ensure that each compo-nent of the equipment is thoroughly cleaned.
- Remind participants to follow safety protocols and wear personal protective equipment when handling cleaning solutions or disassembling equipment.
- Observe participants as they complete the simulation to provide feedback and support, and to ad-dress any questions or concerns they may have.
- Use the cleaning checklist or protocol as a guide to evaluate participants' cleaning and maintenance skills, and provide constructive feedback to help them improve.
- Use this activity as an opportunity to reinforce the importance of post-production cleaning and maintenance in maintaining equipment functionality and ensuring product safety.

Answers to Exercises for PHB

1. Fill in the blanks with the correct option.

a. i. complete
b. i. sense of sight, smell and taste
c. iii. Clot on boiling
d. i. –36 to –35°C
e. i. pasteurising
f. iv. assist
g. ii. Filtration
h. i. ageing
i. iv. semi-solid
j. ii. Excess

2. Arrange the following in the right sequence.

1. Selecting ingredients
2. Preparing the formulation
3. Blending ingredients
4. Homogenising the mix
5. Pasteurising the mix
6. Cooling the mix
7. Ageing the mix
8. Freezing the mix
9. Hardening and storing
10. Sending for dispatch

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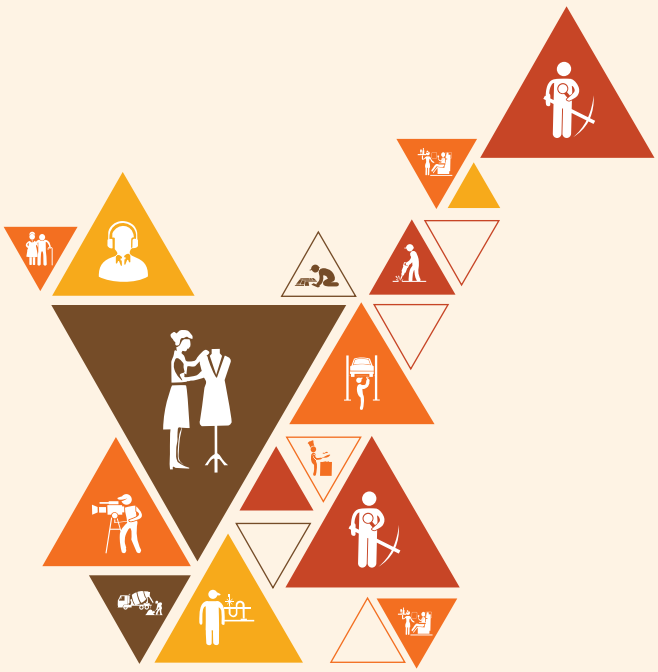
FICSI
Food Industry Capacity and Skill Initiative

6. Complete Documentation and Record Keeping Related to Production of Ice Cream

Unit 6.1 - Documentation and Record Keeping



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Key Learning Outcomes

At the end of this module, the students will be able to:

1. State the need for documenting and maintaining records of raw materials, process, and finished
2. products;
3. State the method of documenting and recording the details of raw material to final finished
4. product;
5. State ERP system and maintaining documentation via ERP

Unit 6.1: Documentation and Record Keeping

Unit Objectives

At the end of this unit, students will be able to:

1. State the need for documenting and maintaining records of raw materials, process, and finished products.
2. State the method of documenting and recording the details of raw material to final finished product.

Resources to be Used

Participant handbook, Projector, Laptop/Computer with the internet, White Board, Flip Chart, Markers, PowerPoint presentation on Documentation and Record Keeping.

Say

- Good morning trainees, today, we will learn about Documentation and Record Keeping.
- In this session, we will learn about the importance of documentation and how it can help in con-trolling product quality, identifying costs, and ensuring smooth operations.
- We will also discuss the different types of records that should be maintained by food processing organizations and how to keep them accurately.
- Towards the end, we will discuss ERP solutions and how they can help streamline documentation and record-keeping processes.

Do

- Begin by asking the trainees about their current record-keeping practices and any challenges they face. This will help set the context for the session and also give an idea of the trainees' prior knowledge.
- Introduce the need for documentation and record-keeping in food processing organizations. High-light how it can help in ensuring quality, identifying costs, and meeting legal requirements.
- Cover the types of records that should be maintained, including production logs, stock control books, processing log books, and sales records. Explain how to maintain these records accurately and efficiently.
- Elaborate on the importance of batch numbers and how they are used to track production and sales. Discuss how standard formulations and process parameters help maintain consistent prod-uct quality.

Ask

- What types of records do you currently maintain in your organization?
- What challenges do you face in maintaining accurate records?

Elaborate

- Need for Documentation

  Documentation is important in the food industry to ensure that food products are safe, comply with regulations, and meet customer expectations. It involves recording and main-taining accurate and complete information about production processes, ingredients, quali-ty control, and other aspects of food production. Documentation helps to facilitate tracea-bility, identify and correct problems, and improve efficiency and productivity.

- How to Keep Records?

  Keeping accurate and organized records is essential for effective documentation in the food industry. It involves establishing standard operating procedures (SOPs) for record-keeping, using appropriate forms and templates, ensuring that data is entered and verified correctly, and storing records in a secure and accessible manner. Good record-keeping practices can help to reduce errors, support decision-making, and facilitate compliance with regulatory requirements.

