NCVET
कौशल गुणवत्ता प्रगति

Skill India
कौशल भारत - कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
RE IMAGINE FUTURE

FICSI
Food Industry Capacity and Skill Initiative

Participant Handbook

Sector
Food Processing

Sub-Sector
Multi Sectorial

Occupation
Production

Reference ID: **FIC/Q9005, Version 3.0**
NSQF level 2

Industrial Production Worker - Food Processing

Published by

Food Industry Capacity & Skill Initiative (FICSI)

Shriram Bharatiya Kala Kendra, 1, Copernicus Marg, Mandi House, New Delhi-110001

Email: admin@ficsi.in

Website: www.ficsi.in

Phone: +91-97112 60230, +91-97112 60240

First Edition, January 2023

This book is sponsored by Food Industry Capacity & Skill Initiative (FICSI)

Printed in India by FICSI

Disclaimer

The information contained herein has been obtained from various reliable sources. Food Industry Capacity & Skill Initiative (FICSI) disclaims all warranties to the accuracy, completeness or adequacy of such information. Food Industry Capacity & Skill Initiative shall have no liability for errors, omissions, or inadequacies, in the information contained herein, or for interpretations thereof. Every effort has been made to trace the owners of the copyright material included in the book. The publishers would be grateful for any omissions brought to their notice for acknowledgements in future editions of the book. No entity in Food Industry Capacity & Skill Initiative shall be responsible for any loss whatsoever, sustained by any person who relies on this material. All pictures shown are for illustration purpose only. The coded boxes in the book called Quick Response Code (QR code) will help to access the e-resources linked to the content. These QR codes are generated from links and YouTube video resources available on Internet for knowledge enhancement on the topic and are not created by FICSI. Embedding of the link or QR code in the content should not be assumed endorsement of any kind. Food Industry Capacity & Skill Initiative is not responsible for the views expressed or content or reliability of linked videos. FICSI cannot guarantee that these links/ QR codes will work all the time as we do not have control over availability of the linked pages.

> 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

Skill India
कौशल भारत-कुशल भारत

FICSI
Food Industry Capacity and Skill Initiative

N•S•D•C
National
Skill Development
Corporation
Transforming the skill landscape

Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

FOOD INDUSTRY CAPACITY AND SKILL INITIATIVE

for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **Industrial Production Worker - Food Processing**
QP No. **FIC/Q9005 NSQF level 2**

Date of Issuance: September 30th, 2021

Valid up to*: September 30th, 2024

**Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)*

Authorised Signatory
(CEO, FICSI)

Acknowledgment

FICSI is thankful to all the organisations and individuals who have helped us in the preparation of this participant handbook.

We extend our special thanks to the Ministry of Food Processing Industries (MoFPI) and National Institute of Food Technology Entrepreneurship and Management (NIFTEM) for providing funds and their unequivocal support.

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

About this book

This Participant Handbook is designed to enable training for the specific Qualification Pack(QP). Each National Occupational Standard (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS. The symbols used in this book are described below.

This reference book has been developed for use Participant Handbook of the skill development course for a Industrial Production Worker - Food Processing being implemented by FICSI through its affiliated training service providers. The contents of this book are completely aligned to the Qualification Pack for the role of a Industrial Production Worker - Food Processing NSQF level 2 and has been divided into Units corresponding to each NOS (National Occupational Standard). The contents of the book have been developed by NIFTEM (National Institute of Food Technology, Entrepreneurship and management, Kundli with support of MOFPI, Government of India).

This Participant Handbook is designed to enable training for the specific Qualification Pack (QP). Each National Occupational Standards (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS.

- FIC/N9020 Monitor the Food Production on a Mechanized production line for Processed Food
- FIC/N9002: Use Basic Health and Safety Practices at a Food Processing Workplace
- DGT/VSQ/N0101: Employability Skills

Symbols Used


Key Learning Outcomes


Notes


Unit Objectives


Tips

Table of Content

1. Introduction to the Training Program and Overview of Food Processing Industry

Unit 1.1- Introduction to Training Programme

Unit 1.1-Food Processing and Technology: An overview

FIC/N9020

Key Learning Outcomes

At the end of the module, the participants will be able to:

1. Explain the purpose and benefits of the training program; introduce each other and build rapport with fellow participant and trainer
2. Explain the outcomes of the training program
3. Define food processing and understand the current scenario of food processing industry in India and global;
4. List the various sectors of the food processing industry;

Unit 1.1 Introduction to the training program

Unit Objectives

At the end of the unit, participant will be able to:

1. Explain the purpose and benefits of the training program.
2. Explain the outcomes of the training program
3. Introduce the fellow participant and the trainer

1.1.1 Purpose and benefits of the training program

This training program is developed to impart specific knowledge and skills relevant to job role required to perform as an "Industrial Production Worker - Food Processing-Food Processing", in the "Food Processing" Sector/Industry. The training program of Industrial Production Worker - Food Processing is based on the Qualification Pack (QP) code FIC/Q9005. A QP consists of a set of National Occupational Standards (NOS). A NOS specify the standard competency, a worker must possess while conducting any job/activity at the processing area. The following NOS are compulsory to QP Industrial Production Worker - Food Processing: Food Processing;

1. Monitor the food production on a mechanized production line for processed food items (FIC/N9020)
2. Work effectively with others (CSC/N1336)
3. Basic health and safety practices at food processing workplace (FIC/N9002)

Occupation Standards (OS) is the set of standards related to performance at workplace, an individual must accomplish while performing any job/activity, along with the knowledge and understanding need to achieve that standard without fail. Occupational Standards are relevant to the Indian and global contexts.

After successful completion of training and passing the assessment, participant will be issued a certificate.

Fig.1.1.1 Skill card

1.1.2 The Skill card

Skill Card is issued to Certified Trainers and Assessors, displaying the following:

- Name
- Unique ID
- Certification Grade
- Validity of the Certification

The skill cards have a quick response (QR) code and by scanning it, an employer can understand what kind of skill course the person has undergone and what type of certification he/she has been awarded. For a trained job seeker, it is hassle free; he/she will not have to carry bundles of certificates.

The card may be converted into a smart card, with an embedded chip over time.

1.1.3 The Training Outcomes

After completing this program, participants will be able to:

1. Learn about Food Processing and its importance;
2. Monitor the processed food production on a mechanized production line;
3. Understand how to work effectively with others;
4. Understand basic health and safety practices at workplace
5. Observe food safety and hygiene standards at work;
6. Maintain documents and keep records of all the activities taking place in a food processing unit.

Notes

Unit 1.2 Food Processing and Technology: An Overview

Unit Objectives

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

- Define food processing and understand the importance of food processing industry;
- Explain the current scenario of food processing industry in India and global
- List the various sectors of the food processing industry.

1.2.1 Scope and importance of food processing Industry



Food is a substance consisting of protein, carbohydrate, fat, minerals and vitamins used by the body to sustain growth and furnish energy. India's Food and Grocery market stands on the sixth position in the world and constitutes 70% of the total retail market in India.

1.2.2 Food processing

Food processing is the method used to transform raw ingredients/materials into consumable form of food. With food processing industry, it became possible to maintain a nutritious and safe food for the millions of people. Most agricultural products need processing into edible form e.g. wheat to flour, paddy to rice etc. They may again processed to make it easy to consume e.g. flour into roti, bread etc.

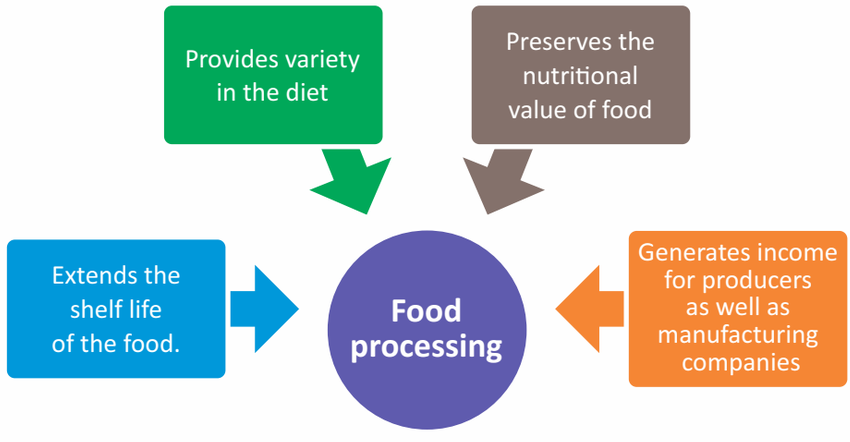


Fig.2. Objectives of food processing

1.2.2.1 Key facts of Indian food processing industry

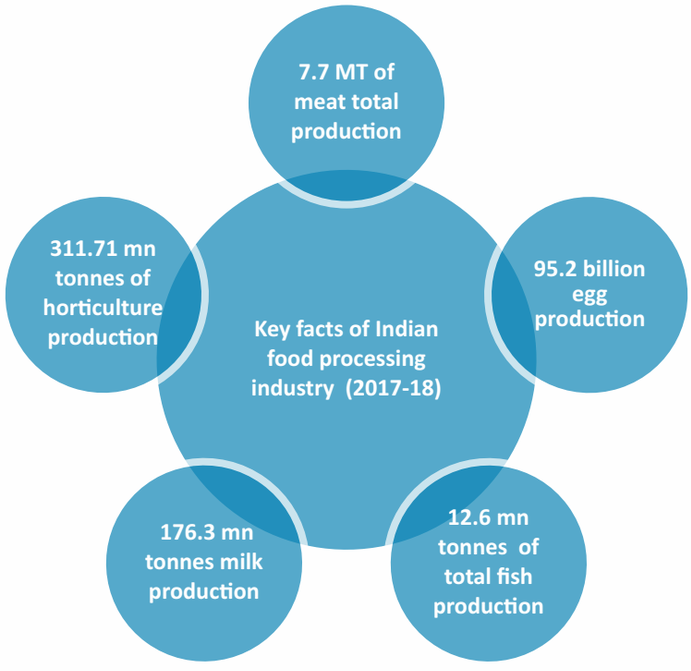


Fig. 3. Key facts of Indian food processing industry

1.2.2.2 Key facts of Indian food processing industry

Despite the large production, only a small portion is processed and marketed. The status of processing is given below

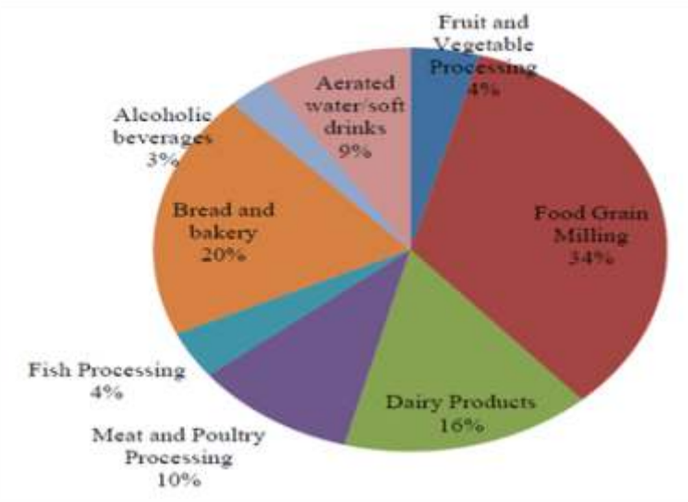


Fig. 4. Status of food processing in India. Source: ASI, MOFPI and IMaCS analysis

1.2.2.3 State wise status for production of processed foods

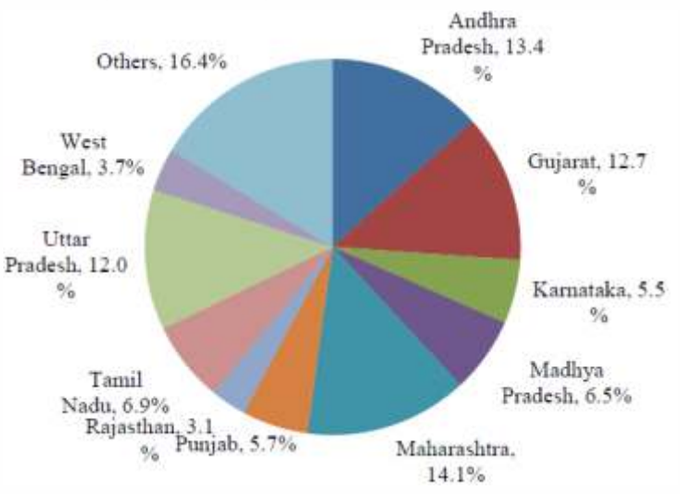


Fig. 5. State-wise status of processed food production. Source: analysis by ASI and IMaCS

1.2.3 Government initiatives for Indian food processing sector

Several schemes and financial support were launched by the Ministry of Food Processing Industries (MOFPI), Government of India. Some of them are mentioned below:

- Pradhan Mantri Kisan Sampada Yojana: focused on the development of Agro-Marine Processing and Agro-Processing hubs.
- Mega food park scheme: Sanctioned 40 Mega Food Parks (MFPs). At present, 17 Mega Food Parks are in operation.
- Scheme for creation/expansion of infrastructure for preservation or value addition units,
- Scheme of development of cold chain

1.2.4 Global Food processing industry

The global food processing industry is valued at US $ 3.2 trillion and is expected to reach an estimated $ 4.1 trillion by the end of 2014 with a growth rate of 4.3% from 2019-24. In consumption, production and exports, Indian food processing sector ranks fifth worldwide. The major market for the sale of food products from India is Europe contributing 39% and US contributing 21%.India ranked first in production of milk, pulses, spices, fish, livestock, and plantation crops. India secured second position in Fruits and Vegetables production after China.

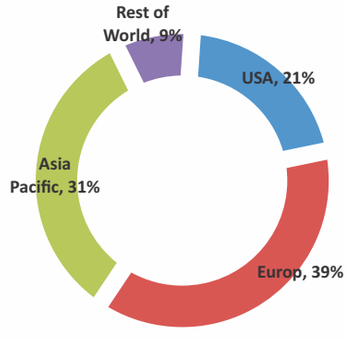


Fig. 6. Global markets for processed food exported from India. Source FICCI

1.2.5 Food processing industry in India

Table 1: Sub sectors of food processing industry

Sector		Products
Dairy		Packaged milk, cream, butter, ghee, ice-cream, milk powder, cheese, yoghurt, etc.
Fruit and vegetables		Fresh fruits and vegetables, Beverages, juices, concentrates, pulps, frozen and dehydrated products, pickles, etc.
Grains and cereals		Flours, glucose, malted foods, beer and malt extracts, grain-based alcohol, etc.
Meat, poultry and fish		Fresh and frozen meats, fish, fish oil and sea food, egg, egg powder etc.
Bread and bakery		Biscuits, breads, cakes, confectionery, pastries, cookies, etc.
Other foods		Fats and oils, sugar and other sweets, alcoholic and non-alcoholic beverages, namkeens etc.

Exercise

Fill in the blanks with the correct option

1) ---------- is the method used to transform raw ingredients/materials into consumable form of food
   a. Food preparation
   b. Food processing
   c. Food irradiation

2) The major market for the sale of food products from India is .....
   a. Asia
   b. Europe
   c. US

3) Which among the following is not an advantage of food processing?
   a. Preserves the nutritive value of food
   b. Deteriorates the food
   c. Extent the shelf life of food

4) Which among the following is not an initiative by the Indian government for the food processing sector
   a. Mega food parks
   b. Cold chain from farm to consumer
   c. Chemical promotion and development scheme

5) The worldwide food processing industry is valued at US $ -------- trillion
   a. 4.6
   b. 3.2
   c. 6.5

6) India's Food and Grocery market stands on the ---------- position in the world
   a. Fourth
   b. First
   c. sixth

7) Pradhan Mantri Kisan Sampada Yojana focus on the development of ----------Processing
   a. Agro-Marine
   b. Meat and poultry
   c. Dairy

8) ---------- is issued for the participant after successful completion of this training program
   a. Identity card
   b. Skill card
   c. Training card

Notes

Scan the QR codes or click on the link to watch the related videos

Scan this QR Code or Click below link to access video of Overview of Food Processing Industry

2. Organizational standards and norms

FICSI
Food Industry Capacity and Skill Initiative

Unit 2.1- Roles and responsibilities of Industrial Production Worker - Food Processing

Unit 2.2- Knowledge and understanding of the organization

Unit 2.3- Workplace ethics

Unit 2.4- Personal hygiene guidelines for food handlers

Unit 2.5- Food Safety and hygienic standards for workplace

(CSC/N1336)

Key Learning Outcomes

At the end of the module, the participants will be able to:

1. Describe the main roles and responsibilities of an industrial production worker;
2. Understand the nature and availability of job for an industrial production worker in Indian food processing industry
3. State how to conduct yourself at the workplace
4. Understand the importance of disciplined behavior for the success in workplace
5. State how to resolve interpersonal conflicts at workplace
6. Explain how to address workplace grievances to the management
7. State the importance of working as a team in the workplace;
8. Understand the importance of organizational policies and procedures;
9. Understanding regulatory standards applicable to food processing industry;
10. Understand the importance of adhering to good personal hygiene
11. Explain Food safety and hygienic standards for food processing industries
12. Explain GMP with respect to workplace
13. Understand General Hygienic and Sanitary practices to be followed by Food Business operators (Schedule 4 of FSSAI regulations)
14. Understand risk assessment process and HACCP

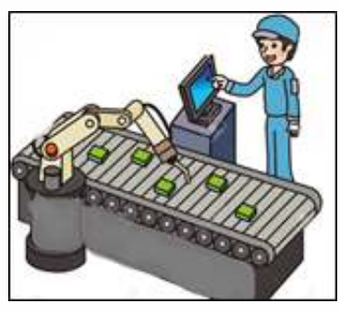
Unit 2.1 Roles and responsibilities of Industrial Production Worker

Unit Objectives

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

1. Describe the main goals and tasks of an industrial production worker;
2. Understand the nature and availability of job for an industrial production worker in food processing industry

2.1.1 Industrial Production Worker ~~- Food Processing~~

Production workers are responsible for mass production of a specific food product in a production facility.		

