

# **Dairy Product Processing**

# Level-II



Based on September, 2021, Version 3 Occupational

## **Standards**

Module Title: - Implementing Food Safety
Program and Procedures

LG Code: IND DPP2 M03 LO (1-3) LG (15-17)

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December, 2022 Adama, Ethiopia



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## Introduction to the module

Food safety program is written document that specifies how a business will control all food Safety hazards that may be reasonably expected to occur in all food handling operations of the food business. The food safety program and related procedures must comply with legal requirements of the food safety standards and must be communicated to all food handlers. Where no food safety program is in place, food safety requirements may be specified in general operating procedures

All members of the food supply chain play a role in maintaining food safety. Whether you are a food supplier, a food business owner, a manufacturer, or a customer, you have a significant part in food safety. This aspect of the food supply chain aims to protect customers from food poisoning and foodborne illnesses that can affect human life and business performance for establishment owners.

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## **LG# 15 LO #1: Implement the food safety program**

#### Instruction sheet 1

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Introduction to the module
- Identifying food handling requirements
- Carrying out food handling of food safety program
- Controlling food safety hazards
- Reporting food safety incidents and taking corrective actions
- Recording food safety information
- Maintaining workplace
- Conducting work

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This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically,	
sheet	
Identify food nandling requirements	1.1.
Carry out food handling of food safety program	Identifying
Control food safety hazards	handling
Report food safety incidents and taking corrective actions	
Record food safety information	
Maintain workplace	
Conduct work	
Learning Instructions:	
1. Read the specific objectives of this Learning Guide.	
2. Follow the instructions described below.	
3. Read the information written in the information Sheets	
4. Accomplish the Self-checks	
5. Perform Operation Sheets	
6. Do the "LAP test	
	This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, sheet   Identify food nandling of food safety program  Carry out food handling of food safety program  Control food safety incidents and taking corrective actions  Record food safety information  Maintain workplace  Conduct work  Learning Instructions:  Read the specific objectives of this Learning Guide.  Read the information written in the information Sheets  Accomplish the Self-checks  Perform Operation Sheets  Do the "LAP test

## requirements

## 1.1.1. Food handling

Food handling is the process of preparing food that is safe for public consumption and any impact upon food or any actions involving food or its components (food production, preparation, treatment, packaging, storage, transportation, distribution, supply and delivery for sale and sale) that may influence food safety, quality and nutritional value

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A food handler is anyone who handles packaged or unpackaged food directly as well as the equipment and utensils used to prepare or serve food and/or surfaces that come into contact with food. Food handlers must do everything they can to make sure they do not contaminate food .

#### • Safe milk handling techniques includes:-

- ✓ milk receipt and storage
- ✓ preparation/processing
- ✓ cooking, holding, cooling, chilling and reheating at appropriate temperature
- $\checkmark$  packaging and disposal

https://www.youtube.com/watch?v=8tuJ6Up\_Hlo (access Nov 24/2022)

#### 1.1.2. Safe food handling requirement

Bacteria like Staphylococci are found on the hair, skin, mouth, and nose and in the throat of healthy people. According to one estimate, nearly 50 percent of healthy food handlers carry disease agents that can be transmitted by food. The most important tool you have to prevent food borne illness is good personal hygiene Safe steps in food handling, cooking, and storage are essential in preventing foodborne illness. You can't see, smell, or taste harmful bacteria that may cause illness. In every step of food preparation, follow the four guidelines to keep food safe:

- ✓ Clean Wash hands and surfaces often.
- ✓ Separate -Don't cross-contaminate.
- $\checkmark$  Cook- Cook to proper temperatures, checking with a food thermometer.
- ✓ Chill- Refrigerate promptly.