- Introduction to ERP Solutions

  Enterprise resource planning (ERP) solutions are software systems that integrate and manage various business functions, including production, inventory, finance, and customer service. In the food industry, ERP solutions can provide real-time visibility and control over production processes, improve inventory management, streamline supply chain opera-tions, and enhance quality control. They can also help to automate routine tasks, reduce errors, and increase efficiency and productivity.

Activity

1. **Activity Name:** Record-keeping Challenge
2. **Objective:** To apply the principles of documentation and record-keeping in a real-life scenario.
3. **Resources:** Handouts with examples of production logs and record-keeping templates, pens/pencils.
4. **Duration of the activity:** 20-30 minutes
5. **Steps involved:**
   - Divide the trainees into small groups of 3-4.
   - Provide them with a real-life scenario (e.g. a new product launch, a sudden increase in demand) and ask them to create a record-keeping plan for the scenario.
   - Give them handouts with examples of production logs and record-keeping templates to help them get started.
   - Allow 15-20 minutes for the groups to work on their record-keeping plans.
   - Once the time is up, ask each group to present their record-keeping plan to the class.
   - Encourage the class to ask questions and give feedback on each other's plans.
   - Discuss as a class the importance of record-keeping and the challenges faced in keeping accurate records.
   - Provide any additional information or feedback as needed.
6. **Outcome:** Trainees will apply the principles of documentation and record-keeping in a real-life scenario. Also trainees will learn from other groups' ideas and receive feedback on their own ideas.

Notes for Facilitation

- Encourage group participation and discussion during the activity.
- Allow each group sufficient time to work on their record-keeping plan.
- Provide positive feedback on each group's ideas.
- Emphasize the importance of accurate record-keeping for the success of a business.
- Encourage the trainees to ask questions and provide feedback to each other during the group presentations.

Answers to Exercises for PHB

1. Tick the correct options.

a.

i. It gives detailed knowledge about the running of a business.

ii. It helps to control product quality.

iii. It helps to keep track of the money invested in the business.

iv. It helps to identify the separate costs of raw material or product ingredients.

v. It helps to identify the production cost of a particular process.

vii. It helps to ensure that quality assurance procedures are followed.

viii. It helps to ensure that the production unit is running smoothly/effectively.

ix. It works as an evidence for legal procedures.

xii. It helps to set an appropriate product price.

xiii. It helps to take corrective measures at the right time.

b.

i. the quantity and type of raw materials.

iii. the quantity and type of ingredients used.

iv. the processing conditions in which production took place (e.g. the temperature set or the air pressure applied).

v. the product quality.

2. Match the columns

a. Every production process completed is given a number ii. Batch number
b. The details of raw material procurement is noted i. Stock control books
c. The details of production process is noted v. Processing log books
d. The details of product sales is recorded vi. Sales and distribution log
e. Records serve as iv. Legal evidence
f. Properly maintained records help to identify whether iii. Quality procedures are followed

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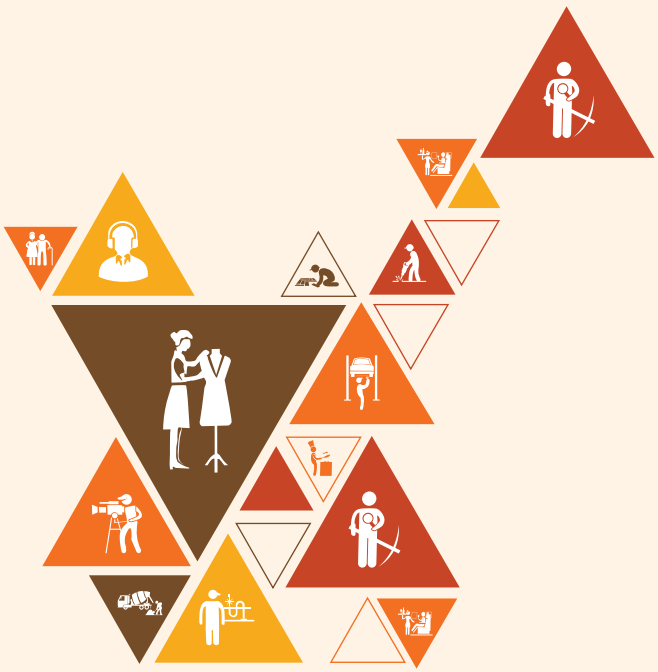
Food Industry Capacity and Skill Initiative

7. Employability Skills



DGT/VSQ/N0101

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Employability Skills

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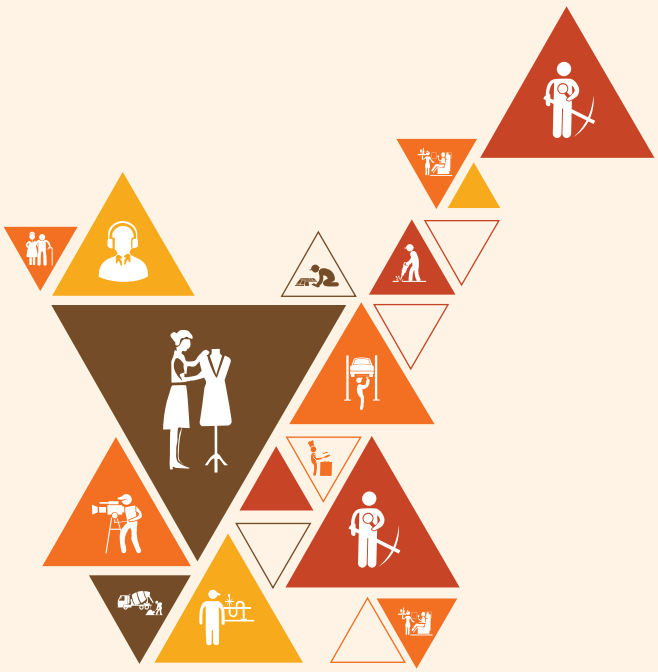
8. Annexures