Notes

2.1.2 Roles and responsibilities of Industrial Production Worker

Roles	Responsibilities
Prepare and maintain work area and processing machineries in a mechanized production line	• Conduct the cleaning and sanitization of all the equipment's and processing machineries before and after production • Inspect the machineries prior to operation for any mechanical inefficiency and technical problem • Conduct maintenance plan as per SOP (Standard Operating Procedure)
Operate processing equipment and machineries with minimum loss	• Optimize the use of machinery • Ensure smooth operation of machinery and identify and report any operating system issues
A good source for technical and organizational knowledge	• Understand organization's as well as regulatory standards pertaining to work
Use basic health and safety practices at work place	• Maintain a strict level of personal and workplace hygiene • Adopt personnel hygiene practices, follow dress codes and wear PPE's required for the job • Understand the risk involved in work and methods to minimize possible hazards
Work effectively with others to accomplish the organizational goals	• Be a good source of information pertaining to the area of work • Be responsible and disciplined while at work • Liaise and Communicate effectively with coworkers to ensure efficient production

Table 2: Roles and responsibilities of Industrial Production Worker - Food Processing

2.1.3 Career opportunities for Industrial Production Worker in India

The food processing industry in India has witnessed colossal growth over past few years. The increasing awareness of consumers pertaining to healthy and nutritious diet is the reasons for the growth of Indian food industry. Different types of workers can be employed in a food manufacturing industry. Among them more than 50 % are production workers e.g. skilled workers, operators and laborers etc. This certification programs help the participant in advancing his/her career. With suitable qualifications and experience, workers can advance to supervisory positions and above in future. Table below shows the leading companies in India manufacturing processed foods

S.No.	Sector	Company /brands
1	Fruits and vegetables	HUL, Mother Dairy, Dabur India Ltd, Capital Foods, ITC Ltd etc
2	Dairy	Amul, Mother dairy, Patanjali, Parag, Aavin, Milma, Paras, Mahi etc
3	Poultry and meat	Venkateswara Group, Suguna Poultry Farms, Pioneer Poultry, Godrej Agrovet Ltd, Sky Lark group etc

Table: 3. Leading processed food manufacturing companies in India

Sl.no.	Number of persons (million)	Share (%)
Organized	1.53	18
Unorganized	7.00	82
Total	8.53	100

Source ASI and IMaCS analysis

Table: 4. Employment status in Indian Food manufacturing sector

Unit 2.2 Knowledge and understanding of the organization

Unit Objectives

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

- Explain the importance of adhering to organizational standards and policies;
- Explain the term SOP
- State the importance of adhering to HR policies and understand reporting structure while at work

2.2.1 Organizational policies and procedures

An Industrial Production Worker - Food Processing shall understand the organizational policies and procedures clearly to execute the action plan within the frame of business policies. It includes:

- The organizations norms, standards and accreditation mark
- Different types of products produced by the organization and its flow chart
- Safety and hygiene standards and impact of the same if not followed.
- Dress codes used for different works
- Relevant people in the organization and their roles
- Procedures for reporting work related issues

2.2.2 Standard operating procedures (SOP's)

- SOP's are essential part of food safety system as they provide basic information on how to perform a task
- SOP's are set of instructions prepared by an organization to help supervisors and workers to handle different operations.
- Adhering to SOPs ensure efficiency in work, quality output and performance.
- SOP's reduce failure and miscommunication in the work.
- A production worker shall understand SOP's pertaining to his work.

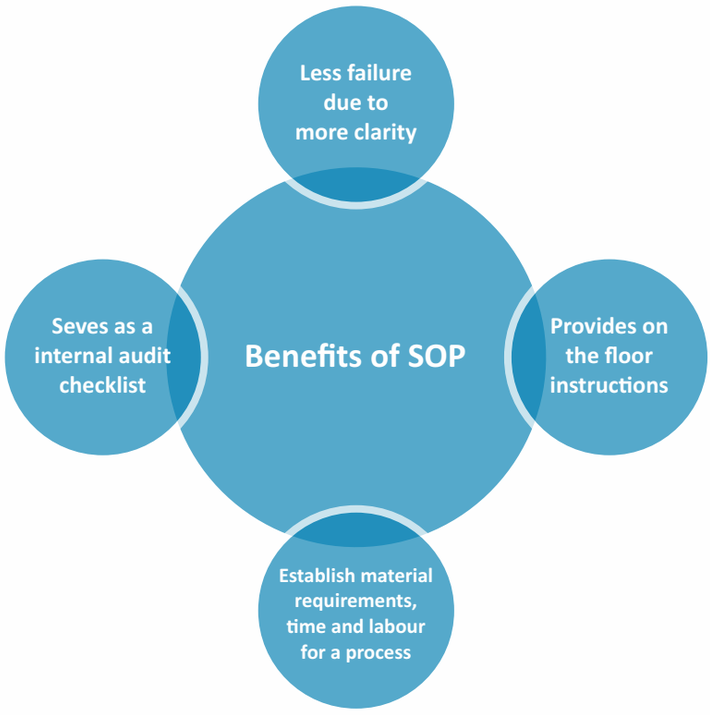


Fig.7. Benefits of adhering to SOP for an organization

2.2.3 Knowledge of Human Resource (HR) policies and reporting structure:

A production worker shall understand the HR policies regarding job roles and responsibilities, terms of employment, reporting structure, different departments and their roles and procedures in the work area. A general reporting structure followed by production department of food industries are following;

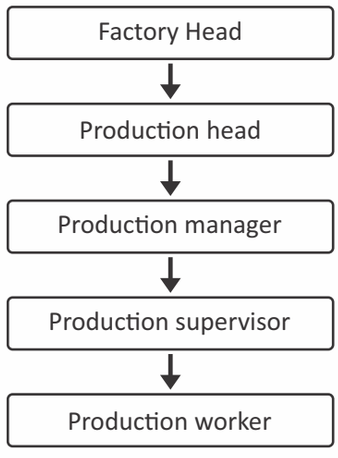


Fig. 8. General Reporting structure followed in the production department of a food processing unit

Unit 2.3 Workplace Ethics

Unit objectives

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

- State how to conduct yourself at the workplace
- Understand the importance of disciplined behavior for the success in workplace
- Explain different skills required for an Industrial Production Worker - Food Processing for the

2.3.1 Workplace ethics

Workplace ethics are the basic guidelines one must be followed while working in an organization to ensure smooth and effective functioning. Some important points to remember are;

- Address seniors, assistants, and co-workers with respect
- Be a team player
- Follow the rules and regulations of the industry
- Follow food hygiene and safety norms all times
- Do not compromise with the quality of the product at any given cost
- Perform work with honesty
- Favoritism, nepotism and casteism should be avoided
- No deliberate damage to organization or property.
- No acts of violence, intimidation and instigation.

2.3.2 Disciplined behavior

Majority of all work place accidents are triggered by unsafe behavior. Behavioral safety is applicable for everyone in the organization. Picture underneath shows how the behaviors of different levels of people are linked in an organization

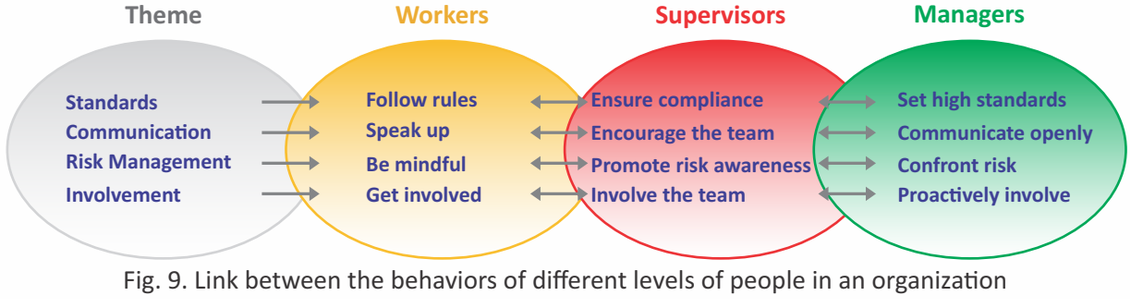


Fig. 9. Link between the behaviors of different levels of people in an organization

Disciplined behavior is important to improve workplace performance and to provide a safe and honest working environment.

Fig. 10. Benefits of disciplined behavior

2.3.3 Language skills for production worker

To be a successful production worker, the participant shall have the following generic skills

2.3.3.1 Speaking: skills that give one the ability to communicate effectively and convey the message in a convincing manner.

2.3.3.2 Reading and writing skills: a production worker shall understand and interpret the process and flow chart required for producing different types of products. He is also responsible to note down the observation on day to day basis and inform the management.

2.3.3.3 Listening: listening is a skill which allows one to understand what another person is saying.

A good listener can;

- Better personal and professional achievements
- Do not make mistakes via communication gap and misunderstanding
- Higher confidence level
- A good source of information

Fig. 11. Criteria's of a good listener

2.3.3.4 Communication

Communication is the process of exchanging information using a medium.

Effective communication is a basic prerequisite for the achievement of organizational goals.

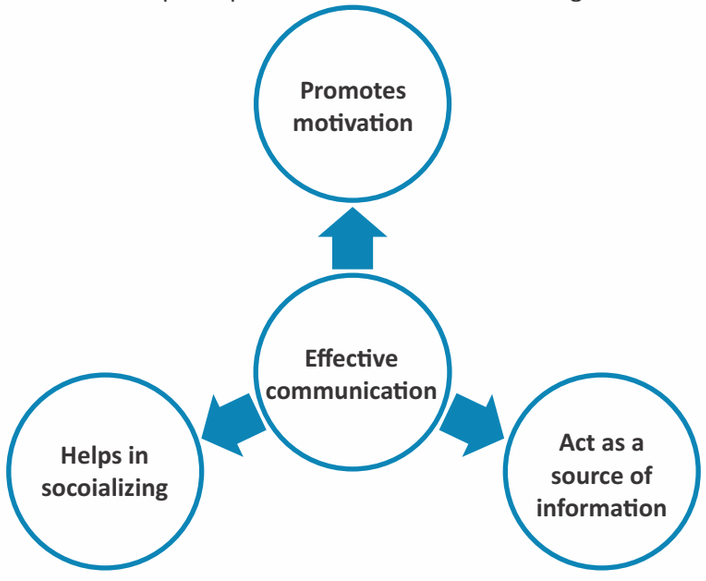


Fig. 12. Benefits of effective communication in workplace

Communication flow in an organization

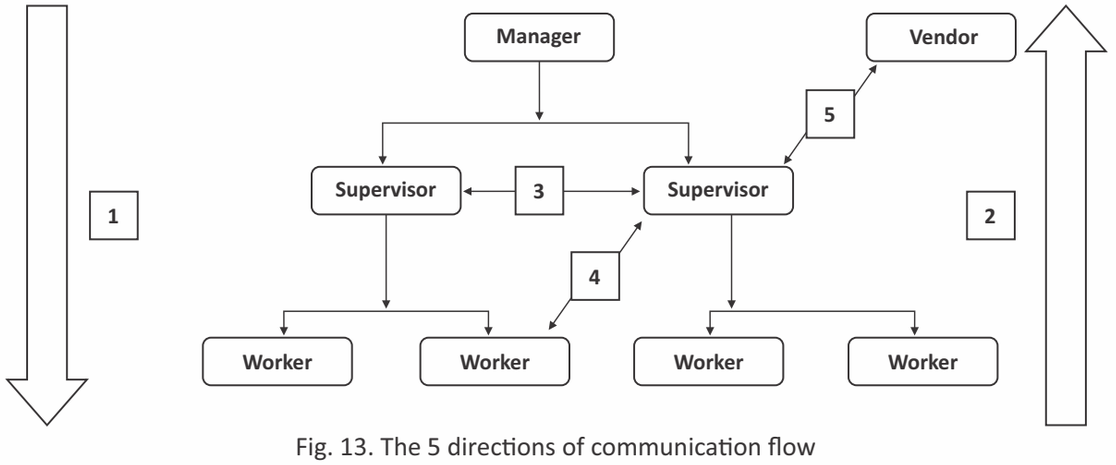


Fig. 13. The 5 directions of communication flow

1. **Downward:** Communication from management to subordinates is downward communication
2. **Upward:** Communication that flows from the sub ordinates to a higher level in an organization
3. **Lateral:** Communication between the same levels of hierarchy in an organization
4. **Diagonal:** Communication between a supervisor - worker or worker - supervisors of other department is called diagonal communication
5. **External:** Communication between a management and external groups. E.g. communication between purchasing departments to vendor.

Criteria's of a good communicator

Fig. 14. Criteria's of a good communicator

The 5 components of communication process are:

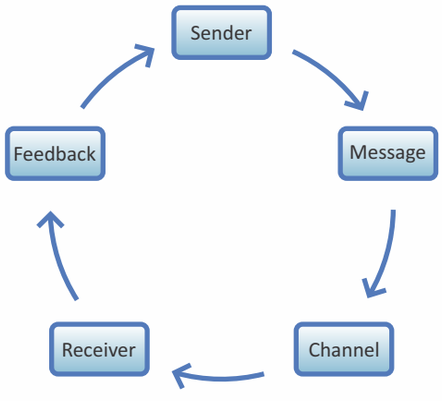


Fig. 15. Components of communication process

- **Context -** The context may be physical, social, chronological or cultural.
- **Sender / Encoder** - The person who sends the message.
- **Message** - The subject a sender needs to communicate.
- **Medium** - Medium is a means for exchanging the message.
- **Recipient / Decoder** - The person who receives the message.
- **Feedback -** Feedback allows the sender to analyze the efficacy of the message sent.

Communication in the workplace

- ✓ Encourage two-way communications in the workplace. Speak up if you are not clear the information received.
- ✓ Provide information to others clearly which help them understand
- ✓ Provide specific and descriptive feedback
- ✓ Be a good listener

The barriers to effective communication	Effects of poor communication

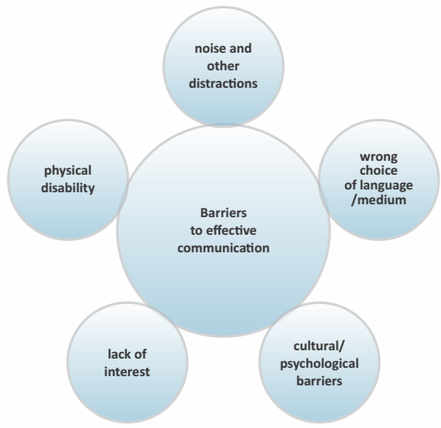
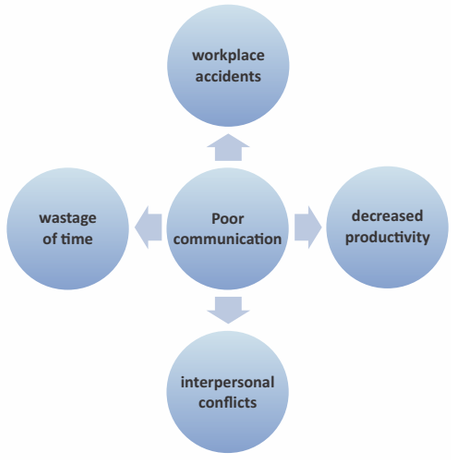

	

Fig. 16. The barriers to effective communication	Fig. 17. Effects of poor communication

2.3.4 Inter personal skills

Interpersonal skills are the ability to develop fruitful relationships with others. Knowing how to develop healthy working relationships with people at the workplace contributes significantly to your success as a production worker.

How to Develop Good Interpersonal Skills

Effective communication plays a key role in developing good interpersonal skills.

1. Nonverbal communication which result in achieving positive interpersonal skills are:
- smile and eye contact
- correct postures and gestures
2. Good listening skills.
- It conveys that “you care”
- It enables you to understand other people's viewpoints and empathize with their situation.
3. Verbal communication which result in achieving positive interpersonal skills are:
- Use of voice and intensity.

2.3.5 Work as a team

Team work promotes strong working relationships which eventually contribute higher productivity. When the employees work together as a team, they are more likely to;

- ✓ Communicate well with others
- ✓ Support and get motivated
- ✓ Work cooperatively for the success of the organization

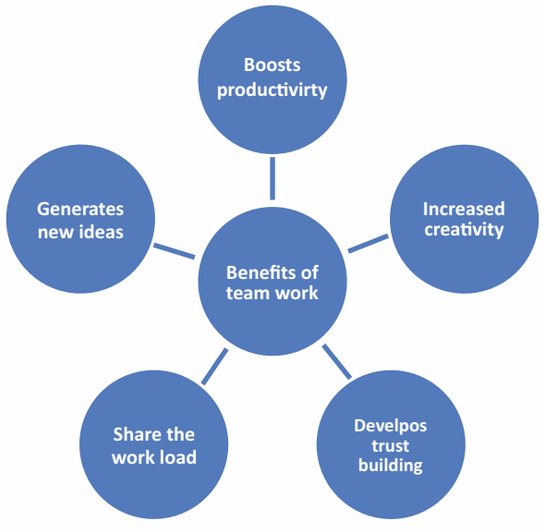


Fig.2.5. Benefits of team work

2.3.6 Conflict Resolution skills

Interpersonal conflicts: The conflict comprises the human affective states including anxiety, hostility, resistance, aggression, and competition. The common reasons for interpersonal conflicts in a workplace are;

- ✓ Lack of effective communication
- ✓ Individual differences on values and beliefs
- ✓ Lack of trust
- ✓ Incivility
- ✓ Stress

The conflict resolution process

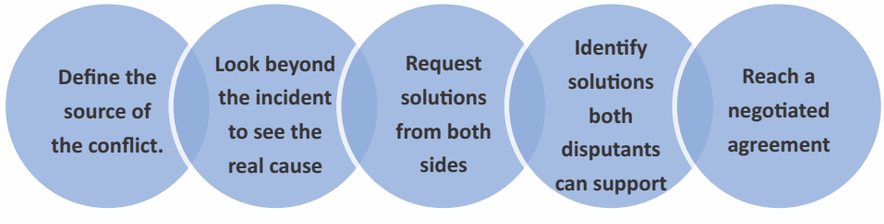


Fig. 19. The conflict resolution process

2.3.7 Grievance management in workplace

Grievance refers to a concerns/ complaint that an employee has regarding the work/workplace, or someone they work with which made him/her feel dissatisfied.