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- **Cleanliness** is a major factor in preventing foodborne illness. Even with food safety inspection and monitoring at Federal, State, and local government facilities, the
- Wash hands with warm, soapy water for 20 seconds:
  - $\checkmark$  before and after handling food
  - ✓ after (using the bathroom, changing a diaper, handling pets, tending to a sick person and blowing your nose, coughing, or sneezing)

### 1.1.3. Source of milk contamination

- Milk can be contaminated through germs from
  - $\checkmark$  Animal's poop and skin can get in milk
  - ✓ The environment (including the barn and milking equipment)
  - ✓ The dairy animal's udder can be infected (mastitis)

## • The common reasons for food contamination are:

- ✓ Improper storing, handling, and preparing food
- ✓ Improperly cleaned or sanitized utensils
- ✓ Contamination by flies, cockroaches, insects, and pests

## • Food contamination can be categorized in four different ways:-

- ✓ Biological contamination
- $\checkmark$  Chemical contamination

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- $\checkmark$  Physical contamination
- $\checkmark$  Cross-contamination

## A. Biological contamination

Biological contamination occurs when food becomes contaminated by living organisms or the substances they produce.



Figure 1.1. Biological milk contaminant

## **B.** Chemical contamination

Chemical contamination occurs when food produces or comes into contact with toxic chemicals, which can lead to chemical food poisoning. Chemical contaminants fall into one of two categories: natural and artificial

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**Figure 1.2.** Chemical contamination of milk

## C. Physical contamination

Physical contamination occurs when a physical object enters food at some stage of the production or preparation process. Physical objects in food can be a choking hazard and often introduce biological contaminants as well

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**Diagram 1.1.Source of physical contaminant of milk** 

#### **D.** Cross -contamination

Cross-contamination is the accidental transfer of contaminants from one surface or substance to another, usually as a result of improper handling procedures. In a food setting, the term refers to the transfer of contaminants from a surface, object or person to food. Cross-contamination usually refers to biological contamination but can also be physical or chemical.



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#### Figure 1.3. Cross- contamination

#### 1.1.4. Techniques to reduce the risk of food/milk Contamination

Milk can be contaminated at any point in the milk production process. It is the responsibility of the food business operator (milk producer) to identify these points and implement control measures to protect milk from contamination.

#### • Collection

- $\checkmark$  All equipment must be kept clean and in good condition.
- ✓ Good personal hygiene
- Storing Condition
  - ✓ Follow the first-expired, first-out (FEFO) method if the food has a use-by or expiration date.
  - ✓ Check the use-by or expiration date.
  - $\checkmark$  Store food that will expire first in front of items that will expire later.

## • Shopping

- ✓ Purchase refrigerated or frozen items after selecting your nonperishables.
- $\checkmark$  Never choose meat or poultry in packaging that is torn or leaking.
- ✓ Do not buy food past "Sell-By," "Use-By," or other expiration dates.
- ✓ Always refrigerate perishable food within 2 hours (1 hour when the temperature is above 90 °F).
- ✓ Check the temperature of your refrigerator and freezer with an appliance thermometer. The refrigerator should be at 40 °F or below and the freezer at 0 °F or below.
- Cook or freeze fresh poultry, fish, ground meats, and variety meats within 2 days; other beef, veal, lamb, or pork, within 3 to 5 days.

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- Perishable food such as meat and poultry should be wrapped securely to maintain quality and to prevent meat juices from getting onto other food.
- **Processing:** Always wash hands with soap and warm water for 20 seconds before and after handling milk don't crosscontaminate. Keep milk cover
- **Cooking:** Cook all raw beef, pork, lamb and veal steaks, chops, and roasts to a minimum internal temperature of 145 °F as measured with a food thermometer before removing meat from the heat source.
- **Refreezing:** Freezing milk at the temperature the range between -0.512°C and -0.550°C, and only very rarely falls outside that range. The average freezing point of raw cows' milk is close to -0.522°C or -0.540°C

https://www.youtube.com/watch?v=b7SJLnupLhE (access Nov 24/2022)

#### 1.2. Carrying out food handling on food safety program

1.2.1. Food safety programs

#### • Allergen program

An Allergen program should include a list of allergens that could impact the supplier's materials, equipment, processes and products including potential cross-contact allergens. A list of materials and ingredients containing allergens should be in the plan. Methods should be outlined to include ways to prevent any unintentional allergen contamination. Cleaning of equipment containing allergens is verified prior to product changeover.

• The allergen cleaning process should be validated and verified.