Annexure I: Training Delivery Plan

Annexure II: Assessment Criteria

Annexure III: List of QR Codes Used in PHB



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	Ice Cream Processing Technician		
Qualification Pack Name & Ref. ID	FIC/Q2004, V3.0		
Version No.	3.0	**Version Update Date**	29-07-2021
Pre-requisites to Training (if any)	1. Food standards and regulations 2. Operating different types of dairy processing equipment 3. Packaging technology 4. GMP 5. HACCP 6. QMS 7. Computer basics and ERP system followed by the organization 8. Training in Food Safety Standards and Regulations (as per FSSAI) (Mandatory)		
Training Outcomes	**By the end of this program, the participants will be able to:** 9. Produce all types of ice-cream in semi-automated and fully automated units 10. Handle ice-cream processing machineries while maintaining process parameters 11. Plan production sequence as per production order 12. Document and record necessary as required in the work process 13. Observe food safety and hygiene standards at work.		

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
1	**Introduction to the training program**	**Introduction to food processing and the role of Ice cream processing technician**	• Introduce each other and build rapport with fellow participants and the trainer. • Explain food processing. • List the various sub-sectors of food processing industry • Discuss the future trends and career growth opportunities available to ice cream processing technician in the food processing industry.	FIC/N2013, v1.0 KU1, KU2, KU3, KU4, KU5	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	2 Theory (02:00) Practical (0:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
			• Summarize the key roles and responsibilities of ice cream processing technician. • Discuss the organizational standards and norms				
2	**Prepare and maintain work area and process machineries**	**Cleaning and Maintaining the Work Area**	• List the materials and equipment used in the cleaning and maintenance of the work area • Demonstrate the process of preparing the work area for scheduled production.	FIC/N2013, v1.0 PC1, PC2, KU9, KU10, KU11, KU12, KU13	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, White/ Black board/ Chart paper, Markers/ computer and projector, Trainer's guide, student handbook, approved sanitizers for cleaning of the work area and machineries, approved lubricators, dustbins, necessary tools to attend minor repair work in process machinery, Motor (AC), Different Size of Stainless Steel (SS) Pipes, Different Size of Angles (SS),	8 Theory (03:00) Practical (05:00)
		Understanding Cleaning and Sanitization Methods	• Describe the methods of cleaning and sanitization. • List the common detergents and sanitizers used in cleaning work area and machineries.	FIC/N2013, v1.0 PC1, PC2, KU9, KU10, KU11, KU12, KU13			8 Theory (03:00) Practical (05:00)
		CIP and SIP Cleaning Methods	• Describe CIP method of cleaning. • Describe SIP method of cleaning.	FIC/N2013, v1.0 PC1, PC2, KU9, KU10, KU11, KU12, KU13			7 Theory (02:00) Practical (05:00)
		Preparing Work Area for Ice Cream Processing	• Show how to clean the work area and machineries to prepare for ice cream processing. • Describe the functions to be carried out before starting production.	FIC/N2013, v1.0 PC1, PC2, KU9, KU10, KU11, KU12, KU13			7 Theory (02:00) Practical (05:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Waste Management	• Explain the method of managing and disposing waste material.	FIC/N2013, v1.0 PC3, KU13		Different Size of Joint (SS), Different Size of Valves(SS), Plates of Heat Exchanger(SS), mixy, Weighing Machine, gas with burners and cream freezer	7 Theory (02:00) Practical (05:00)
		Maintenance Procedure for Dairy Processing Machineries	• Explain the maintenance procedure to be followed for dairy processing machineries before starting production	FIC/N2013, v1.0 PC4, PC5, PC6, PC7, PC8, KU8			7 Theory (02:00) Practical (05:00)
		Maintenance of Tools and Machines	• List the different types of maintenance procedures. • Show how to maintain the tools and machines utilised for production.	FIC/N2013, v1.0 PC4, PC5, PC6, PC7, PC8, KU8			7 Theory (02:00) Practical (05:00)
		Repairing Process Machinery	• Display the procedure to rectify faults and minor repairs in process machinery.	FIC/N2013, v1.0 PC4, PC5, PC6, PC7, PC8, KU8			7 Theory (02:00) Practical (05:00)
2	**Produce Ice Cream**	**Planning for Production Maximization**	• Describe the process of planning production sequence to maximize capacity utilization of resources. • Apply basic mathematics for various calculations in day-to-day processes.	FIC/N2014, v1.0 PC1, PC2, PC3 PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, KU15	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	8 Theory (03:00) Practical (05:00)
		Understanding Operational Efficiency in Production	• Plan the production schedule as per organizational standards and instructions. • List the factors affecting operation efficiency during production.	FIC/N2014, v1.0 PC1, PC2, PC3 PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, KU15			8 Theory (03:00) Practical (05:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Raw Material Management Part - 1	• List the ingredients required for production. • Check the raw material quality and grade. • Prepare the raw material for production.	FIC/N2014, v1.0 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19			8 Theory (03:00) Practical (05:00)
		Raw Material Management Part - 2	• Inspect the conformance of raw material quality to company standards. • Organize quality raw material as per production process and company standards.	FIC/N2014, v1.0 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19			7 Theory (02:00) Practical (05:00)
		Raw Material Management Part - 3	• Explain the methods for storing raw materials for later use.	FIC/N2014, v1.0 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19			7 Theory (02:00) Practical (05:00)
		Effective Production Scheduling Part - 1	• List the raw materials, packaging materials, manpower, equipment and machineries for the scheduled production.	FIC/N2014, v1.0 PC1, PC2, PC3 PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, KU15			8 Theory (03:00) Practical (05:00)
		Effective Production Scheduling Part - 2	• Calculate batch size and prioritize urgent orders based on the production schedule and machine capacity.	FIC/N2014, v1.0 PC1, PC2, PC3 PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, KU15			7 Theory (02:00) Practical (05:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Effective Production Scheduling Part - 3	• Plan the production sequence to maximize capacity, utilization of resources, manpower and machinery.	FIC/N2014, v1.0 PC1, PC2, PC3 PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, KU15			7 Theory (02:00) Practical (05:00)