Types of grievances in workplace include;

- ✓ Pay and benefits.
- ✓ Bullying/ harassment.
- ✓ Work place risks and safety concerns.
- ✓ Workload.

Grievance handling procedure

1. The organization shall have a written grievance procedure, by which employee can escalate his/her issues
2. Investigating grievance: - the organization carryout investigation.
3. Grievance meeting: the organization holds a meeting so that the employee gets opportunity to explain the complaint.
4. Considering the evidences, the organization decides whether to reject or hold the grievance.
5. The employee can go for appeal if he feels unfair to the decisions made by organization

2.1 Practical : Self quiz on work ethics

Aim: to get an understanding on how ethical person you are.

Materials required

- ✓ Stationary items, quiz format.

Name of participant:			Roll no:		
Dependability	**1. Are you reliable?**				
	Never	Seldom	Sometimes	Usually	Always
	2. Do you follow rules?				
	Never	Seldom	Sometimes	Usually	Always
Responsibility	**1. Do you honor your word?**				
	Never	Seldom	Sometimes	Usually	Always
	2. While working, do you ever do other things?				
	Never	Seldom	Sometimes	Usually	Always
	3. Do you help your co-worker at work?				
	Never	Seldom	Sometimes	Usually	Always
Honesty	**1. Are you true to the words you make?**				
	Never	Seldom	Sometimes	Usually	Always
Level of rigor	**1. Are you a hard worker?**				
	Never	Seldom	Sometimes	Usually	Always
Level of initiatives	**1. Do you perform work that is not required of you?**				
	Never	Seldom	Sometimes	Usually	Always
	2. Do you work for extra time when the organization needs you (e.g. festive season)				
	Never	Seldom	Sometimes	Usually	Always

Table 2.1. Workplace ethics

Methodology

1. Fill the quiz format given by the trainer as honestly as possible.

Unit 2.4 Personal hygiene guidelines for food handlers

Unit Objectives

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

- Explain good personal hygiene practices to be followed by food handlers at workplace
- Explain the importance of PPE's at workplace
- Explain how to prepare yourself for carrying out food processing in hygienic manner
- Understand different hygiene/precautionary signages at work

2.1.4 Good Personnel hygiene practices

Fig. 20. Good personal hygiene practices to be followed at workplace

2.4.1.1 Personal protective equipment's includes necessary garments used to protect the workers body from injury/ infection and to avoid cross contamination which may affect the quality of food.

Types of PPE's

- Head protection: Safety Helmets
- Eye & face protection: Safety Goggles, Face shields
- Hearing protection: Ear muff, Ear plug
- Respiratory protection: Dust Masks, Cartridges
- Hand & arm protection: Hand gloves (PVC, Nitryle, Rubber)
- Foot protection: Safety shoes, Gum boots
- Body protection: Full body PVC suit, Safety Belts

Refer module 6 for the detailed safety aspects of PPE's

Fig. 21. Personal Protective Equipments (PPE's)

2.4.1.2 Hand Wash

- Wash hands before commencing work and after using toilets
- Keep fingernails trimmed always
- Avoid perfumed detergents/soaps/ sanitizers for hand washing

2.4.1.3 Clothing:

Fig. 23. Dress code for food handlers

- Wear clean, neat work dress and appropriate PPE's
- Do not use perfumes/ deodorants

2.4.1.4 Hair:

- Hair must be covered all time while working
- Men shall be clean shaven, otherwise beard shall be covered

2.4.1.5 Jewellery:

Fig. 25. Jewellery policy at workplace

- Avoid loose jewellery and watches at work place
- Do not loose handle pens, mobile, spectacles, tools etc at work
- Jewellery having ritual significance shall be protected to prevent mix up into the food

2.4.1.6 Health status

- Do not work if affected by a communicable disease
- Conduct medical examination of food handlers as per SOP and document the records

Fig. 26. Conducting health check up of employees

Personnel Hygiene Practices at work place

Fig. 27. Personal hygiene practices for workplace

Understand Signage at workplace

Fig. 28. Understand hygienic signage's for workplace

Practical 2: Demonstrate use of Personal Protective Equipment's (PPE's)

Aim: to get hands on training on the appropriate use of PPE's

Materials required: coats/ aprons, ear plugs/muffs, eye protection, head wear, protective boot covers, protective hand and arm coverings etc

Methodology:

1. Each participant is provided with any one PPE's and ask him/her to wear it.
2. Ask the others to tell if she/he use it in the correct manner or not.
3. Finally, one can wear all the PPE's and show to all other participants.

Unit 2.5 Food Safety and hygienic standards for workplace

Unit Objectives

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

- Define food safety, food microbiology and state different contaminants that spoil foods
- Explain the regulatory standards applicable to the food processing industry
- Explain good manufacturing practices to be followed at workplace;
- Explain GMP with respect to workplace
- Understand General Hygienic and Sanitary practices to be followed by Food Business operators (Schedule 4 of FSSAI regulations)
- Understand risk assessment process and HACCP

2.5.1 Food safety and microbiology of foods

2.5.1.1 Food safety: -

Food safety is the correct handling, producing, and preserving of food to eliminate the chances of food borne poisonings caused by microbes that may contaminate food at different stages of production/processing/distribution.

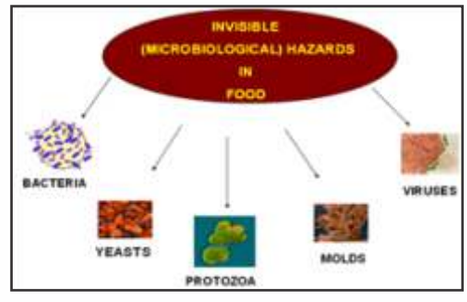
Fig. 29. 10 golden rules for safe food as per FSSAI

2.5.1.2 Food microbiology

Food microbiology refers to the study of microorganisms, present in food as well as used to produce food. Many microorganisms are harmful which cause illness and there are some microorganisms which is used for production of food e.g. to produce curd, dosa, idly etc..

2.5.1.3 Spoilage of food

Any change in food that renders it unfit for human consumption is called as food spoilage. These changes may be caused by contamination by microorganisms, infestation by insects or degradation by endogenous enzymes. A food product may be contaminated by the following agents;

Biological contamination	Pathogenic bacteria (e.g Salmonella enteritidis, Staphylococcus aureus, Camphylobacterjejuni, Clostridium perfringens, Clostridiun botulinum, Listeria monocytogenes and Escherichia coli O157:H7), viruses (e.g. Bird fluh5n1), and parasites (e.g. Trichinella spiralis)	 
Chemical contaminants	Includes substances that are toxic and unsafe for human consumption (e.g. Cleaning, lubricating agent's and sanitizers in processed foods, pesticides and insecticides in vegetables, antibiotics and mycotoxins in milk etc).	
Physical contamination	Foreign substances like stones, glass, metal, hair, wood, plastic, knife blades, needles, bones in boneless meat etc.	

Different Signs of Food Spoilage: -

- Off flavor and discoloration
- Sliminess
- Mould and fungal growth
- dry / spongy texture
- Unaccepted taste

2.5.1.4 Food preservation

Food preservation is the method of protecting foods against microorganisms, spoilage, and contaminating agents. The objective of preserving processed food is to:

- Retain the original nutritive value
- Retain the original color, texture and flavor
- Extend the shelf life of the food
- Ensure year-round availability of seasonal foods
- Prevent or delay food spoilage

2.5.2 Regulatory standards applicable to food processing industry

1.	Food Safety and Standards Regulations, 2011	• Food Safety and Standards (Licensing and Registration of Food businesses) Regulation, 2011 • Food Safety and Standards (Packaging and Labeling) Regulation, 2011 • Food Safety and Standards (Food product standards and Food Additives) Regulation, 2011 (part I & part II) • Food Safety and Standards (Prohibition and Restriction on sales) Regulation, 2011 • Food Safety and Standards (contaminants, toxins and residues) Regulation, 2011 • Food Safety and Standards (Laboratory and sampling analysis) Regulation, 2011
2.	ISO (International Organization for Standardization)	• ISO 9000 covers quality management. • ISO14000 covers environmental management. • ISO 22000 covers food safety management system. ISO 22000 integrates HACCP principlesand Codex Alimentarius Commission.
3.	Occupational Health Safety (OH & S)	• It ensures an accident-free industrial environment
4.	Factories Act - 1948	• Maximum weekly working time of 48 hours for employees and not more than 9 hours in a day. If an employee has to work for more than the prescribed hours he is eligible for overtime remuneration which is twice the amount of ordinary wages.

5.	Employment and labor law 2019	• Covers issues like terms of employment, employee representations and discrimination in the workplace, maternal and family leaves.
6.	The Workmen's Compensation Act	This act covers accident/injury compensation.
7.	GMP / Food Safety Requirement as per Schedule 4 of FSSR '2011	It covers all the food safety guidelines for the Persons handling food in a manufacturing company.

Table 7: Standards applicable to food processing industry

2.5.3 Good manufacturing practices (GMP)

GMP is the set of guidelines to ensure the production of high quality and safe food to customers. The areas of focus in GMP include personnel hygiene, process validation, maintenance of equipment and cleaning and sanitization.

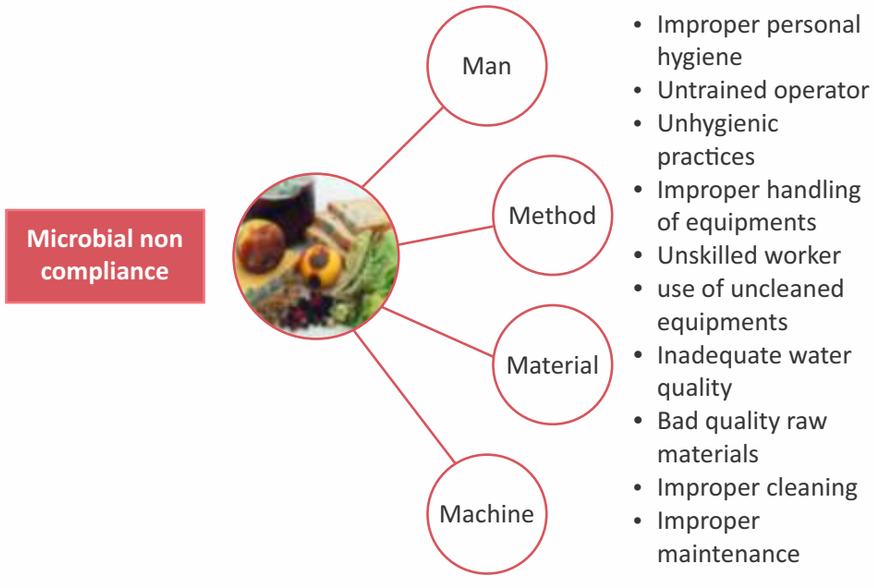


Fig. 30. Reasons for microbial non compliance in foods

2.5.4 General Hygienic and Sanitary practices to be followed by Food Business operators (Schedule 4 of FSSAI regulations)

According to Schedule 4 of FSSAI regulations, it is mandatory that every Food Business Operator has to follow hygienic and sanitary practices in the premises where food is being manufactured. Schedule 4 is a set of requirements to ensure safety of the food made in any premise and Food Business Operator shall continuously try to improve hygienic conditions and sanitary practices at the premises with an aim of attaining India HACCP standards. The Schedule 4 is divided into five parts as follows:

1. Part I - General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration
2. Part II - General Requirements on Hygienic and Sanitary Practices to be followed by all FBO applying for License
3. Part III- Specific Hygienic and Sanitary Practices to be followed by FBO engaged in manufacture, processing, storing and selling of Milk and Milk Products
4. Part IV - Specific Hygienic and Sanitary Practices to be followed by FBO engaged in manufacture, processing, storing and selling of Meat and Meat Products
5. Part V - Specific Hygienic and Sanitary Practices to be followed by Practices to be followed by FBO engaged in catering / food service establishments

The general sanitary and hygienic requirements are part of Good Manufacturing Practices (GMP) and Good Hygienic Practices (GHP). For food manufacturer/ processor/handler below indicated generic guidelines are provided which will give fair idea about the practices to be followed. The place where food is made, processed or handled shall comply with the below indicated general requirements:

- The food processing facility shall be located away from the polluted areas to avoid the risk of air/water borne contaminants.
- There shall be enough space for production and storage of food product in the manufacturing facility.
- Floors, Ceilings, walls, windows doors and other openings must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.
- Only portable water shall be used in a food processing unit. The water shall be tested for bacteriological parameters at regular intervals.
- All the equipment's and machineries used in a production unit shall be kept cleaned to avoid the risk of growth of microbes
- All equipment's shall be placed away from the walls to allow proper inspection.
- There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.
- The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.
- Persons working in a food manufacturing unit must adhere to personal hygiene standards.
- The vehicles used for transportation of raw materials and finished good shall be kept clean always.
- The finished goods shall be stored as per correct temperature and humidity conditions
- All the chemicals shall be stores away from finished goods, packaging materials and raw materials

2.5.5 Risk assessment and food security

Early assessment and detection of risks which may affect the safety and security of foods helps to minimize the chances of potential hazards from happening.Risk Assessment is a scientifically based process consisting of the following steps:

- Hazard identification
- Hazard characterization
- Exposure assessment and
- Risk characterization

2.5.5.1 Risk assessment process

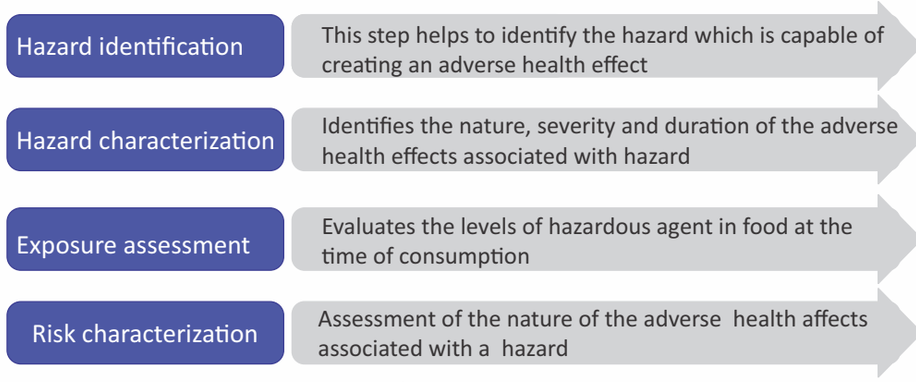


Fig. 31. Risk assessment process

2.5.5.2 Hazard Analysis and Critical Control Point (HACCP)

Hazard Analysis Critical Control Point (HACCP) is a method to identify the critical points in the processing line and to implement critical limits in compliance with regulatory/institutional standards. Hazard is a physical, chemical or biological agent in which can cause illness/injury to the consumers. Hazards can be physical, chemical or biological.

HACCP principles: A HACCP plan consists of 7 major HACCP principles. They are;

Fig. 32. 7 principles of HACCP

HAACP system requires following PRP's (pre-requisite programmes) in place :

1. SSOP (Sanitation standard operating procedure)
2. GMP (Good Manufacturing Practices)
3. GHP (Good Hygienic Practices)

Notes

Exercise

Fill in the blanks with correct option

1) ----------are responsible for mass production of a specific food product in a production facility.
   a. Production workers
   b. Cleaning workers
   c. Supervisors

2) According to Factories Act – 1948, No employee is supposed to work for more than ---------- hours in a week.
   a. 48 hours
   b. 52 hours
   c. 56 hours
   d. 50 hours

3) ---------- can be described as the process of imparting or exchanging of information by speaking, writing, or using some other medium.
   a. Listening
   b. Communication
   c. Digital literacy
   d. Planning

4) ---------- is the process by which processed and unprocessed food is protected against microbes, spoiling agents, and contaminants
   a. Food preservation
   b. Food microbiology
   c. Food contamination
   d. Food irradiation

5) HACCP stands for
   a. Hazard Analysis and Critical Control Parameters
   b. Hazard Analysis and control critical points
   c. Hazard Analysis and Critical Control points
   d. Hazard authority and Critical Control points

6) SOP stands for----------
   a. Sanitary operating procedures
   b. Standard operating procedures
   c. Standard operating parameters
   d. Sanitary operating parameters

7) -------- is allowed in a food processing area
   a. Eatables
   b. Jewellery
   c. PPE's
   d. Slippers

8) ---------- among the following leads to microbial non compliance of food
   a. Poor quality water
   b. Good personal hygiene
   c. Good quality raw materials
   d. Good hygienic practices

9) Which among the following is not a component of communication process
   a. Message
   b. Medium
   c. Feedback
   d. Method

10) ---------- Type of communication takes place at same levels of hierarchy in an organization?
   a. Downward
   b. Upward
   c. Lateral
   d. External

Scan the QR codes or click on the link to access the related videos

Industrial Production Worker

Personal Hygiene and Employee Facilities

GMP, GHP and FSMS

Notes

3. Prepare and Maintain Work Area and Processing Machineries for Production

Unit3.1- Cleaning and sanitization

Unit3.2- Prepare and maintain work area and processing machineries for production process

Unit3.3- Machine maintenance and trouble shooting

Unit3.4- Waste management

(FIC/N9020)

Unit 3.1 Cleaning and sanitization

Unit Objectives

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

1. List various pre-requisites for effective cleaning and sanitization of equipment and facilities;
2. Understand general procedure for cleaning and sanitization;
3. State various precautionary measures to be taken while cleaning and sanitization of food processing equipment and other facilities.