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- Equipment segregation for allergen control is conducted and effectively manages the risk of cross- contact allergens..
- Specific procedures have been developed for the storage of allergen containing ingredients.
- The product identification system addresses materials, ingredients, work-in-progress and products containing allergens.
- Products containing allergens are properly labeled

**Note**: even if the only allergen in the An approved supplier program is a set of procedures implemented by the facility to assure the safety and quality of incoming goods and services. It may be based on the safety risk presented by the raw material, or based on historical performance or prior history of the supplier. The facility should be able to provide documented evidence that incoming materials have either been inspected or that they come from an approved supplier. The methods for selecting, evaluating, approving facility is milk and it is in all products produced, the facility must have a program stating this and Staff is aware of the risk of allergens and the allergen management procedures.

### • Approved supplier

and monitoring an approved supplier must be documented.

#### • Calibration Program

The facility should have a calibration program that includes equipment that is used to test food safety and quality parameters (e.g. temperature, pH, product weight). Calibration steps:

- ✓ Identify all the equipment that requires calibration (thermometers, scales,pH meters, etc)
- ✓ Ensure the equipment, once calibrated, is protected so that measurements remain accurate.
- $\checkmark$  Ensure authorized personnel only operate the equipment and are using approved methods.
- $\checkmark$  Determine how accurate the measurements need to be.

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- ✓ Calibrate equipment regularly.
- ✓ Develop a procedure to address products produced between the time equipment "out-of-calibration" is discovered and the last calibration check with normal tolerances recorded.
- ✓ Clearly identify who is responsible for undertaking calibration, recording the results of all calibrations and labeling equipment to indicate .
- ✓ calibration schedule that identifies what, how often, who and how a piece of equipment is calibrated is a good practice.
- Cleaning and Sanitizing : A written cleaning program should be in place and fully implemented that includes provisions for effective cleaning of equipment, facilities, utensils, amenities and external areas. The cleaning and sanitation program should include the following detail:
  - $\checkmark$  List all the areas and equipment to be cleaned.
  - The frequency for cleaning, sanitizing different areas of the premises and all associated equipment including pre-operative cleaning and cleaning between breaks.
  - ✓ A full description of the cleaning and sanitation procedures for each piece of equipment or area of the operation.
  - $\checkmark$  All cleaning verification records should be maintained.
  - ✓ The cleaning program should be reviewed annually or anytime changes are made.
  - $\checkmark$  Hazardous chemicals should be stored separately, away from any product
  - $\checkmark$  The storage of hazardous chemicals should follow all government regulations.

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- Consumer complaint program: Complaints may be locally received or received from a central site, call center, or corporate entity and shall include complaints from customers, and/or regulatory authorities. All should be available for use in the complaint procedure.
- **Control of foreign material:** Foreign matter detectors can include metal detectors, x-ray, color sorters, screens, sieves and filters. They should be designed and installed to detect and/or trap foreign objects that have been identified in the facility.
- Crisis Management A crisis management plan that describes actions that will be taken as a result of external, environmental, climatic, equipment failure or other potential business threats that will impact
- The Crisis Management plan
  - $\checkmark$  crisis alert contact list
  - $\checkmark$  sources of legal assistance, which may counsel management in a crisis situation, and
  - ✓ designation of responsibilities for internal and external communication during a crisis.

## • Environmental monitoring program

An environmental monitoring program should identify the applicable pathogens or indicator organisms to test for in the facility those are:-

- ✓ The number of samples to be taken, the sampling sites, and the frequency of sampling should be indicated in an environmental sampling plan
- $\checkmark$  All sample sites should be marked on a map of the facility
- $\checkmark$  A sampling schedule should be prepared
- ✓ Responsibility for sampling should be identified
- ✓ A corrective action plan should be in place that includes cleaning, re-sampling, vector swabbing and follow up testing.

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- $\checkmark$  All corrective actions should be documented and indicated on a map of the facility.
- ✓ All sampling records should be maintained, which includes all results and follow up tests.
- Food defense: Food defense is having measures in place to reduce the chances of someone intentionally contaminating the food supply in order to kill or hurt people, disrupt our economy, or ruin your business. The facility should prepare, implement and maintain a food defense protocol that outlines the methods, responsibilities and criteria for preventing food adulteration caused by deliberate acts of sabotage.
  - ✓ Specific areas of program that may be addressed include:
    - ✤ Employee identification
    - $\clubsuit$  visitor
    - $\clubsuit$  contractor
    - $\clubsuit$  tour access
- Internal audit: an audit is an independent examination of the system. Audits should encompass multiple levels of requirements, including: the plan, execution of the plan and evidence of success. There are all types of audits that may be performed in a facility.
- Types of audits:
  - ✓ Facility and equipment inspections
  - ✓ Foreign Materials
  - ✓ GMPs
  - ✓ Pre-requisite programs or Preventative Controls