3	**Carry out processing of Ice-Cream**	**Production process of Ice-cream and frozen dessert**	• Explain the process for producing various types of ice-cream and frozen dessert.	FIC/N2015, v1.0 PC1, PC2, PC3, PC4, PC5, PC6, KU9, KU10, KU11	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook, Different Size of Valves (SS), Plates of Heat Exchanger (SS), Mixy, Muslin Cloth, Weighing Machine, Milk Sampling Bottle, Milk Stirrer, Nut bolts (different Sizes), Can (Aluminum/ SS), Thermometer, Test Tube (Glass), Test Tube Holder, Gas with Burner, Measurement Cane, Utensils to Heat the Milk, Joints/ angles Opener, Cream Freezer, Fillers,	8 Theory (02:00) Practical (06:00)
		Making and handling Ice Cream Mix Part - 1	• List the composition of different types of ice-cream.	FIC/N2015, v1.0 PC1, PC2, PC3, PC4, PC5, PC6, KU9, KU10, KU11			8 Theory (02:00) Practical (06:00)
		Making and handling Ice Cream Mix Part – 2	• Demonstrate the process of making the mix.	FIC/N2015, v1.0 PC1, PC2, PC3, PC4, PC5, PC6, KU9, KU10, KU11			8 Theory (02:00) Practical (06:00)
		Making and handling Ice Cream Mix Part - 3	• Describe the method of pre-heating ice- cream mix. • Discuss the method of ageing the ice-cream mix.	FIC/N2015, v1.0 PC7, PC8, PC9, PC10, PC11, PC12, PC13			8 Theory (02:00) Practical (06:00)
		Making and handling Ice Cream Mix Part - 4	• Demonstrate the method of blending the ice-cream mix. • Perform the process of filtration for making an ice-cream mix.	FIC/N2015, v1.0 PC7, PC8, PC9, PC10, PC11, PC12, PC13			8 Theory (02:00) Practical (06:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Making and handling Ice Cream Mix Part - 5	• Demonstrate the method of homogenization of ice-cream mix. • Perform pasteurization of ice-cream mix.	FIC/N2015, v1.0 PC7, PC8, PC9, PC10, PC11, PC12, PC13		Wrappers and Packers, Moulds (Ice Cream Moulds)	8 Theory (02:00) Practical (06:00)
		Making and handling Ice Cream Mix Part - 6	• Demonstrate the method of cooling the ice- cream mix. • Demonstrate the method of freezing the ice-cream mix.	FIC/N2015, v1.0 PC7, PC8, PC9, PC10, PC11, PC12, PC13			8 Theory (02:00) Practical (06:00)
		Understanding Overrun in Ice Cream and Frozen Desserts	• State the method of estimating the overrun in ice-cream and frozen dessert.	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)
		Importance of Quality Control in Ice Cream Production	• Describe quality parameters analyzed in ice cream production	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)
		Producing Frozen Desserts	• Demonstrate the process of producing frozen desserts.	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Producing plain and Premium ice-cream	• Demonstrate the process of producing plain ice-cream. • Demonstrate the process of producing premium ice-cream	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)
		Producing kulfi and syrup	• Demonstrate the process of producing kulfi. • Demonstrate the process of producing syrup.	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)
		Effective Packag-ing of Ice Cream	• List the factors to consider during the packing of ice-cream. • List the materials used for packaging ice- cream.	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)
		Method of Hard-ening and Storage in Ice-cream	• Explain the method of hardening and storage in ice-cream.	FIC/N2015, v1.0 PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, pC22, PC23, pC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, KU15, KU16			8 Theory (02:00) Practical (06:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
		Post-production cleaning methods	• Describe post-production cleaning methods and waste management procedures • Demonstrate the process of cleaning the work area and machineries after production	FIC/N2015, v1.0 PC32, PC33, PC34, PC35, KU19, KU20, KU21, KU22, KU23, KU24			8 Theory (02:00) Practical (06:00)
4	**Document and record information**	**Documentation and Recording**	• Discuss the importance of documentation and maintaining records during the entire work process.	FIC/N2016 v1.0 PC1, PC2, PC3, PC4, KU9	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, Food safety manual, log books	8 Theory (03:00) Practical (05:00)
		Production Work Record-Keeping	• List of information to be recorded as per the production work. • Document necessary information such as production plan, process parameters, and finished products.	FIC/N2016 v1.0 PC5, PC6, PC7, PC8, PC9, PC10, KU10, KU11, KU12			8 Theory (03:00) Practical (05:00)
		Effective Record Keeping	• Prepare records to record information as per production and organizational requirements.	FIC/N2016 v1.0 PC5, PC6, PC7, PC8, PC9, PC10, KU10, KU11, KJU12			7 Theory (02:00) Practical (05:00)
		ERP and its Importance in Documentation Management	• State ERP and maintaining documentation via ERP	FIC/N2016 v1.0 PC11, PC12, PC13, PC14, PC15, KU12, KU13, KU14			7 Theory (02:00) Practical (05:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
5	**Ensuring food safety, personal hygiene and workplace sanitation**	**Workplace safety and hygiene**	• Discuss the importance of safety, hygiene and sanitation in the dairy processing. • Demonstrate the steps to be performed to maintain a safe and hygiene workplace.	FIC/N9001 v1.0 PC13, PC14, PC15, PC16, PC17, KU18	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, Protective gloves, head caps, aprons, safety goggles, safety boots, mouth covers, sanitizer, food safety manual, logbooks etc.	8 Theory (03:00) Practical (05:00)
		HACCP Principles in the Dairy Industry	• Discuss the relevant HACCP principles to be followed in the dairy industry. • Demonstrate the steps to be performed to implement HACCP practices for ensuring food safety.	FIC/N9001 v1.0 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, KU19, KU20, KU21, KU22			8 Theory (03:00) Practical (05:00)
		GMP Procedures	• Describe GMP procedures as per FSSAI guidelines and GHP	FIC/N9001 v1.0 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, KU19, KU20, KU21, KU22			7 Theory (02:00) Practical (05:00)
		Types of Workplace Hazards and Prevention Measures	• Describe Hazards and its type • Roleplay a situation depicting the safety practices to be followed at the workplace.	FIC/N9001 v1.0 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, KU19, KU20, KU21, KU22			7 Theory (02:00) Practical (05:00)