3.1.1 Cleaning and sanitization

Cleaning and sanitization of food contact surfaces is done to remove food residues. The food residues enhance bacterial growth which adversely affect the quality and shelf life of food produced

3.1.1.1 Importance of clean work environment

Objectives of cleaning

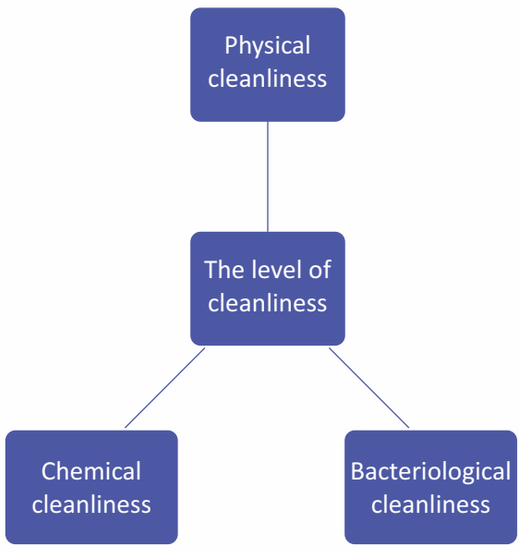


Fig. 33 objectives of cleaning

Benefits of Clean work environment

Figure 34. benefits of cleaning

3.1.2 Pre-requisites for effective cleaning and sanitization

3.1.2.1 Good Quality Water

The water used at food processing plant shall specify to IS 10500.

- While processing, only potable water shall be used as an ingredient.
- For cleaning of equipment's, which comes in direct contact with food, potable water shall be used
- Worker must understand potable and non-portable water pipe lines.

3.1.2.2 Equipment's used for manual cleaning

Washing tank	
Cleaning brushes and scrubbers	
High spray nozzle jets	

Table 8: Equipment's used for cleaning

3.1.2.3 Detergents and sanitizers

Agent used	Application	Risk associated	Safety measures
Cleaning agent			
Hypochlorites (salts of potassium, sodium and calcium)	Cleaning of food contact surfaces	Risk of corrosion involved	Ensure the right concentration is used
Ozone	Cleaning of food as well as non food contact surfaces	Leaves no residue so no risk is involved	Safe on food contact surfaces
Sanitizers			
Liquid chlorine	Can be used inside and outside of stainless steel equipments and vessels	Risk of corrosion involved	Ensure the right concentration is used
Hydrogen peroxide	Kills spores, pathogens and spoilage organisms	Strong odour	Can be used in well ventilated areas

Table 9: Commonly used detergents and sanitizers in food industries

Sanitizers are used to reduce the number of pathogens to a safe level. Sanitization can be achieved by using hot water (160˚ fahrenheit) or by using approved chemicals (chlorine, quaternary ammonium compounds, iodine etc).

Notes

3.1.3 The cleaning processes

3.1.3.1 Cleaning out of place (COP)/ manual cleaning

Remove residues	• remove the pieces of meat, fat and other residues
Soaking	• soak the parts of equipment in a tank of water and detergent
Cleaning	• clean the parts manually/mechanically
Rinsing	• rinse with warm water to remove detergent
Drying	• remove the excess water from the surface of equipment
Sanitation	• apply approved sanitizer and remove sanitizer residues

3.1.3.2 Cleaning out of place (COP)/ manual cleaning

Sl.no.	Step	Description
1	Pre-rinse	With fresh clean water at 45-50°C, circulate for approximately 10 minutes, drain and check if the water is visually free from food solids. If not, rinse further with fresh water till visually free from food solids
2	Cleaning agent	Circulate caustic solution 1-1.2% caustic or adequate amount of detergent solution (which do not contribute any strong odor/smell) for 10 minutes at 75-80°C and drain
3	Fresh water rinse	With fresh clean water at 45-50°C, circulate for approximately 2 minutes and drain when there is no residue of the cleaning agent in the rinse water being drained. If caustic had been used, conduct caustic carry over test* on the rinse water. If the test shows presence of caustic, rinse further with fresh water till the test shows absence of caustic in the rinse water
4	Sanitization	Sanitize with hypochlorite solution just before use
5	Fresh water rinse	Final rinse with fresh water

***Carry over test:** Take about 10 ml of final rinse water sample in a beaker. Add few drops of phenolphthalein indicator. Observe the colour. Development of pink colour indicates the presence of caustic in rinse water while absence of pink colour indicates absence of caustic in rinse water.

3.1.4 The precautionary measures for Cleaning and Sanitization process

- Use appropriate PPE (Mask, gloves, goggles, safety belts, ladder, etc.).
- All energy sources are de-energized before carrying out cleaning activity.
- Always clean the equipment first and then the floors
- If the cleaning process requires man entry into the vessel/equipment, ensure that the Confined Space Entry permit has been received and all due safety measures have been taken.
- All equipment shall be stored when not in use in a clean and dry place that prevents contamination.

3.1.4.1 Personal hygiene and safety for cleaning workers

• Follow the dress code specified for the work • Wear appropriate PPE required for the job • Always adhere to personal hygiene habits	 

Practical 3: Manual cleaning of milk storage tank (MST)

Aim: to acquire hands on knowledge on manual cleaning of milk storage tank.

Methodology:
Conduct the operations (SOP of manual cleaning of milk storage tank, precautionary measures to be taken before starting the operation, sanitization after cleaning operation) along with the instructions from the trained person from the unit.

Practical 4: conduct carry over test to detect the presence of caustic in the final rinse of CIP process

Aim: to detect the presence of caustic in the final rinse water from a CIP process

Methodology: Take about 10 ml of final rinse water sample in a beaker. Add few drops of phenolphthalein indicator. Observe the colour. Development of pink colour indicates the presence of caustic in rinse water while absence of pink colour indicates absence of caustic in rinse water.

Unit 3.2 Prepare and maintain work area and processing machineries for production process

Unit Objectives

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

- Explain the process of cleaning work area and processing machineries for production;
- Identify the equipments, machineries and tools used for processing of milk, meat and baking industries
- Explain how to conduct safety and hygiene checks of machineries and equipment's for production process

3.2.1 Cleaning of work area

As per food safety norms, all food processing premises should follow high standards of hygiene and cleanliness to check contamination of products. The process of cleaning the work area is as follows;

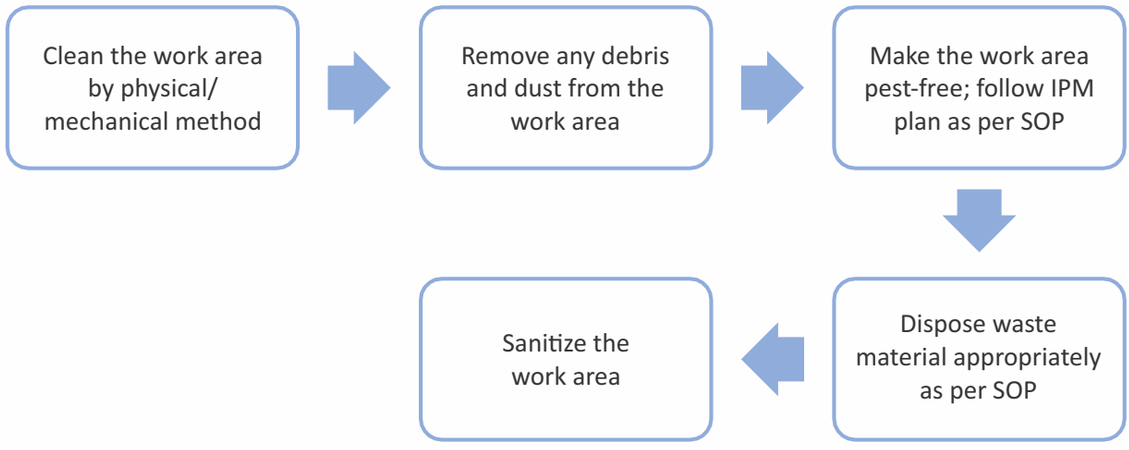
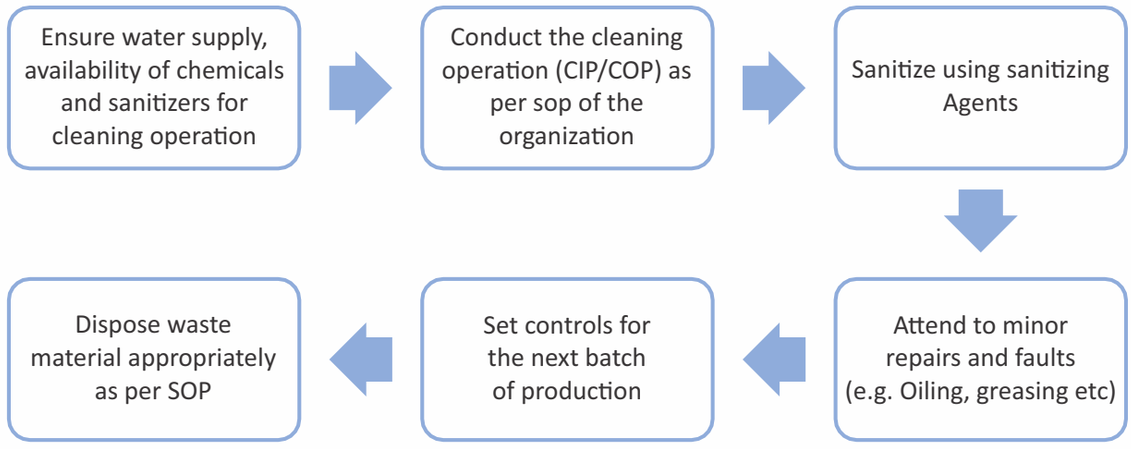


Fig. 36. General procedure for cleaning of work area before production

3.2.2 Guidelines for ensuring the cleanliness of work area for production

- Ensure the work area is free of any waste material before starting production
- There is no mixing/contamination in raw and processed products.
- Raw materials are transported to the production area only after conducting the cleaning process
- Ensure the pest control activities are done before commencing production

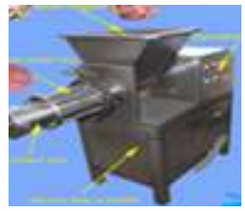
3.2.3 Cleaning of equipment's/machineries and tools



3.2.4 Equipments and machineries used in milk processing unit

			
Weighing bowl	**Milk pump**	**Milk Chiller/ Plate Heat Exchanger**	**Storage Tanks/ silo**
			
Pasteurizer	**Packaging machine**	**Cream separator**	**Homogenizer**

3.2.5 Tools and machineries used for primary processing of meat

			
Knives and cleavers	Knife sterilizer	Grinders and saw	Meat cutter
			
Meat bins	De boner	Trimmers	Stunning machine
			
Scalding machine	Feather picking machine	Chilling machine	Packaging machine

3.2.6 Equipments used in baking unit

			
Egg beater	**Dough proofer**	**Dough divider**	**Bread slicer**
			
Biscuit making machine	**Dough making machine**	**Oven**	**Toast molder**

3.2.7 Guidelines for ensuring the cleanliness of machineries for production

- ✓ Ensure all the machineries are cleaned and sanitized before starting production
- ✓ Ensure the machineries which are dissembled for cleaning are reassembled
- ✓ Ensure minor repairs are conducted for machineries
- ✓ Ensure oiling/ greasing is done as per SOP
- ✓ Ensure the controls are set in machineries for the next batch of production

3.2.8 Safety and hygiene checks of the work area and processing machineries before production

✓ Ensure the work area, floors, walls and drains are cleaned ✓ Ensure the availability of utilities (power back up, hot water, steam, compressed air etc.), measurement and control devices (temperature, weighing machine, pressure gauge etc.) ✓ Ensure the waste materials are disposed properly	
✓ Ensure all the equipment's and tools are cleaned, sanitized and ready for operation ✓ All metal equipment's and tools are air dried after cleaning ✓ Material handling equipment's (conveyor systems, forklifts etc.) and storage facility (crates, bins cold storage etc.) are available for operation	

3.2.9 Performance check on machines and equipment's

✓ Ensure the equipment's disassemble for cleaning are reassembled ✓ Equipment's are calibrated wherever necessary ✓ Monitor the control panel of the machineries and ensure the process parameters are set as per the standards ✓ Ensure all the regulatory keys are in working condition	

Practical 5: Prepare and maintain work area in a baking unit.

Aim: to acquire hands on knowledge on preparation of work area and process machineries before starting of processing in a baking unit.

Materials required: cleaning agents, sanitizers, disinfectants, cleaning aids.

Methodology:

1. Perform the cleaning operation as described in the

Sl. No.	Name of food contact surfaces cleaned	Name of nonfood contact surfaces cleane	Name and strength of cleaning agents used
1			
2			
3			
4			

Table 11: Observation sheet for cleaning and sanitization

Practical 6: Prepare and maintain process machineries of a baking unit.

Aim: to acquire hands on knowledge on preparation of process machineries before starting of processing.

Materials required: COP reagents.

Machineries to be covered: flour sifter, mixer, sugar grinder, dough maker, dough elevator, cutter, moulder, bread/cake pans, baking oven, cooling conveyor, metal detector, packaging machines, labeling machines.

Methodology:

1. Understand the machineries used in baking unit
2. Wear all PPE's for the required activity
3. Execute CIP of the machineries for the internal cleaning and carry out COP of the other machineries

Table 12: Observation sheet for maintain machineries for production

Sl. No.	Name of the activity	Time taken to conduct the activity

Unit 3.3 Machine Maintenance and trouble shooting

3.3.1 Machine Maintenance

The maintenance procedures followed in food processing industry are broken into four categories. They are:

Table 13: Types of Maintenance

1	Periodic maintenance	· Involves periodically inspecting, servicing, and cleaning the equipment · Involves periodic replacing of parts to prevent sudden failure and process problems · Equipment calibration
2	Preventive maintenance	· Involves predicting the service life of important parts/equipment · Regular inspection or diagnosis · Parts/equipment are replaced as per manufacturers specifications · Lubrication as per SOP
3	Corrective maintenance	· Involves redesigning of equipment to improve reliability
4	Breakdown maintenance	· Involves repairing of equipment after breakdown · Inform maintenance department if major breakdown happens.

3.3.2 Signs and symptoms of machine breakdown

Before breaking down completely, each machine shows a variety of signs and symptoms indicating the type and severity of fault. Some of them are given below;

1. Abnormal sound
2. Burn smell
3. High vibrations
4. Leakages
5. Alarms etc.

3.3.3 How to avoid machinery breakdown

- Understand and follow manufacturer's instructions
- Proper cleaning and maintenance (cleaning as per SOP, preventive maintenance, lubrication etc.)
- Do not over run the machines
- Maintain good electrical connections
- Replace parts as per manufacturers recommendation
- Do not misalign tighteners
- Do not ignore warning signs
- Run the machine if you are trained well

3.3.4 Responsibilities of production worker in emergency shout down of machine

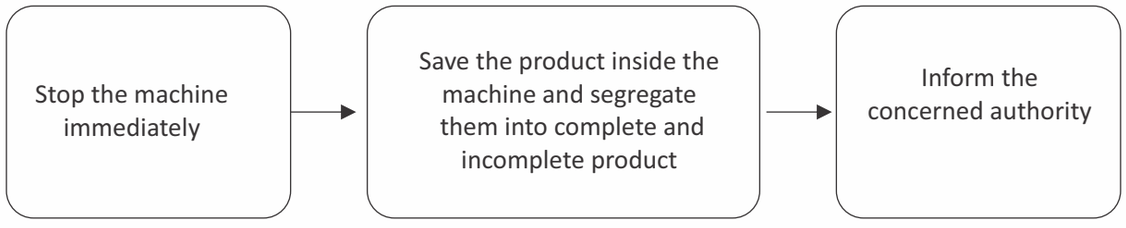


Fig. 38. Responsibilities of production worker in emergency shutdown of machines

Notes

Unit 3.4 waste management

Unit Objectives

At the end of the session, participant will be able to:

- Explain the method of managing and disposing waste material in a food processing unit.

3.4.1 Waste management in food processing industries

Food waste and other waste shall be removed periodically from the production area to avoid potential hazards. In a food processing facility, the disposal of solid, liquid and gaseous effluents is done in conformance with requirements of organization / Environment Pollution Control Board. Waste materials generated in a food processing unit can be classified as:

i. Solid wastes

ii. Liquid wastes

iii. Oily wastes

iv. Gaseous waste/water vapors

i. Solid wastes: Wastes generated during operations such as processing or generated during maintenance are referred to as solid wastes. E.g. wasted from meat processing industry, ghee residue, peels of vegetables etc

ii. Liquid wastes: The waste generated in the liquid form, during various operations performed in the processing industries such as washing, cleaning, flushing, manufacturing etc. are referred to as Liquid wastes. E.g. cleaning chemicals, flushing fluids etc

iii. Oily wastes: The wastes which involve oil lubrication such as coolant leakage and motors, along with leakage from hydraulic machines, crankcases, compressors etc. are termed as oily wastes. Separate disposal methods are adopted for oily wastes, differentiating them from liquid wastes.

iv. Gaseous wastes/water vapors: The waste released in the air either in gaseous state or in the form of volatile vapors are termed as Gaseous wastes. The odious fume from the chimney which consists of various gases like CO2 and CO polluting the environment to a great extent, refrigerant leakage from pipe lines of the compressors are example of gaseous waste

All the food processing units must have an Effluent Treatment Plant (ETP) to treat waste material and water before disposal.