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- ✓ Food safety plans (HACCP)
- ✓ Food quality plans (QACCP)
- ✓ Legislative controls
- ✓ Pre-Ops, Sanitation and Pest Control

## • Scope and frequency of internal audits.

- $\checkmark$  who will perform the audit
- $\checkmark$  what will be audited
- $\checkmark$  Where will the audit be performed and when
- Non-conforming product: Non-conforming product is product at any stage in the process that does not meet agreed food safety and quality criteria. The program should be describe the following activities
  - $\checkmark$  Identify who can release the product from hold and determine its disposition
  - ✓ Employees should be trained in the hold procedure and what their responsibility is if a product is put on hold
  - $\checkmark$  In circumstances where product is adulterated or condemned
  - $\checkmark$  the supplier should detail how the condemned product is identified and disposed
  - ✓ A record of the disposition of non-conforming product and equipment including product that is reworked, repackaged and condemned
- Pest Control: The facility should have a pest control program that covers the premises, its surrounding areas, storage facilities, machinery and equipment should be kept free of waste or accumulated debris so as not to attract pests and vermin. The program

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should include a list of the targeted pests, an outline of the methods used to prevent pest problems, an outline of the pest elimination methods.

• **Preventive maintenance:** A preventative maintenance program should include the methods and responsibility for the maintenance and repair of plant, equipment and buildings.

#### • A maintenance program should address the following:

- $\checkmark$  There is a planned maintenance schedule that includes critical equipment and areas of the site.
- $\checkmark$  There are maintenance procedures that include food safety and quality issues.
- ✓ Maintenance procedures afford no risk to product safety and integrity.
- ✓ Maintenance personnel and contractors know maintenance procedures.
- ✓ Maintenance staff and contractors follow food safety and hygiene practices.
- ✓ Preventative maintenance activities are documented.
- ✓ Plant and equipment failures are documented.
- ✓ The maintenance schedule is adjusted for plant and equipment failures.
- ✓ Operating staff and supervisors are notified when repairs are made /completed.
- $\checkmark$  All tools, parts and debris are removed from repair areas.
- ✓ Sanitation activity occurs after maintenance repair in food processing areas.
- ✓ Notification occurs when potential risk to product is evident through maintenance activities or breakdowns.

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- **Product Release:** A product release program ensures that only compliant products are released to the market. The facility should prepare a procedure outlining the responsibility and protocols for the release of products and effectively implement that procedure. The facility should ensure that:
  - $\checkmark$  All products are confirmed as compliant before release to the market.
  - ✓ All staff is familiar with product release procedures and that personnel authorized to release product are aware of their responsibilities.
  - ✓ All products under quarantine or authorized personnel only release hold status after the product has successfully passed inspection.
  - ✓ All products released for distribution should have records maintained
  - $\checkmark$  Records should be reviewed routinely to ensure that holds are closed out.
  - $\checkmark$  Any product that is still on-hold should be physically or visually verifiable.
- **Product Specifications:** Product descriptions should include product specifications.
  - ✓ Safety-related information in raw material and ingredient specifications may include
- $\checkmark$  threshold levels for microbiological pathogens, factors affecting microbiological growth such as
- ✓ pH and water activity,
- $\checkmark$  threshold levels for potential chemical or physical contaminants and
- $\checkmark$  The presence or absence of known allergens.
- ✓ The extent to which these factors need to be included in the specifications will depend on the use of the material and the food safety risk to the finished product.

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#### • material specifications

✓ color, grade, nutritional data, size and weight

## • Quality Control

The facility should document a procedure outlining the methods established to test finished product. The types of test that controlled by the finished product specification.

- ✓ Sensory analysis (e.g., taste, color, flavor, odor),
- ✓ Physical (e.g., count, weight, size, texture),
- ✓ Chemical (e.g., fat, salt, moisture, brix, pH), and
- ✓ Microbiological (e.g., aerobic plate count, yeast and mold, coliforms).