SL	Module Name	Session Name	Session Objectives	NOS	Methodology	Training Tools/Aids	Duration (hours)
Total							Theory Duration 102:00 Practical Duration 288:00
OJT							00:00
Employability Skills (DGT/VSQ/N0101)							30:00
Total Duration							Theory + Practical + OJT + ES 330:00

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Ice Cream Processing Technician	
Job Role	**Ice Cream Processing Technician**
Qualification Pack	**FIC/Q2004, V3.0**
Sector Skill Council	**Food Processing**

S. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
2	Assessment will be conducted for all compulsory NOS, as well as the selected elective NOS/set of NOS.
	OR
4	Assessment will be conducted for all compulsory NOS, as well as the selected optional NOS/set of NOS.
5	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
6	Individual assessment agencies will create unique evaulations for skill practical for every student at each examination/training center based on this criteria
7	To pass the Qualification Pack , every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
8	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

Assessable Outcomes	Assessment Criteria for Outcomes	Marks Allocation	
		Theory	Practical
FIC/N2013: Prepare and maintain work area and process machineries for production of ice cream	PC1. clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	10	15
	PC2. ensure that work area is safe and hygienic for food processing	3	7
	PC3. dispose waste materials as per organisation standards and industry requirements	5	10
	PC4. check the working and performance of all machineries and equipments used for process such as homogenizer, pasteurizer, heat exchanger, packaging machines, etc.	5	10
	PC5. clean the machineries and tools used with recommended sanitizers following specifications and organisation standards	5	10
	PC6. place the necessary tools required for process	2	3
	PC7. attend minor repairs/faults of all machines, if required	2.5	5
	PC8. select and set the machines and tools required	2.5	5
	NOS Total	**35**	**65**