Fig. 39. Effluent treatment plant

3.4.2 Methods for minimizing environmental damage

The entire food chain from farm to table has a significant contribution to pollution, global warming potential, acidification and eutrophication potential as well as consumption of water and energy. Ammonia is the dominant source of acidifying emissions during animal production. Some methods to minimize environmental pollution from the food industry are following

- ✓ Do not dumb wastes into public sewages, instead implant water treatment systems in the processing unit
- ✓ The solid wastes shall be combusted to avoid health issues to public
- ✓ Watch the usage of water for activities in the processing plant

Notes

Exercise

Fill in the blanks with correct option

1. The temperature of hot water shall be -------- 0 F for efficient sanitization
   a. 160
   b. 180
   c. 170
   d. 200

2. In CIP cleaning, the ----------% of caustic used for cleaning
   a. 0.5-1 %
   b. 1-1.2%
   c. 1.5-2 %
   d. 2-3 %

3. ---------- is the indicator used in carry over test to detect the presence of caustic in final rinse water during CIP cleaning
   a. Lodine
   b. Phenolphthalein
   c. Hydrogen peroxide
   d. Caustic

4. Match the following CIP process

1	Pre-rinse	a.	Circulate caustic solution 1-1.2% caustic for 10 minutes at 75-80°C and drain
2	Cleaning agent	b.	With fresh clean water at 45-50°C, circulate for approximately 2 minutes and drain
3	Fresh water rinse	c.	With fresh clean water at 45-50°C
4	Sanitization	d.	Final rinse with fresh water
5	Fresh water rinse	e.	Sanitize with hypochlorite solution just before use

5. Expand ETP
   a. Effluent Treatment Plan
   b. Effluent Treatment Plant
   c. Emergency Treatment Plant
   d. Emergency Treatment Plant

6. Which among the following is not a signs and symptoms indicating machinery break down
   a. Abnormal sound
   b. Burn smell
   c. High vibrations
   d. Rotten smell

7. ---------- involves periodically inspecting, servicing, and cleaning the equipment
   a. Periodic maintenance
   b. Preventive maintenance
   c. Breakdown maintenance

8. Which among the following is not an sanitizing agent
   a. Hypochlorite's
   b. Chlorine
   c. Hot water

9. The risk associated with chlorine as a sanitizer is
   a. Leads change in color
   b. Leads corrosion
   c. Leads change in texture

10. Which among the detergents used in food industry does not leads corrosion in food contact surfaces
    a. Potassium Hypochlorite
    b. Sodium Hypochlorite
    c. Ozone

Notes

Notes

4. The Production Process

FICSI
Food Industry Capacity and Skill Initiative

Unit 4.1- Operation of machineries and equipment's

Unit 4.2- Post Production cleaning and storage of tools

Unit 4.3- Manufacturing Process and Controls in Bakery industry

Unit 4.4- Manufacturing Process and Controls in Fruits and Vegetable Processing industry

Unit 4.5- Manufacturing Process and Controls in milk and milk products processing industry

Unit 4.6- Manufacturing Process and Controls in meat processing industry

(FIC/N9020)

Key Learning Outcomes

At the end of the module, the participants will be able to:

1. State different types of mechanized production process followed by food industries;
2. Explain how to ensure the availability of raw materials for the smooth running of production unit
3. Understand how to operate machineries to produce food products
4. Explain the precautions to be taken while packaging, labeling and storage of finished product;
5. Explain the factors affecting efficient production process
6. Demonstrate the process of post-production cleaning of work area and processing machineries
7. State various food safety equipment's used in baking, fruits/vegetables, milk/milk products and meat processing units and understands various process steps and hygienic controls related to them.

Unit 4.1 Operation of machineries and equipment's

Unit Objectives

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

1. Classify the different unit operations followed by food processing industries
2. Understand the process of reviewing the production plan and optimizing the machineries and raw materials for production
3. Explain how to carry out production in a mechanized processing line
4. Explain the importance of conducting quality checks for raw materials and finished goods
5. Explain the method of handling and storage of finished goods
6. State different factors affecting efficient production process

4.1.1 Classification of unit operations in food processing

Table 14: Unit operations in food processing

No	Group of operations	Typical food processing operation
1	Mechanical processing	Peeling, cutting, slicing, size reduction, sorting, grading, mixing, emulsification
2	Assembly operations	Agglomeration, Extrusion and forming
3	Mechanical separation	Screening, filtration, mechanical expression, centrifugation
4	Mechanical transport	Pumping of fluids, Pneumatic conveying, Hydraulic conveying, mechanical conveying
5	Heat transfer operations	Blanching of vegetables, cooking and frying, pasteurization, Sterilization, evaporation, cooling, freezing and thawing
6	Mass Transfer operation	Spray Drying, tray drying, fluid Extraction and distillation
7	Membrane separations	Ultra-filtration, Nano-filtration, Reverse Osmosis
8	Non-thermal preservation	Irradiation, High pressure processing

4.1.2 Pre-requisites for the efficient production process

4.1.2.1 Reviewing the Production order

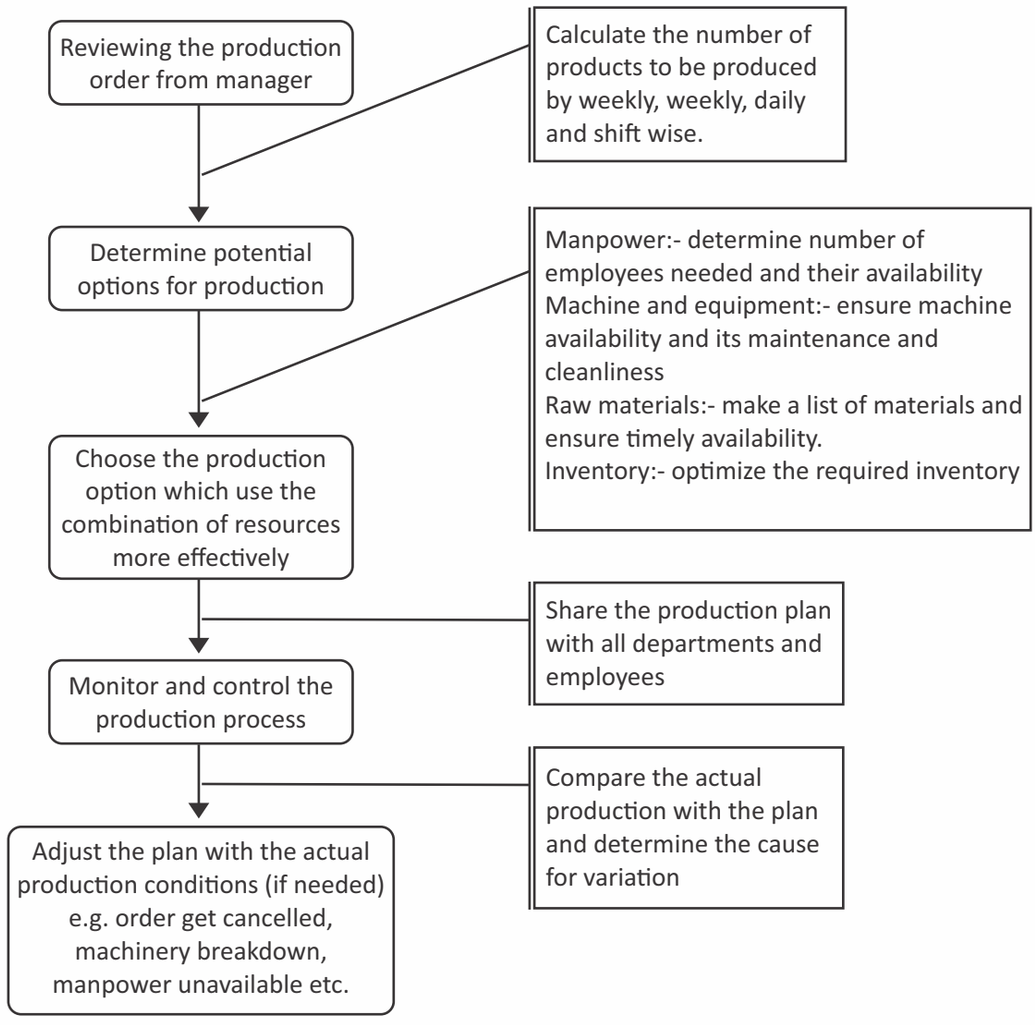


Fig. 39. Methods to review production order

4.1.2.2 Availability of raw materials

- ✓ All raw ingredients must be transported to the processing area prior to actual processing.
- ✓ Care should be taken while moving, handling and storing raw materials to avoid damage.
- ✓ Mixing of ingredients (if necessary) shall be done hygienically before loading into the machine
- ✓ Ensure timely availability of raw materials for the smooth running of machineries

4.1.3 Operation of machineries and equipment's

4.1.3.1 Conduct performance check on machineries

✓ Ensure all the regulatory keys are working properly ✓ Inspect/check machines prior to operation for any mechanical inefficiency. Report if any technical maintenance is required. ✓ Identify and report variation/ technical issues and possible indicators of fault in operating condition ✓ Maintain time temperature combination as per organizations standards e.g. pasteurized foods, blanching of vegetables etc.	

4.1.3.2 Loading of raw materials into machineries

✓ Review the production plan and get instructions from supervisor before starting production ✓ Ensure all the raw materials confirm to the quality standards of the organization ✓ Do not overload the machines ✓ Load the raw material on the machine effectively and safely, check and control line speeds, production rates etc.	

4.1.3.3 Quality inspection

✓ Obtain samples for inspection against required standard in the beginning of the production, in between and at the end of the production. ✓ Understand the quality parameters of the product produced. ✓ Identify and pick the unacceptable (leaked, underweight) product from the conveyor belt and dispose as per SOP	

4.1.3.4 Packaging and labeling

✓ Hygienically load the packaging material into the machine ✓ Check the ink rollers for labeling before starting the machine and if required refill it. ✓ Make sure all the finished product is labeled clearly before dispatch as per SOP ✓ Check and adjust the staking to avoid blockage/jam	

4.1.3.5 Finished goods handling

✓ Finished food products must always be stored away from raw ingredients, cleaning agents and other inventories ✓ Perishable ingredients must be kept at the proper temperatures as per SOP ✓ Care should be taken while moving finished products to avoid damage to packaging materials. ✓ Damaged product must be stored in a separate area and must be clearly marked	

4.1.4 Factors affecting production

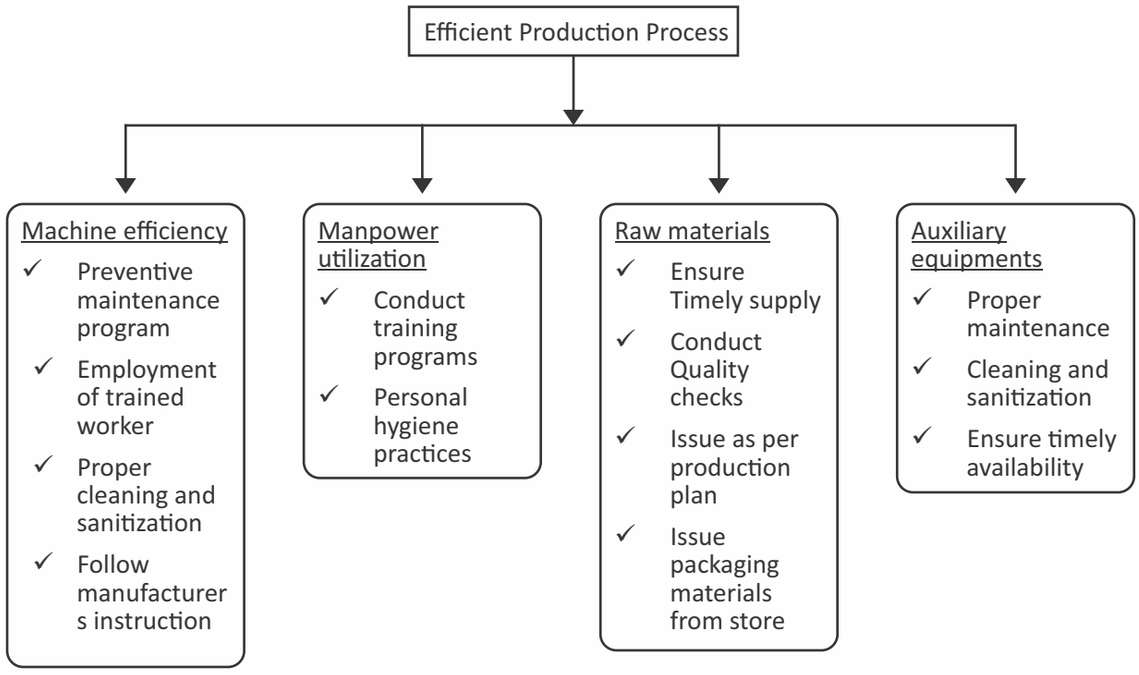


Fig.40. factors affecting efficient production process

Practical test 7: Planning the equipment utilization for mechanized production.

Aim: To acquire hands on knowledge on planning the process time for effective utilization of machineries.

Materials required: work flow diagram, sop, and raw materials, ready to use machineries.

Methodology:

1. Calculate the number of times you will require to operate the machine for the given batch size and machine capacity.
2. Calculation
   Consider capacity of machine is= 'x' kg
   Batch size is = 'y' kg
   Number of times the machine needs to operate for optimum utilization= x/y.
   For e.g. machine capacity is 200 kg and batch size is 50 kg,,
   Then number of times the machine needs to operate= 200/50= 4.
3. Select only the raw materials which meets the quality parameters
4. Check machineries are working properly before actual production commences
5. Carryout production with supervision of trained operator

Table 15: Observation sheet for production

Sl. No.	Production size	Batch size	Equipment's/ machines used	No of times Equipment's/ machines used	Duration of process
1					
2					
3					
4					
5					

Table 16: details of production

Sl. No.	Total production time	Total materials produced
1		
2		
3		
4		
5		

Practical 8: Hands on training on packaging of pouch milk in a dairy plant.

Aim: to acquire hands on knowledge packaging machine operation.

Methodology:

1. Conduct pre-operational requirements (cleaning/sanitization, wear PPE's, approval from QC department)
2. Conduct the operations (starting, stopping, functions of regulatory control keys etc) along with the instructions from the trained person from the unit.

Unit 4.2 Post Production cleaning and storage of tools

Unit Objectives

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

- Demonstrate the process of cleaning the work area and machineries after production

4.2.1 Post production cleaning method

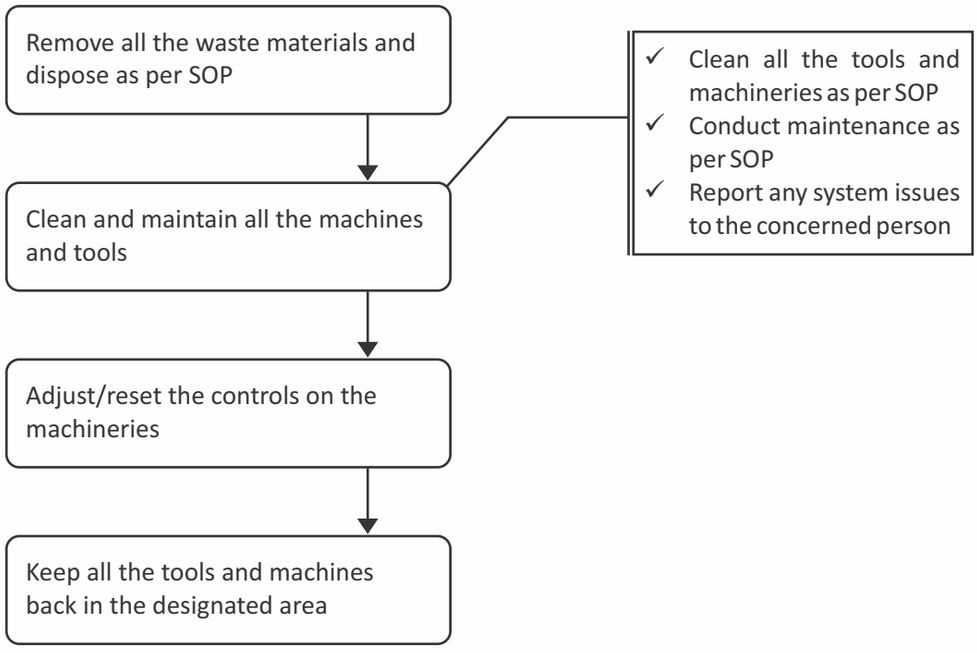


Fig. 41. Method for post production cleaning and sanitization

Practical 9: Conduct post production cleaning and sanitization in a meat processing unit

Aim: to acquire hands on knowledge on post production cleaning and sanitization of production line.

Methodology:

1. Conduct the post production cleaning operations along with the instructions from the trained person from the unit.
2. Understand the use of PPE's while cleaning operation.

Unit 4.3 Manufacturing Process and Controls in Bakery industry

Unit Objectives

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

- State various food safety equipment's used in bakery industry;
- Understand various process steps and hygienic controls related to them.

4.3.1 Food Safety equipment's used in a baking unit

The Food Safety equipment's are used to keep the food safe by eliminating the risk of foreign particles.

Main equipment's used to ensure food safety is: -

- Metal Detectors: they are used to detect metal pieces that may contaminate food.
- Sieves: Used to sift foreign matters from the raw materials.
- Magnets: used to remove metal pieces from raw materials.
- Filters: used to remove contaminants from liquid ingredients and water
- Oozier: Keep the environment sterile.
- Air/plastic curtains: restrict the entry of insects and dust.

4.3.2 Material Flow in Baking unit

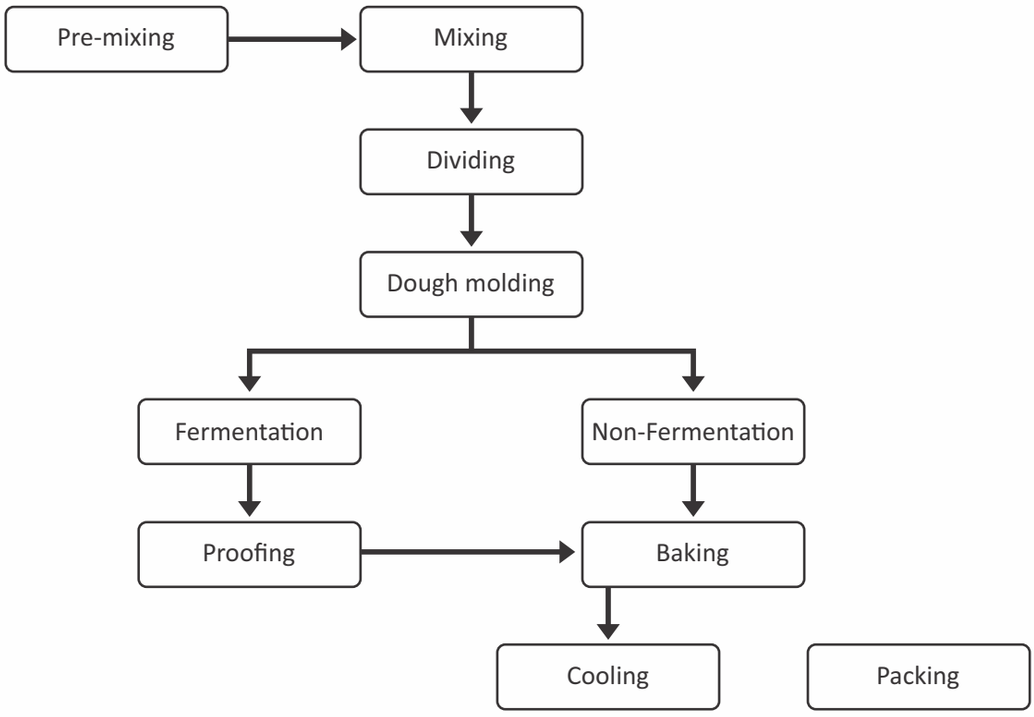


Fig. 42. Material flow in a bakery unit

4.3.3 Hygienic controls to be taken by a production worker

Premixing

i) All the Flour used for production shall be sieved through minimum 32u mesh.
ii) Prevent cross-contamination while pre-mixing of ingredients
iii) Pass sugar through magnetic grill to remove contaminants.
iv) Broken egg- shells shall be disposed off from the production area at regular intervals.

Mixing

i) Make sure, the mixing room is clean, and the mixing utensils are free from old batter.

Processing

i) Baking room shall be clean and dry. Temperature control shall be maintained as per SOP.
ii) Controls shall be maintained on temperatures, humidity, and baking time.
iii) Finishing, cutting, and decorating shall be done hygienically.

Packaging and Storage of Finished Product

i) The packaging material shall be free from anyextraneous matter.
ii) Sterilize the Slicer blades and conveyor belts with isopropyl alcohol as per SOP.
iii) The packaging machines shall be sanitized as per SOP of the organization.
iv) The finished products shall be stored as per the SOP and FIFO (First In First Out) shall be applied for finished goods dispatch

Unit 4.4 Manufacturing Process and Controls in Fruits and Vegetable Processing Industry

Unit Objectives

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

- Understand various process steps and hygienic controls related to them in fruits and vegetable processing industry.



4.4.1 Hygiene Controls in Specific Process Steps

Table 17:Steps of hygiene controls in specific process

Sl. no.	Processing step	Responsibilities of operator
1	**Receiving**	a. Visually examine the vehicle for cleanliness b. Rejection of damaged/moldy materials c. Checks for foreign Material such as wood, glass and other non-metallic substances d. Understand correct sampling methods for inspection e. Ensure testing equipment's are calibrated
2	**Storage**	a. Control of store room temperature and humidity as per SOP b. Supervise stock rotation procedure c. Implementing cleaning schedules. d. Fumigation of wooden pallets as per SOP
3	**Sorting and Grading**	a. Check for physical hazards foreign matter such as stones, dirt, wire, string, sticks, excreta etc. b. Checks for rotten/damaged parts c. Checks for presence of metal pieces

4	**Cleaning and washing**	a. Minimize losses by correct handling b. Washing shall be done in portable water, ozonated Water or chlorinated water c. Dosage of sanitizer solution shall be correct to prevent further deterioration of the products
5	**Blanching**	a. Understand Time & temp of blanching
6	**Processing**	a. Shredding, cutting, crushing, blending, pulping, pitting, coring shall be done in a manner to avoid product contamination and minimize deteriorative reactions such as browning. b. Understand adequate drying time and temperature. c. Avoid cross contamination d. Maintain rate and temperature of freezing e. Maintain records of batches prepared
7	**Preservation**	a. Understand permitted levels of preservative
8	**Packaging and storage**	a. Check for physical appearance of container/package. b. Calibrate the weighing scale on regular basis c. Handle properly to minimize loses d. Check for packaging/labeling defects e. Store the packaged items away from raw materials as per SOP
9	**Shipping/ Distribution**	a. Inspection of container for seal and tamper-proof. b. Maintain stock rotation procedure as per SOP

Unit 4.5 Manufacturing Process and Controls milk and milk products processing industries

Unit Objectives

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

- State various food safety equipment's used in milk and milk products processing industry;
- Understand various process steps and hygienic controls related to them.

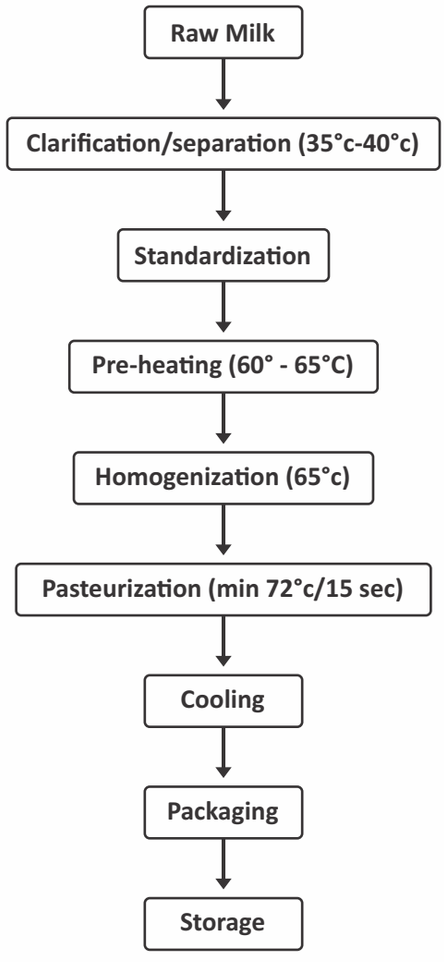


4.5.1 Milk Handling Equipment's

Sl no	Equipment		Daily Checks
1		**Weighing bowl**	• Cleaning and sanitization before start and end of reception • Check accuracy of weighing with standard weight. • Check gasket of weighing bowl for leakage
2		**Milk lines**	• CIP of complete line • Gaskets should be clean and intact • Run water in the line before start up to check leakages after assembling
3		**Line filters**	• CIP of complete line • Gaskets should be clean and intact • Run water in the line before start up to check leakages after assembling
		**Milk pump**	• CIP of complete line • Gaskets should be clean and intact • Run water in the line before start up to check leakages after assembling

5		**Milk Chiller/ Plate Heat Exchanger**	• Unusual sounds, vibrations and leakage shall be checked
6		**Storage Tanks/ silo**	• Clean when emptied • Inspect for any corrosion
7		**Pasteurizer**	• The Pasteurizer should be CIP cleaned regularly after day's operations.
8		**Packaging machine**	• Daily inspection for cleanliness

4.5.2 Material flow in milk processing plant



Flow Chart:Milk processing

4.5.3 Hygiene Controls in Specific Process Steps

Table 19: Steps for hygiene controls in milk plant

Sl. No.	Operation of Milk Plant	Responsibilities of operator
1.	**Operation of Milk Plant**	• Follow sampling procedure as per the SOP of the organization • Start unloading of raw milk only after getting clearance from laboratory. • Use calibrated instruments for sampling • Avoid loss of milk while unloading • Ensure the chilled water supply pumps are started & chilled water supply valves are opened.
2.	**Pasteurization**	• Do not allow pasteurizer to run dry at any stage during the operation • Follow the time temperature combination as per the standards of the organization
3.	**Packaging**	• Commence the packaging after getting clearance of the first pouch by laboratory. • Check the pouches for leakages, under / overweight, bag length, proper printing of date and head of packing machine and cleanliness. • Get clearance from the laboratory of the last pouch packed and shut down the machine and close all the valves • Follow good hygienic practices while work
4.	**Storage of packed milk**	• Packed milk shall be stored in cold room till it is dispatched • Maintain the temperature of cold room as per organizations standards • While dispatching the First-in-First-out (FIFO) method shall be followed
5.	**Storage of packed milk**	• All crates shall be inspected properly before washing. Any crate having excessive spoilage is cleaned manually. • Detergent solution should be of proper strength and heated to required temperature. • All spray nozzles of the crate washer shall be properly open. • Enough water and steam pressure shall be ensured before washing crates.

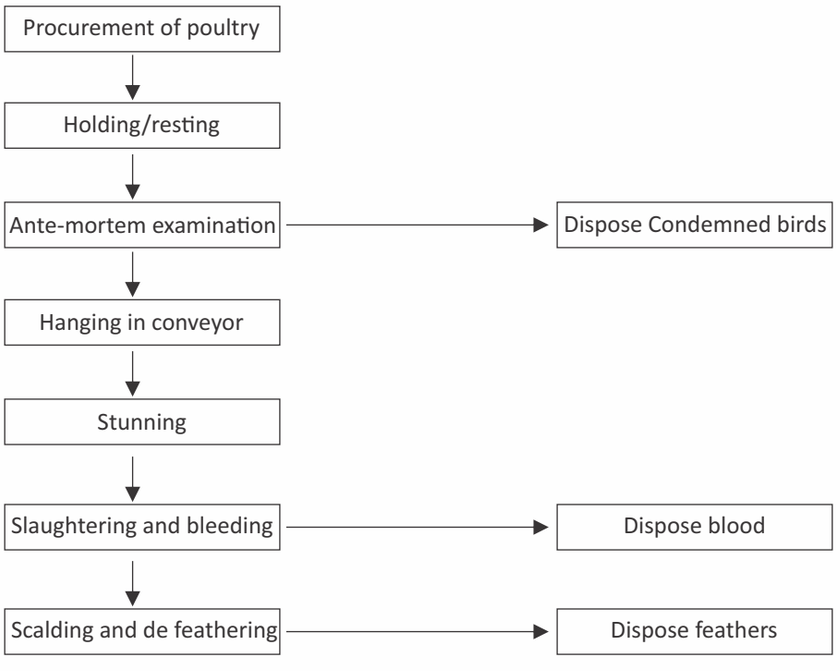
Unit 4.6 Manufacturing Process and Controls in Meat Processing Industries

Unit Objectives

At the end of the module, the participants will be able to:

- Explain the material flow in meat processing industry;
- Understand various process steps and hygienic controls related to them.

4.6.1 Processing of poultry meat



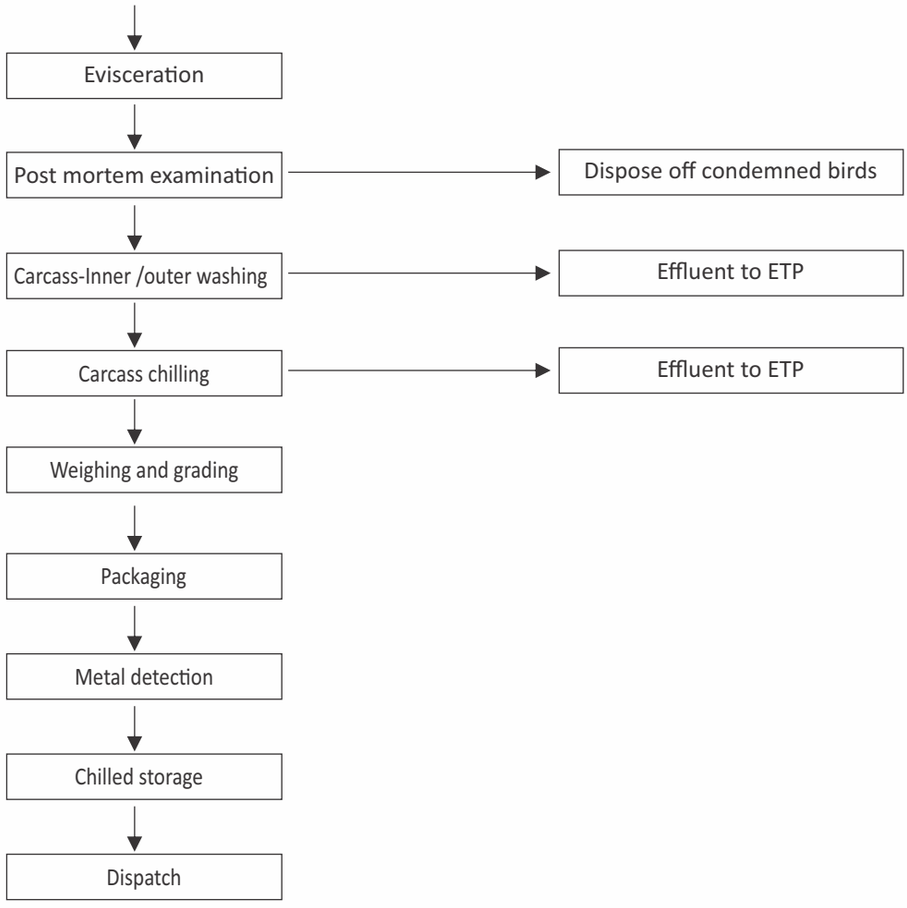


Fig. 44. Material flow in a meat processing unit

4.6.2 Hygiene Controls in Specific Process Steps

- Do not make any harm to the birds while handling
- Clean and sanitize the slaughtering area and equipment's as per SOP.
- No live bird shall enter scalder.
- Temperature shall be maintained for efficient scalding process
- While de-feathering, avoid rupturing of skin.
- Wash the carcass with antimicrobial agent and portable water to reduce the microbial load
- Chill the carcass to below 4°C.
- While Freezing core temperature of the carcass shall be at or below -18°C.
- Condemned birds/ wastes shall be disposed as per SOP of the organization

Exercise

Fill in the blanks with correct option

1. ------ is used in baking industries to keep the environment free from microbes and other germs
   a. Air curtains
   b. Oozier
   c. Magnets
   d. Sieves

2. Which among the following is not a sub sector of food processing industry?
   a. Dairy
   b. Bread and bakery
   c. Fruit and vegetable
   d. Petroleum

3. Spray Drying, tray drying, fluid Extraction and distillation comes under which category of food processing
   a. Heat transfer operations
   b. Mass transfer operations
   c. Membrane filtration

4. Chilling of carcass is none at ---------- °C
   a. 3
   b. 2
   c. -18
   d. 4

5. Contact parts of packing machines in baking unit shall be cleaned with ---------- ppm of hypochlorite solution
   a. 50
   b. 100
   c. 500
   d. 15

6. ---------- is conducted in fruit and vegetable processing industries to remove physical hazards (foreign matter)such as stones, dirt, wire, string, sticks, excreta, other animal contamination
   a. Blanching
   b. Preservation
   c. Sorting and grading
   d. Processing

7. FIFO stands for
   a. First In First Out
   b. First In Last Out
   c. Last In First Out
   d. First Input First Out

8. When the capacity of machine is 1000 kg, the batch size to produce is 100 kg, calculate the number of times the machine needs to operate
   a. 10
   b. 5
   c. 20
   d. 100

Notes

Scan this QR Code or click on link to access related videos

Scan this QR Code or Click on below link to access video on Introduction to the Bread & Bakery Industry

Scan this QR Code or click on below link to access video of
Overview of Fruits and Vegetables Processing

Scan this QR Code or click on below link to access video of
Overview of Dairy Industry

Scan this QR Code or click on below link to access video of
Overview of Meat and Poultry Industry

5. Documentation and Record Keeping

Unit5.1- Need of documentation and record keeping

Unit5.2- Process of documenting records

FIC/N9020

Key Learning Outcomes

At the end of the module, the participants will be able to:

1. Understand importance of documentation;
2. State do's and don'ts of documentation.
3. Understand the structure of documentation followed by food processing industries
4. Understand importance of maintaining records of all the activities taking place in a food manufacturing unit
5. List different types of records maintained in a food manufacturing unit

Unit 5.1 Need of documentation and record keeping

Unit Objectives

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

1. Understand importance of documentation
2. State do's and don'ts of documentation

5.1.1 Documentation and record keeping

Every organization must maintain records of all the activities taking place within.

Fig. 45. Benefits of documentation

Dos and don'ts of documentation

Do's	Don'ts
Use permanent ink	Do not use pencil
Write clearly	Do not use “Tipp-Ex”
Strike out mistakes (initial & date)	Do not obliterate mistakes
Make entry at time each action is undertaken	Do not leave empty boxes
Sign signature entries	

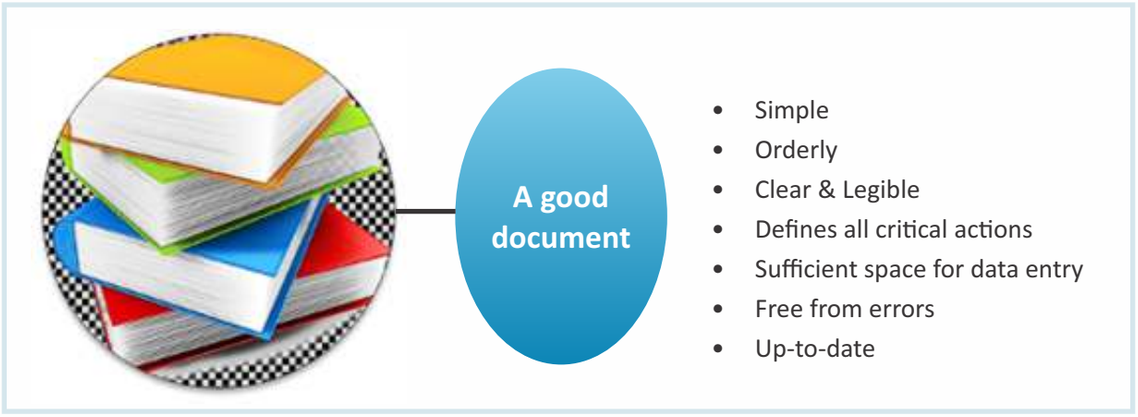


Fig. 46. Criteria's of a good document

5.1.2 Types of data recording

Table 20: Type of records		
1	Paper work	
2	Electronic	

5.1.3 Structure of Documents

Table 21: Structure of Documents		
Level 1	Quality Assurance Manual	✓ Mandatory for ISO ✓ Relates goals, objectives and accountability
Level 2	SOP's (standard Operating Procedures)	✓ Defines how a process/area function
Level 3	WI's (Work Instructions)	✓ Defines how a work objective can be achieved
Level 4	Records	✓ Evidence of conformance

Unit 5.2 Process of documenting records

Unit Objectives

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

- Understand importance of maintaining records of all the activities taking place in a food manufacturing unit
- List different types of records maintained in a food manufacturing unit

5.2.1 Importance of maintaining records

Appropriate records of processing, production and distributions must be maintained in a legible manner, retained in good condition for a period of one year or the shelf life of the product, whichever is more.