FIC/N2014: Prepare for production of ice cream	PC1. read and understand the production order from the supervisor	4	6
	PC2. check the availability of raw materials, packaging materials, equipment and manpower	2	3
	PC3. support in planning production sequence by selecting products that does not impact the quality of the other avoiding CIP after each product using the same equipment and machinery for various products planning maximum capacity utilization of machineries considering the process time for each product planning efficient utilization of resources/manpower prioritizing urgent orders	5	10
	PC4. calculate the batch size based on the production order and machine capacity	2	3
	PC5. calculate the raw material requirement (considering the process loss) to produce the required quantity of finished product(s)	2	3
	PC6. calculate the raw materials (including ingredients), packaging materials and manpower requirement for the completing the order	2	3
	PC7. read and understand the production order from the supervisor	2	5
	PC8. ensure working and performance of all machineries required for process	2	5
	PC9. report supervisor on any malfunctions of machine	1	2
	PC10. calculate the process time for effective utilization of machineries and manpower	1	2
	PC11. allot responsibilities/ work to the assistants and helpers	1.5	3.5
	PC12. refer process chart/ product flow chart/formulation chart for product(s) produced	0.5	1.5
	PC13. weigh the raw materials and ingredients required for the batch	0.5	1.5
	PC14. check the conformance of raw material by verifying the quality analysis report and assessing its physical parameters	2	3
	PC15. connect pipes between holding tanks and process equipment	2	3
	PC16. assemble fittings, valves, bowls, impeller shaft, strainers and other parts to equipment to prepare for production	1	4
	PC17. start machine and check the working condition and performance of the machine	2	3
	PC18. make minor adjustments and repairs (if required)	2	3
	PC19. keep the tools accessible to attend repairs/faults in case of breakdown	0.5	0.5
	NOS Total	**35**	**65**
FIC/N2015: Produce ice cream	PC1. sterilize the processing equipments before process by opening valves or pumping recommended sterilizing solution and rinse water through pipes	0.5	1.5
	PC2. check the quality of raw materials through physical parameters by verifying the quality report	1	1
	PC3. set and control metering devices or open valves or start pump to allow measured quantity of liquid ingredient into the mixing tank following the SOP	2	3
	PC4. adjust valves to control the speed of agitators to mix liquid ingredients	1	2
	PC5. weigh the dry ingredients like skim milk powder, sugar, emulsifiers, stabilizers, etc required for the batch and pre blend, and add into the liquid ingredients in the mixing tank following the SOP	2	4
	PC6. control the speed of agitators and set timer to mix dry and wet ingredients to make ice-cream mix	0.5	1.5
	PC7. pump ice-cream mixture into the pasteurization tank	0.5	0.5
	PC8. turn valves to admit steam and control steam pressure by adjusting valves to heat ice-cream mixture in the pasteurization tank, set and control time and speed of the agitator in the pasteurization tank to stir the ice-cream mixture	2	3

	PC9. open valves to transfer the pasteurized ice cream mix into the homogenizer, turn valves to admit steam and control pressure of the homogenizer to homogenize mixture at high pressure to break fat globules in mixture and obtain smooth texture	2	3
	PC10. open valves to pass the homogenized mixture into heat exchangers for cooling	0.5	0.5
	PC11. turn valves of the coolant pipes to pass coolant (like refrigerated water, glycol etc) to cool the homogenized mixture	0.5	0.5
	PC12. transfer the cooled homogenized mixture into refrigerated storage tank for ageing to improve whipping qualities, body and texture of ice cream, control and maintain time and temperature of the refrigerated storage tank during ageing process	2	3
	PC13. measure required quantity of flavour and colour in the flavour tank and start the pump to transfer flavour and colour into the aged mixture in the refrigerated storage tank	0.5	1.5
	PC14. open valve and pass the flavoured homogenized mixture into the dynamic freezer, and turn valves of the coolant pipes of the dynamic freezer to pass refrigerant to cool the mixture to achieve required freezing temperature	0.5	1.5
	PC15. adjust and control the speed of whipper blades in the freezer to whip ice-cream mixture to incorporate air and to convert liquid mixture to soft and smooth solid of soft serve ice-cream	0.5	1.5
	PC16. check the quality of the ice cream through physical parameters like colour, appearance, flavour, texture, taste etc	1	1
	PC17. measure coating ingredients (such as chocolate, fruit juice, color, water, flavor, sugar, acid, stabilizers etc) to prepare coating material for frozen ice-cream, start pump to transfer the coating ingredients into the enrobing tank, turn steam valves to heat contents in the enrobing tank to specified temperature to prepare ice-cream coating material	2	3
	PC18. measure centre filling ingredients such as chocolate, fruits, nuts, color, flavor, sugar, stabilizers etc, and prepare centre filling material following sop, start pump or manually transfer centre filling material into the centre filling machine	2	3
	PC19. set the ice-cream packaging machine for filling volume, start the packaging machine to fill soft serve ice-cream directly from the freezer into cone or other packaging materials like plastic/laminated paper containers	1	2
	PC20. position the filler of the centre filling machine, set the filling quantity , and start machine to inject the filling material into the centre of the ice-cream in cone/cup/containers (for centre filled ice-cream)	1	2
	PC21. pack the primary packed ice-cream in cartons and transfer the cartons to hardening room for hardening ice cream, and maintain the temperature of the hardening room following the SOP (batch process)	1	2
	PC22. transfer the hardened ice-cream into frozen storage area and maintain storage temperature	0.5	1.5
	PC23. start the packaging machine to fill measured quantity of ice-cream in liquid form into the moulds, start machine to insert stick into the moulded ice- cream, maintain required temperature to harden ice- cream, start machine that pass hardened ice-cream over the enrobing tank and dip ice cream in the coating material (for coated ice-creams)	2	3
	PC24. insert forming fixtures in nozzles of ice cream feed lines that extrude specified shape of ice cream like bar, roll, swirl shape etc, load sticks to insert into icecream, and start machine that cut extruded ice- cream ribbon into measured portions	1	2