The records maintained in a food processing unit are as follows:

Table 22: Type of documents

Legal	I. FSSAI License and Registration of Manufacturer/Supplier/Dealers/Retailers II. Pollution Certificate of factory III. ETP Compliance record
Procurement/Quality	I. Raw material receiving and traceability records II. Quality Control / Lab test reports records/Compositional analysis/Microbial test records III. External testing reports - Microbiological / chemical test reports pertaining food products, water, other food ingredients, additives etc IV. Certificates of Analysis/COA V. Internal and external audit records/ Corrective action (CAPA). VI. Records for receipt of packaging materials and COA/Supplier certification. VII. Certificate for Virgin / food grade Packing material VIII. Certificate of Ink approved for use for packaging. IX. Testing record of Packaging materials. X. Records of samples picked up FSSAI/State FDA authorities.

Production/Processing	I. Daily production records II. Raw material consumption/utilization records III. Process monitoring records – CCP's IV. Temperature records of storage facilities V. Consolidated daily production records. VI. Packing/Packaging records VII. Dispatch records
Procurement/Quality	I. Cleaning, hygiene and sanitation records. II. Pest Control and routine treatment records. III. CIP Record - Processing Level IV. Record of Equipment Swabs for Monitoring Effectiveness of Cleaning V. Record - Periodic Review of Residual Chemical after Cleaning VI. Records of Cleaning and Disinfection for Cold Stores/ Freezers VII. Vehicle inspection record –incoming and outgoing
Cleaning, Sanitation and Pest Control	I. Cleaning, hygiene and sanitation records. II. Pest Control and routine treatment records. III. CIP Record - Processing Level IV. Record of Equipment Swabs for Monitoring Effectiveness of Cleaning V. Record - Periodic Review of Residual Chemical after Cleaning VI. Records of Cleaning and Disinfection for Cold Stores/ Freezers VII. Vehicle inspection record –incoming and outgoing
HR documents	I. Training record of Food handlers. II. Health record of employees III. Record of system to prevent entry of Person from other Department suffering from diseases/Visitor entry records IV. Record of Hygiene monitoring of operators/ Workers V. Training Records of Officer's (new Joinees/ OJT or Identified Trainings)
Marketing	I. Consumer complaint records II. Product Traceability Record - Mock Recall Simulation III. Product recall and traceability record
Maintenance records	I. Calibration records II. Preventive and breakdown maintenance records

Exercise

Fill in the blanks with correct option

1. While writing a document, you should not ----------

a. Use permanent ink

b. Strike out mistakes

c. Sign entries

d. Use pencil

2. Which among the following records are not required for legal purpose

a. FSSAI License and Registration

b. Pollution Certificate of factory

c. Production records

3. ---------- is used to define how a work objective can be achieved

a. SOP

b. work instruction

c. quality manual

4. ---------- document is mandatory for ISO

a. Quality assurance manual

b. SOP

c. Work instructions

5. ETP Compliance record is a

a. Legal record

b. Production record

c. Procurement record

Notes

Scan this QR Code or click on link to access related videos

Scan this QR Code or click on below
link to access video of
Documentation and Record Keeping in Food Processing Unit

6. Basic Health and Safety Practices at Food Processing Workplace

FICSI
Food Industry Capacity and Skill Initiative

Unit 6.1- Workplace safety
Unit 6.2- Types of Safety and safety measures
Unit 6.3- Methods to build safety in daily operations
Unit 6.4- Emergency response and evacuation
Unit 6.5- Rescue techniques during emergency
Unit 6.6- Basic first aid methods
Unit 6.7- Methods of accident prevention
Unit 6.8-Managing the safety hazards in different industries

(FIC/N9002)

Key Learning Outcomes

At the end of the module, the participants will be able to:

1. Define workplace safety; its importance and understand the safety rules to be followed while working in an organization
2. Understand different types of safety and safety rules to be followed in workplace;
3. Explain the common causes of industrial fires
4. Understand how to build safety in daily operations at workplace
5. Explain the do's and don'ts of safety at workplace
6. State different types of emergencies and how to tackle with them;
7. How to evacuate from a building in case of fire;
8. How to use a fire extinguisher and fire bucket
9. Explain fire rescue techniques at emergency
10. Explain the methods to carry an injured person during emergency
11. Demonstrate the basic first aid techniques for different kind of emergency at workplace
12. Demonstrate how to conduct CPR
13. State the importance of effective cleaning and housekeeping program to prevent accidents in the workplace
14. Understand and execute pest management plan at workplace;
15. Explain the safe methods to dispose waste materials
16. Understand the importance of attaining safety trainings at work
17. Understand the method of reporting incidents
18. State different types of hazards commonly seen in food processing industry;

Unit 6.1 Workplace safety

Unit Objectives

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

1. Define workplace safety; and its importance
2. Understand the safety rules to be followed while working in an organization
3. Explain the hazards associated with different food industries.

6.1.1 Workplace safety

Workplace safety comprises all factors that impact the safety, health, and well-being of employees in the working environment.

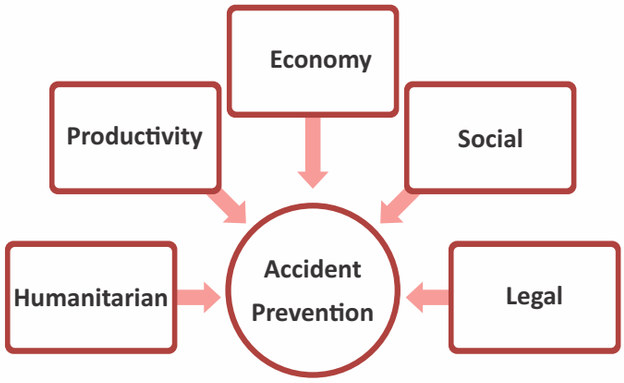
Why is health and safety important?	How workplace can be made safe?
 Fig. 47. Importance of health and safety	✓ Understand the hazards associated with each task ✓ Wear PPE's wherever necessary and adhere to good hygienic practices ✓ Keep the work area clean ✓ Report unsafe conditions to the concerned authority immediately ✓ Reduce workplace stress and take breaks ✓ Use mechanical aids wherever necessary ✓ Understand the organizations policies and know your rights

Fig. 48. Commonly occurring accidents in a food processing unit

6.1.2 Workplace hazards

Table 23: Workplace hazards in food processing industries

Sl no.	Hazard type	Risks involved	Precautionary measures
1.	**Machinery Hazards**	✓ Moving Conveyors ✓ Falling objects and compressed equipment	✓ Machine guarding: wear appropriate PPE's ✓ Lockout/tag out (LO/TO): shut down properly when not in use, de-energize and locked out ✓ Follow Preventive maintenance program ✓ Loud noises create communication gap which create risk of injury
2.	**Leakage of gases**	✓ Corrosive: some gases may cause damage to the skin, eyes, and lungs e.g. ammonia. ✓ Flammable ✓ Explosive: In an enclosed space with ignition source some gases may cause explosions.	✓ Proper marking of the pipes ✓ Display the pressure level, flow direction contents etc
3.	**Slip, Trip, and Fall Dangers**	✓ major causes of injury	✓ Good housekeeping programs ✓ Provide drainage and stand on floor mats where ever necessary ✓ Follow Floor marking and way finding tape
4.	**Falls from Height**	✓ Cause serious injury including fatality	✓ Follow the safety rules for working at heights ✓ Wear PPE's necessary for job
5.	**Material handling**	✓ Affect the spine of employee if heavy weights are carried improperly	✓ Use lifting aids wherever necessary ✓ Do not overload while moving materials from one place to other

Unit 6.2 Types of Safety and safety measures

Unit Objectives

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

- Understand different types of safety and safety rules to be followed in workplace;
- Explain the most common cause of industrial fires and explosions.

6.2.1 Types of Safety

6.2.1.1 Personal safety: it includes use of correct personal protective equipment's (PPE's)according to the work, correct lifting and carrying posture, being aware of safety rules etc.PPE's are effective to address hazards including physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.

 Protective Gloves	 Head Cap	 Mouth Mask	 Safety Goggles	 Aprons	 Safety Boots	 Ear protection

Table 24: Personal Protective Equipment's (PPE's)

6.2.1.2 Chemical safety:

The safety guideline while handling chemicals includes:

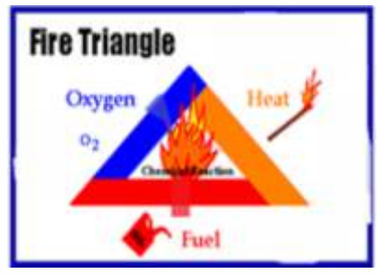
- ✓ Go through Material Safety Data Sheet (MSDS) before using any chemical
- ✓ Use appropriate PPE while handling chemicals
- ✓ Ensure the chemical storage stacks are sturdy. Heavy containers must be kept on the bottom
- ✓ Ensure the lids are tightly closed after each use
- ✓ Label the container with waterproof marker
- ✓ Avoid spillage, if spillage occurs clean it immediately
- ✓ Do not keep chemicals above shoulder height

Fig. 49. Signage's on chemical safety

6.2.1.3 Machine safety: It includes using and maintaining the equipment as per safety norms provided by the manufacturer

- ✓ Before handling machines and equipment's, learn to operate and understand as per manufacturer's instructions
- ✓ Cables, plugs and sockets must be checked for faults before operating. Voltage of machines and supplies must match.
- ✓ Loose jewelry, clothing and long hair must be kept out of running machines
- ✓ Machines and sockets must be switched off before disconnecting,
- ✓ Hands shall be kept dry while handling machine and right PPE's should be worn always to minimize hazards
- ✓ Machines shall never be pulled by their cables. Loose cables of the machines should be kept away from the pathways to minimize hazard
- ✓ Warning signs shall be erected before starting machines

6.2.1.4 Fire safety: It includes being aware of actions to be taken in case of fire

Industrial fires and explosions happen for many reasons, mainly due to the unawareness of the danger that exist in the workplace.	

The major causes of industrial explosions are;

1) Flammable liquids and gases: The safety precautions shall be taken to eliminate the risks involved in working with flammable liquids and gasses includes;
   - ✓ Know the hazards: - Know the hazard to prevent the hazard. Understand the safety information for every liquid you may deal with. Material safety data sheet (MSDS) that comes with every chemical must be retained and make available to workers.
   - ✓ Proper storage of flammable liquids: - All hazardous materials must be stored as per SOP of the organization.
   - ✓ Control all ignition sources: - All the ignition sources shall be kept away.
   - ✓ Wear personal protective equipment's
2) Equipment and machinery: defected equipment's/ machines are one among the main reasons of industrial fires. The frictions between the parts may lead to fire incident in running machineries. Methods for preventing fires due to equipment and machinery issues includes:
   - ✓ Awareness: Undergo safety awareness training as per the organizations policies so that everyone knows how to watch the risks surround them and what they are supposed to do if some incidents happen.
   - ✓ Good housekeeping: Always keep the equipment's/machines and area surrounding them clean.
   - ✓ Maintenance: follow manufacturer's instructions for maintenance for all the equipment's/machines in processing plant. This also keeps the equipment working for long.
3) Electrical Hazards: it constitutes the main cause of fires in manufacturing plants. Some reasons for electrical hazards to occur includes:

✓ Unawareness of the worker ✓ Improper Wiring ✓ Outlets which are overloaded ✓ Use of Extension cords ✓ Overloading of electrical circuits ✓ Electro Static discharge	

Any of the above can make a spark, which may lead to fire explosion. The key to preventing electrical fires in your working premise is awareness of the hazard and prevention methods. This includes attending training, proper maintenance programs, and following practices as per SOP. Following are some points to put into practice at the workplace:

- ✓ Do not overload electrical circuits.
- ✓ Switch off the equipment when not in use.
- ✓ Do not use extension cords
- ✓ Use antistatic equipment's.
- ✓ Follow a regular housekeeping plan.
- ✓ Implement and display reporting system.

Notes

Unit 6.3 Methods to build safety in daily operations

Unit Objectives

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

- Understand how to build safety in daily operations at workplace
- Explain the do's and don'ts of safety at workplace

6.3.1 Environment, Health and Safety (EHS) Policy

EHS department in every organization is responsible for implementing safety practices at work protecting the environment too. It also provides training to the employees in preventing accidents, response to an incident, prepare for emergency, and use of PPE's. A production worker shall understand the EHS policies of the organization

6.3.2 Ladder safety

✓ Use a ladder which suits the job to be done. ✓ Inspect it for cracks/ broken parts before using. ✓ Always Place ladder on a stable and even surface. Do not place a ladder above to another object. ✓ Ensure a stable working platform (1:4 ratio). The base of the ladder should be placed 1 foot away of whatever it leans against for every 4 feet of height it contacts at the top.	

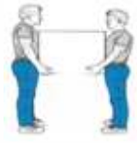
6.3.3 Safe Material handling practices

6.3.3.1 Manual material handling

The points to remember while manual handling of materials includes; ✓ While carrying of load, always keep it as near to body as possible. ✓ Always prefer to push rather than pull. ✓ Before lifting load, judge the weight of that load. ✓ Always ask for help of another person for carrying heavier objects. ✓ Ensure that there is no obstruction in the pathway	

Fig.51 Manual material handling equipment's

Table 25: Do's and dont's of weight lifting

Do's		Dont's	
Heavy weights shall be lifted as a team		Do not lift bulky loads alone	
Turn with your legs. Avoid twisting at your waist		Do not twist when lifting	
Use your legs and buttocks muscle to lift the load		Don't strain your back	
Use equipment for heavy lifting		Do not lift heavy objects alone. Use an equipment/get help from others	

6.3.3.2 Mechanical material handling

It involves the use of machines for moving and transferring materials at required location.Eg: Cranes, fork lift, chain blocks, wire rope, slings, eye bolts, shackles, lifting beams.

6.3.4 Building fire safety in daily operations

Fire safety can be accomplished by establishing as well as implementing and following the safety policies and procedures.

6.3.4.1 Fire Safety Measures

The proactive measures for fire prevention include

Fig. 52. Proactive measures for fire prevention

6.3.5 Safety at confined spaces

Confined space can be any enclosed space there exist a risk of serious injury including death for those working without taking proper precautions. E.g. storage tanks, silos etc.

Safety precautions for confined space

- ✓ Always issue a work permit for working at confined space
- ✓ Avoid entering to confined spaces unless and until the work is unavoidable.
- ✓ Implement a safe working system at confined space, use necessary PPE's
- ✓ Implement emergency plan for confined apace incidents.

6.3.6 Hazardous waste handling

Safety rules while handling hazardous waste; ✓ Stop the source of hazardous material ✓ Protect yourself ✓ Clean up the hazards as per SOP ✓ Help the co-worker and report the incident	

6.3.6 Safety do's and dont's

Do's		Dont's	
Accident / Near Miss Reporting: -Report all near miss and accidents to your immediate superior.		**Smoking: -**Do not smoke at non-designated smoking areas.	
Safety Training :- Attend and pay attention to safety trainings.		**Alcoholic Consumption :-** Do not consume alcoholic drinks while at work.	
Spills:- Clean up the spill immediately.		**Horseplay:-** Do not horseplay at work area	
Emergency Drill:- Participate in emergency drills.		**Manual Handling:-** Do not attempt to carry heavy objects. Seek mechanical aids	
Material handling:- Look out for pedestrians		**Material handling:-** Do not stay near / under suspended loads.	

Noice:- Wear ear protection for noisy operations (> 85dB).		**Hand tools:-** Do not use defective tools	
Machine Guarding :- Provide safety guards for the moving parts of the machinery		**Electrical :-** Do not play with electrical equipment unless you are trained to do so	
Housekeeping :- Maintain good housekeeping. Keep hand tools in proper places		**Lockout / Tag out (LOTO):-**Do not perform any work on moving parts of machinery. LOTO must be applied for all maintenance work.	
Staircase:- Hold the handrails when walking up / down the stairs.		**Repair Work:-** Do not attempt to repair any machinery / equipment if you are not trained.	
Storage:- Stack / store materials in proper manner to avoid toppling.		**Forklift:-** Do not overload the forklift beyond its limit.	
In Doubt :- ask to the concerned person if you are in doubt		**Sick :-** Do not work if you are not feeling well or under medication**.**	

Unit 6.4 Emergency response and evacuation

Unit Objectives

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

- State different types of emergencies and how to tackle them;
- How to evacuate from a building in case of fire;
- How to use a fire extinguisher and fire bucket

6.4.1 Types of emergencies

Different types of emergencies include

- Fires
- Earthquakes
- Flooding
- Utility failure
- Bomb threat

6.4.2 Building evacuation

To tackle the emergency in an organized way the following measures shall be taken:

- ✓ Don't be panic
- ✓ Report to management as soon as possible
- ✓ Evacuate the work area safely as per the evacuation plan
- ✓ Never use elevators or escalators. Use only fire exit staircase
- ✓ Move down wards of the building and never upwards.
- ✓ Crawl to the ground covering your eyes & nose partially if the fire and smoke are filled up.
- ✓ Assemble at the Fire Assembling Point
- ✓ On reaching Assembly area provide information about people still in the building

6.4.3 Types of fire extinguisher

There are four types of Fire extinguishers: Class A, Class B, Class C, and Class D.

Table 27: Types of fire extinguishers

Class of extinguisher	Application areas
Class A	Wood and paper fires
Class B	Flammable liquid fires
Class C	Live electrical fires
Class D	Live electrical fires flammable liquids

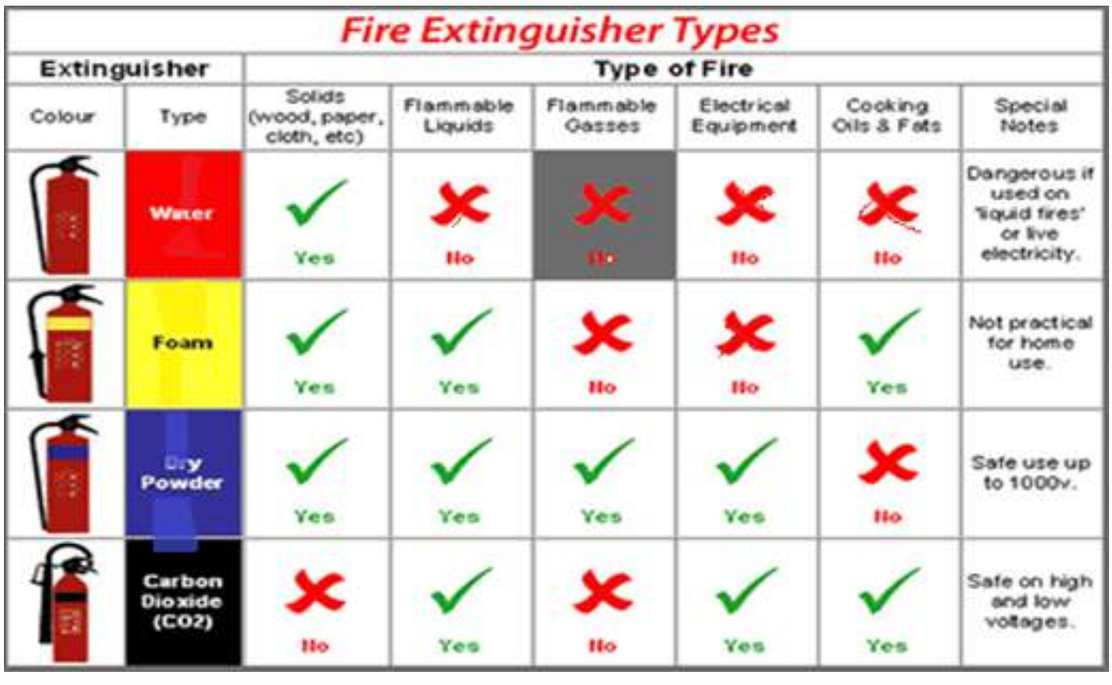


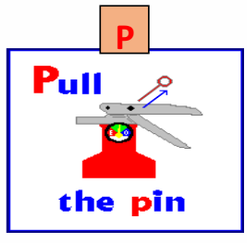
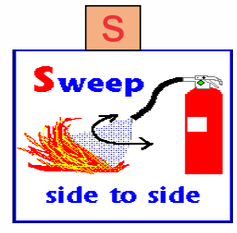
Fig. 53. Types of fire extinguisher

6.4.4 Steps to Use the Fire Extinguisher

The method of extinguishment includes

1. Cooling: - removal of temperature
2. Smothering/blanketing: - reducing oxygen to below 15 %
3. Starvation: - removal of fuel

Table 28: The basic steps to use fire extinguisher

IF IN DOUBT, DO NOT TACKLE A FIRE. Only tackle a fire if you can do so without putting yourself or others at risk			
Pull the Pin	Aim the nozzle to bottom of Fire	Squeeze the Handle	Sweep
			

6.4.5 Steps to Use the Fire Bucket

Table 29:The basic steps to use fire bucket are-

1	Fill the fire bucket with sand.	
2	Pour the sand over the fire in such a way that the flames are covered completely.	
3	Continue the process till the fire is completely under control.	
4	Fill the bucket and place at easily accessible location	

Practical 10: Demonstrate the working of fire extinguisher

Practical 11: Carryout simulation of fire evacuation

Unit 6.5 Rescue techniques during emergency

Unit Objectives

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

- Explain fire rescue techniques
- Explain the methods to carry an injured person during emergency

6.5.1 Fire rescue techniques

Table 30: Techniques of fire rescue

1. Press fire alarm button	2. Make a phone call to fire brigade	3. Evacuate the building from the closest fire exit	4. Report to assembly point
			

Table 31: What to do if your clothes catch fire

Do not run. Stop if you find fire in your clothes	Drop to the ground immediately	Roll over till fire is out of your clothes; covering your face
		

6.5.2 How to carry an injured person during emergency

An injured person shall never be moved from one place to other unless he/she is in a life-threatening situation. Moving an injured person can sometimes worsen the injury especially if he/she is having a spinal injury. Some important points to note while carrying a person to a safer place includes;

6.5.2.1 Handling a person with spinal injury: - Do not move someone with a spinal injury. This may cause even paralysis. the following are some Signs of a spinal injury;

- Injury to head
- Showing state of unconsciousness or being confused.
- Neck/back pain.
- Not able to move neck.
- Weakness or numbness of body.
- Unable to control bladder and bowels.
- Abnormally twisted head/neck.

6.5.2.2 How to stabilize someone with a spinal injury:- the following method can be adopted to stabilize someone with head/spinal injury.

- Provide protection to the head form both the sides by putting pillows as in the picture. - Provide first aid (CPR). - Do not try to remove the person's helmet off if wearing one.	

6.5.2.3 Moving a person without spinal injury

- **Human crutch method:** support the person to sit up with wrapping their arm over your shoulder. Allow the person to stand slowly by supporting. You can support their weight on the injured side. Hold the hand of injured person around your shoulders and other hand around their waist.	
- **Drag the person to safety**. This method is safer than lifting as lifting may sometimes put the injured person at risk of falling. Always pull the person slowly with utmost care. Take care to keep the person's spine aligned and does not twist unnaturally while moving.	

Practical 12: Demonstrate the Rescue techniques during emergency

Unit 6.6 Basic first aid methods

Unit Objectives

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

- Demonstrate the basic first aid techniques for different kind of emergency at workplace
- Demonstrate how to conduct CPR

6.6.1 Basic First Aid for Bleeding

- Cover the wound with a clean cloth till blood flow ends - Apply more layers of cloth depending on the depth of wound - For severe injuries seek medical care immediately to avoid the chances of shock due to blood loss	

6.6.2 Basic First Aid for Burns

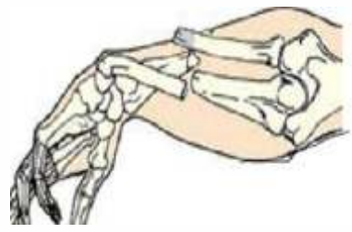
Stop the burning source as soon as possible. If burning is by the chemical exposure, itmust be cleaned off immediately. Take the following first aid steps for burns:

- With cool running water, flush the area for several minutes. Do not directly apply ice to the burned area. - Apply gauze bandage not covering the burn tightly. - Do not apply any home remedies like butter, oils etc. - Do not break the blisters formed in the burned area. - If the burn is severe, consult a doctor.	

6.6.3 Basic First Aid for Fractures

Until consulting a doctor and getting x-ray, all injuries shall be treated as bone fractures. However, the following first aid can be given to the affected person

- Never try to straighten the fractured part.
- Keep the fractured part immobile.
- A cold pack can be applied on the injury,
- Avoid applying ice on the fractured part.
- Elevate the extremity as possible.
- Consult the medical care as soon as possible



6.6.4 First aid for poisoning

Flush with water for at least 15 minutes followed by washing with soap. For eye poisoning flush for at least 15 minutes with lukewarm water. Always consult medical professionals for further treatment.

6.6.5 First aid for electric shock

An electrical shock may even lead to death if proper actions are not taken immediately. Electric current cause damage to vital organs and even cardiac arrest. Take the following actions immediately:

- If possible, turn off the electricity source. Otherwise move the source from the affected person using a non-conducting dry object e.g. cardboard, plastic or wood.
- If the person is not showing any response, begin CPR (Cardio Pulmonary Resuscitation)
- Cover the burned areas with a sterile gauze bandage or a clean cloth. Do not use a blanket or towel to eliminate the chance of sticking the loose fibers to the burns.
- Provide medical care immediately

Practical 13: Demonstrate basic first aid methods for medical emergencies

Practical 14: Learn to perform CPR

Aim: To get hands on training on performing CPR in emergency

Methodology

i. Check for a response of the person by asking loudly 'are you OK?Check his/her breathing for 10 seconds by looking for chest movements or by feeling the breath on your cheek.

ii. If breathing is abnormal, provide30 chest compressions as following

- Place the heel of one hand in the center of their chest and other hand on top of the first, Interlock the fingers by placing one hand on the chest and other on the top of your hand as shown in the picture. Press the chest down between 5–6 cm at the rate of 100-120 compressions in a minute, and release.

iii. Give two rescue breaths

- Take a normal breath, open the airway of the affected person and close his/her nose closed and make a seal around their mouth and breathe out.
- Notice if the affected person's chest is rising and falling when you do this. Give another rescue breath within 5 seconds.

iv. Repeat the chest compressions and two rescue breaths until the person gets medical care.

Fig. 54. Performing CPR

Unit 6.7 Methods of accident prevention

Unit Objectives

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

- State the importance of effective cleaning and housekeeping program to prevent accidents in the workplace;
- Understand and execute pest management plan at workplace;
- Explain the safe methods to dispose waste
- Understand the importance of attaining safety trainings at work

6.7.1 Good Housekeeping practices

A good and effective housekeeping practice is the key to eliminate workplace hazards.

An effective housekeeping program shall cover the following elements

- Effective maintenance: - maintain the buildings and equipment's in good repair, by replacing the damaged parts and maintaining as per the manufacturer's instruction.
- Dust and dirt Removal: - remove dust and dirt form the processing area on regular basis
- Well maintained employee facilities
- Floors and walls: -The civil structure of processing plant shall be cleaned by flooding with water and general-purpose cleaning solution followed by scrubbing with clean, hard brush. After giving final water rinse, mop off with a rubber squeeze to ensure rapid drying.
- Waste disposal: -dispose off the waste materials from the production area as per SOP
- Tools and equipment's: -Tools shall be placed in marked locations. Return the tools after use.

6.7.2 Cleaning and sanitization

Proper cleaning and sanitization is the key to producing high quality, safe foods. A well-trained worker is the foundation to safe food processing without accidents.

Key concepts of cleaning and sanitizing			
Cleaning steps 1. Pre-rinse 2. Wash 3. Post rinse 4. Sanitize	**Factors affeting cleaning process** 1. Time-temperature 2. Mechanical force applied 3. Concentration of cleaning agents	**Worker responsibility** 1. Follow SOP 2. Use right tools 3. Keep records up to date	**Chemical safety** 1. Correct use of chemicals as per SOP 2. Use of PPE's 3. Accident and spill response

6.7.3 Disposal of waste

Proper cleaning and sanitization is the key to producing high quality, safe foods. A well-trained worker is the foundation to safe food processing without accidents.

- Follow the organizations standard for waste disposal - Wear necessary PPE's while handling wastes - Hazardous waste materials shall be handled with extra care to avoid accidents	

6.7.4 Pest Management

Integrated pest management (IPM) is a process followed in food industries to eliminate the risks associated with pests which may adversely affect the quality of food. The pest management plan shall be executed as per the standards of the organization.

Table 32: Equipment's used for pest control

 **Gum Trap**	 **Rat trap**
 **Plastic curtain**	 **Insectocutor**

6.7.5 Work Permit

Work permit is a formal written system used for establishing communication between person requiring the work to be done and the employee who are going to execute the work. Before executing a potentially hazardous work, work permit shall be obtained from the concerned authority.

Different types of work permit

- ✓ General work permit
- ✓ Fumigation
- ✓ Height work permit
- ✓ Chemical Handling
- ✓ Excavation
- ✓ Hot work Permit
- ✓ Fire Impairment Permit

6.7.6 Health and Safety trainings

Training is the key to raise the bars of performance of employees, which also helps to prevent workplace hazards. Employees shall get necessary training when they start a job and ongoing training as often as required. The benefits of undergoing health and safety trainings include;

- ✓ To develop a positive health and safety culture without risk to health of self and co-workers
- ✓ Helps to spot dangerous health and safety risks within the workplace
- ✓ Save money on legal and insurance costs

6.7.7 Understand the hazardous signage's at work

Unit 6.8 Managing the safety hazards in different industries

Unit Objectives

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

- State different types of hazards commonly seen in food processing industry;
- Understand the process of reporting incidents

6.8.1 Safety hazards in different industries

Table 33: Various sectors along with causes of injury

Sl no.	Food processing sector	Main cause of injury
1.	Baking	• Slips by wet floors • Lifting of heavy weights alone • Handling with machineries and conveyors • Dust allergy due to flours spices and seasonings
2.	Meat, poultry and fish	• Cuts while working with knives • Slips, handling and lifting heavy objects • Handling with machinery
3.	Milk and milk product processing	• Handling and lifting heavy trolleys • Falls from ladders, tanks and silos • Machinery - moving conveyors, cuts while running packaging machines • Exposure to chemicals such as detergents/sanitizers, acids, alkalis, steam and hot water
4.	Fruits and vegetable processing	• Handling and lifting cartons • Slips on wet floor • Machinery - conveyors, packaging machines, slicing machines, palletizes

6.8.2 Incident reporting

All incidents (incidents include fatality, major injuries, first aid cases, and near misses' cases) must be reported to the concerned authority in the organization. All incidents must be reported to the site head/manager as soon as possible to investigate the route cause

Incident details	
Name of the person reporting incident:	
Persons involved in incident:	Date, time and location of incident:
Description of the incident:	
Factor contributing the incident?	
Environment	Equipment/materials
Working systems	People (e.g. communication gap, bad behavior

Exercise

Fill in the blanks with correct option

1. Which among the following is not a safe weight lifting technique?
    a. Lift from a position of power
    b. Keep the load close
    c. Do not twist while lifting weight
    d. Lift bulky loads alone

2. Which among the following is not a safe practice while handling chemicals
    a. Understand MSDS
    b. Use PPE's
    c. Store chemicals above shoulder height
    d. Close lids tightly after each use

3. Which among the following is not a safe practice while operating machineries
    a. Checks for faults
    b. Overload the machine
    c. Use proper PPE
    d. Learn to operate machines

4. Which among the following is not an element of fire triangle
    a. Oxygen
    b. Heat
    c. Water
    d. Fuel

5. What is not expected from you if your clothes catches fire
    a. Stop where you are
    b. Drop to the ground
    c. Roll over in the ground
    d. Run away from fire

6. Which among the following is not an emergency situation?
    a. Fires and explosion
    b. Earthquakes
    c. Flooding
    d. Customer complaint

7. Arrange the correct steps to use a fire extinguisher
   a. Squeeze the handle
   b. Sweep
   c. Pull the pin
   d. Aim the nozzle to bottom of fire

8. A fire bucket is filled with ----------
   a. Water
   b. Fuel
   c. Sand
   d. Oil

9. Which among the following is not supposed to do with a person with burns
   a. Flush the burned area with cool running water
   b. Apply a light gauze bandage
   c. apply ointments, butter, or oily remedies to the burn
   d. get medical care

10. Human crutch method is used for .....
   a. Moving a person with spinal injury
   b. Moving a person without spinal injury
   c. Remove an electrocuted person
   d. A first aid for bone fracture

Scan this QR Code or click on link to access related videos

Scan this QR Code or click on below link to access video of
Pest Control

Scan this QR Code or click on below link to access the video of
GHP, GMP & HACCP

Scan this QR Code or click on below link to access the video of
Personnel hygiene and employee facilities

Notes

7. Employability Skills

Scan the QR code below to access the eBook

https://www.skillindiadigital.gov.in/content/list

DGT/VSQ/N0101

8. Annexures

S.No	Unit Name	Subject Name	Page No	Link for QR Code	QR Code
1	Unit 1.2 - Food Processing and Technology: An Overview	Overview of Food Processing Industry	10	https://youtu.be/wMu0EpUgCd4	
2	Unit 2.1 - Role and Responsibilities of Industrial Production Worker	Industrial Production Worker	39	https://youtu.be/0tThA3DYX2c	
3	Unit 4.3 - Manufacturing Process and Controls in Bakery Industry	Introduction to Bread & Bakery Industry	82	https://youtu.be/mcpVs3CVNIw	
4	Unit 4.4 - Material Flow in Baking Unit	Overview of Fruits and Vegetable Processing	82	https://youtu.be/hW10tq2fWfY	
5	Unit 4.5 - Manufacturing Process and Controls milk and milk products processing industries	Overview of Dairy Industry	82	https://youtu.be/4XuvGYvKGnE	
6	Unit 4.6 - Manufacturing Process and Controls in Meat Processing Industries	Overview of Meat and Poultry Industry	82	https://youtu.be/UZ7nMyVQWCU	
7	Unit 5.1 - Need of documenta on and record keeping	Documentation and Record Keeping in Food Processing Unit	90	https://youtu.be/HesWbNFSQS4	
8	Unit 6: Basic Health And Safety Practices At Food Processing Workplace	Pest Control	119	https://www.youtube.com/watch?v=iq8jOuZ5k6k&t=42s	

		119	https://www.youtube.com/watch?v=RS4A-uczS6E&t=554s	HP, GMP & HACCP
		119	https://www.youtube.com/watch?v=daNjRoP_I0c&t=87s	Personnel hygiene and employee facilities
Employability Skills (30 Hrs)			https://www.skillindiadigital.gov.in/content/list	

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

NCVET
कौशल गुणवत्ता प्रगति

N·S·D·C
RE IMAGINE FUTURE

FICSI
Food Industry Capacity and Skill Initiative

Address: Food Industry Capacity and Skill Initative
Shriram Bhartiya Kala Kendra, 3rd floor, 1
Copernicus Marg, Mandi House, New Delhi-110001
Email: admin@ficsi.in
Web: www.ficsi.in
Phone: +91-9711260230, +91-9711260240

Price: ₹