	PC25. start machines that deposit ice-cream on conveyor belts moving through hardening tunnels or spiral freezers for hardening the ice-cream quickly to minimize ice crystal size and stabilize the foam (continuous process)	1	4
	PC26. turn valves and set thermostat to circulate refrigerant and maintain specified temperature in hardening tunnel or spiral freezer	1	2
	PC27. observe deposited ice-cream bars in hardening tunnels or spiral freezers, control and maintain speed of the conveyor and depositing machine, and temperature of the hardening tunnel or spiral freezer	0.5	1.5
	PC28. adjust setting and start the packaging machine to wrap/pack the ice-cream in primary packaging material, pack the wrapped/ primary packed ice-cream in cartons	0.5	1.5
	PC29. sample finished product and transfer to quality lab for analysis and conformance to standards	0.5	0.5
	PC30. transfer the cartons to storage area and maintain storage temperature	0.5	0.5
	PC31. report malfunction/discrepancies/concerns to department supervisor for immediate action	0.5	0.5
	PC32. turn valves or pump recommended sterilizing solution and rinse water through pipes for cip(clean-in- place) of tanks and processing equipment following SOP	1	3
	PC33. clean the work area using recommended cleaning agents and sanitizers	0.5	1.5
	PC34. attend minor repairs/faults of all machines (if any)	0.5	1.5
	PC35. ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or suppliers instructions/manuals	1	1
	NOS Total	**35**	**65**
FIC/N2016: Complete documentation and record keeping related to production of ice cream	PC1. document and maintain records of raw material such as type of raw materials, supplier details, receiving date/ date of manufacture, expiry date, quality parameters for all raw materials, internal quality analysis report, storage condition etc, as per company standards	6	4
	PC2. maintain record of observations (if any) related to raw materials	3	2
	PC3. load the raw materials details in ERP for future reference	3	2
	PC4. verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits	3	2
	PC5. document production details such as products handled, production sequence, equipments and machinery details, efficiency and capacity utilization of equipment etc	6	4
	PC6. document process details such as type or raw material used, process parameters like temperature, time, pressure etc (as applicable) for entire production in process chart or production log for all products produced	9	6
	PC7. document batch size, production yield, and wastage of raw materials, energy utilization and final products produced	6	4
	PC8. maintain record on observations (if any) or deviations related to production and process	3	2
	PC9. load the production and process details in ERP for future reference	3	2
	PC10. verify documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits	3	2
	PC11. document and maintain records on the types of finished products produced	2	1

	PC12. document the finished products details such as name of the product, batch number, time of packing, date of manufacture, date of expiry, other label details, primary, secondary and tertiary packaging materials for all finished products, storage conditions etc, as per organisation standards	4	3
	PC13. maintain record on observations or deviations (if any) related to finished products	3	2
	PC14. load the finished product details in ERP for future reference	3	2
	PC15. verify the documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits	3	2
	NOS Total	**60**	**40**
FIC/N9001: Ensure food safety, hygiene and sanitation for processing food products	PC1. comply with food safety and hygiene procedures followed in the organization	2	3
	PC2. ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.	1	5
	PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products etc. for compliance to physical, chemical and microbiological parameters	2	3
	PC4. pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations	4	6
	PC5. clean, maintain and monitor food processing equipment periodically, using it only for the specified purpose	2	3
	PC6. use safety equipment such as fire extinguisher, eye wash unit, first aid kit when required	4	6
	PC7. follow housekeeping practices by having designated area for machines/ tools	2	3
	PC8. follow industry standards like GMP, HACCP and product recall process	4	6
	PC9. attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control andprevent them	1	4
	PC10. Identify, document and report problems such as rodents and pests to management	1	4
	PC11. conduct workplace checklist audit before and after work to ensure safety and hygiene	1	4
	PC12. document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system	1	3
	PC13. determine the quality of food using criteria such as odour, appearance, taste and best before date, and take immediate measures to prevent spoilage	2	3
	PC14. store raw materials, finished products and allergens separately to prevent cross contamination	2	3
	PC15. label raw materials and finished products and store them in different storage areas according to safe food practices	2	3
	PC16. follow stock rotation based on FEFO/FIFO	4	6
	NOS Total	**35**	**65**

DGT/VSQ/N0101: Employability Skills (30 Hours)	Introduction to Employability Skills	1	1
	PC1. understand the significance of employa-bility skills in meeting the job requirements	-	-
	Constitutional values – Citizenship	1	1
	PC2. identify constitutional values, civic rights, duties, personal values and ethics and envi-ronmentally sustainable practices	-	-
	Becoming a Professional in the 21st Century	1	3
	PC3. explain 21st Century Skills such as Self- Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultur-al awareness, emotional awareness, continu-ous learning mindset etc.	-	-
	Basic English Skills	2	3
	PC4. speak with others using some basic Eng-lish phrases or sentences	-	-
	Communication Skills	1	1
	PC5. follow good manners while communicating with others	-	-
	PC6. work with others in a team	-	-
	Diversity & Inclusion	1	1
	PC7. communicate and behave appropriately with all genders and PwD	-	-
	PC8. report any issues related to sexual har-assment	-	-
	Financial and Legal Literacy	3	4
	PC9. use various financial products and services safely and securely	-	-
	PC10. calculate income, expenses, savings etc.	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-
	Essential Digital Skills	4	6
	PC12. operate digital devices and use its fea-tures and applications securely and safely	-	-
	PC13. use internet and social media platforms securely and safely	-	-
	Entrepreneurship	3	5
	PC14. identify and assess opportunities for po-tential business	-	-
	PC15. identify sources for arranging money and associated financial and legal challenges	-	-
	Customer Service	2	2
	PC16. identify different types of customers	-	-
	PC17. identify customer needs and address them appropriately	-	-
	PC18. follow appropriate hygiene and grooming standards	-	-
	Getting ready for apprenticeship & Jobs	1	3
	PC19. create a basic biodata	-	-
	PC20. search for suitable jobs and apply	-	-
	PC21. identify and register apprenticeship op-portunities as per requirement	-	-
	NOS Total	**20**	**30**

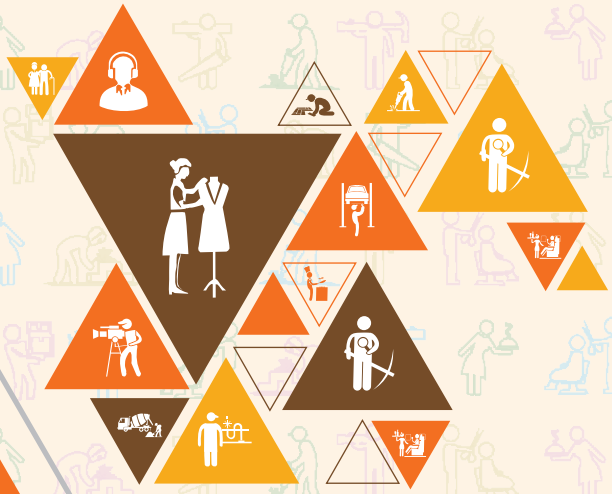
Annexure III

List of QR Codes Used in PHB

Module No.	Unit No.	Topic Name	Page No in PHB	Link for QR Code (s)	QR code (s)
1. Introduction	UNIT 1.2: Introduction to the Food Processing Industry	1.2.1 Food Processing	11	https://www.youtube.com/watch?v=J-2EiMVNtpM&t=23s	Overview of Food Processing Industry
	UNIT 1.3: Introduction to the Dairy Industry in India	1.3.2 Dairy Industry in India	11	https://www.youtube.com/watch?v=4XuvGYvKGnE	Overview of Dairy Industry
		1.3.1 Need for Processing Milk	11	https://www.youtube.com/watch?v=jTcvrizLEP4	Orientation video
	UNIT 1.4: Attributes of an Ice Cream Processing Technician	1.4.1 Roles and Responsibili-ties	11	https://www.youtube.com/watch?v=-2CmMaIbDjE	Introduction to Ice-cream processing
		1.4.1 Roles and Responsibili-ties	11	https://www.youtube.com/watch?v=HUAtwVcVbgU	Roles and Responsibilities

Module No.	Unit No.	Topic Name	Page No in PHB	Link for QR Code (s)	QR code (s)
2. Food Safety, Hygiene and San-itation for Processing Food Products	UNIT 2.3: Good Manufactur-ing Practices (GMP)	2.3.1 Good Manufacturing Practices (GMP)	33	https://www.youtube.com/watch?v=RS4A-uczS6E&t=489s	GMP,GHP & FSMS
	UNIT 2.1: Sanitation and Hy-giene	2.1.1 Personal Sanitation	33	https://www.youtube.com/watch?v=CD0XLUutibk&t=40s	Cleaning facilities
	UNIT 2.5: Introduction to Food Safety	2.5.2 Food Safety Hazard and Risk	33	https://www.youtube.com/watch?v=iq8jOuZ5k6k&t=22s	Pest Control Program
3. Prepare and Maintain Work Area and Process Machineries for Production of Ice Cream	UNIT 3.2: Sanitisation of the Work Area	3.2.1 Cleaning & Sanitizing Work Area, Machinery, Tools, and Equipment	55	https://www.youtube.com/watch?v=doOhWost2io	Facilities and Utilities
	UNIT 3.1: Usage and Mainte-nance of Equipment in Dairy Processing Plant	3.1.1 Equipment Used in Dairy Processing	55	https://www.youtube.com/watch?v=ftogJKHQAX4	Equipments used in Ice-cream processing industry
5. Produce Ice Cream	UNIT 5.4: Introduction to Ice Cream	5.4.1 Production of Ice Cream	97	https://www.youtube.com/watch?v=R7kpys-iiRU	Manufacturing Process of Ice-cream

Module No.	Unit No.	Topic Name	Page No in PHB	Link for QR Code (s)	QR code (s)
	UNIT 5.6: Producing Ice Cream	5.6.1 Figuring the Mix	97	https://www.youtube.com/watch?v=uf7wGAXg4b8	Demonstration video on Ice-cream processing
	UNIT 5.4: Introduction to Ice Cream	5.4.1 Production of Ice Cream	97	https://www.youtube.com/watch?v=TarvglQ3cPg&t=4s	Details on setting an Ice-cream Industry
	UNIT 5.7: Packaging, Harden-ing and Storage of Ice Cream	5.7.2 Hardening and Storage of Ice Cream	97	https://www.youtube.com/watch?v=aOsebi8cAzA	Storage Facility
		5.7.1 Packaging	97	https://www.youtube.com/watch?v=kAO6VRXH7jg	Packaging and Storage of Ice-cream
		5.7.1 Packaging	97	https://www.youtube.com/watch?v=vFbDzfCpy54	Packaging technology for Ice-cream
Employability Skills (30 Hrs)				https://www.skillindiadigital.gov.in/content/list	



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