## • Recall Program:

A product recall applies when a product is found to be unsafe or otherwise in breach of regulatory requirements and is withdrawn from public sale and the consumer market is advised not to use or consume that product. Recalls may be mandatory (i.e., initiated by a regulator), retailer driven, or voluntary (i.e., initiated by the supplier).

## • Training Program

The training program should include a description of how the training needs of the organization are fulfilled.

## The employee training program should include

✓ Job/task performance,

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- ✓ good manufacturing practices
- ✓ pre-requisite programs
- ✓ cleaning and sanitation procedures
- ✓ food regulatory requirements
- ✓ Bio security/Food defence

## • Verification Program

Verification is a confirmation through the review of effective evidence that requirements have been fulfilled. review of inspection records to ensure all monitoring tasks are completed at the frequency that is defined,

- $\checkmark$  ensuring that internal audits occur at the frequency defined
- ✓ Ensuring corrective and preventative actions are effectively implemented and product testing.

## **1.2.2.** Safe handling of milk & dairy products

- Maintaining the safety of milk (example using of Refrigerator at 45 °F)
- Buying fresh fluid milk and storage : appropriate storage at temperatures below 40 °F
- **Buttermilk**: Originally, buttermilk was made as a by-product when making butter. Lactic acid bacteria are added to fresh, fluid pasteurized skim or part-skim milk to produce the thick, tangy buttermilk.
- Flavored Milk: Chocolate and other flavors such as maple, strawberry and coffee may be used for flavored milks. These milks are stored and used as fresh fluid milk.

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- Sweetened Condensed Milk: This is the milk that results from the evaporation of half the water and the addition of sugar in amounts sufficient for preservation. It is stored like evaporated milk.
- UHT Milk: Ultra-high temperature (UHT) milk is regular fluid milk that is packed in an airtight, sterilized, cardboard container.
- Nonfat dry milk: This dairy product is made by removing water from pasteurized, fat-free milk. Due to its low moisture content, it can be kept for long periods of time.
- Cream:
- ✓ Cream has a very high fat content of between 18 and 40 percent butterfat compared to around 3.25 percent in whole milk.
- $\checkmark$  Store cream at 40 °F or below in its original container in the refrigerator.
- Butter: Butter can be stored for up to two weeks at refrigerator temperatures (below 40 °F). Higher temperatures cause off-flavors and unpleasant odors to develop.
- Yogurt: The natural sugar in milk is converted to lactic acid by means of a bacterial culture producing the creamy, pleasantly tart yogurt. Yogurt is pasteurized to destroy disease-causing microorganisms.

 Table 1.1. Safe cold storage times for milk & dairy Products

Product	How to Store	Refrigerator (35-40 °F)	Freezer (0 °F)
Pasteurized Fresh Whole or Skimmed Milk	Refrigerate immediately in original container. Keep container closed.	1 to 5 days beyond "sell- by" date	3 months. Freezing may result in change in texture. Thaw in

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			refrigerator.
Sweetened Condensed Milk(Opened)	Refrigerate tightly covered.	1 week	Do not freeze.
Evaporated Milk (Opened)	Refrigerate tightly covered.	1 week	Do not freeze.
Cultured Buttermilk	Refrigerate immediately in original container. Keep container closed.	2 weeks	Do not freeze.
Homogenized, Reconstituted Dry Nonfat and Skimmed Milk	Keep containers tightly closed. Don't return unused milk to original containers.	1 week	Do not freeze.
Sweet and Regular Cream	Refrigerate immediately in original container. Keep container closed.	1 to 5 days beyond "sell- by" date	Do not freeze. (Change of texture, body appearance. Separation of fat emulsion.)
Non-Dairy Whipped Topping	Keep covered.	<ul> <li>3 months in aerosol can.</li> <li>3 days if prepared from mix.</li> <li>2 weeks if bought frozen and then thawed.</li> </ul>	Do not freeze aerosol cans; others may be stored in freezer up to one year.
Butter	Refrigerate immediately in original container. Keep container closed.	2 weeks	Butter made from pasteurized cream: 6 to 9 months.
Sour Cream	Refrigerate immediately in original container. Keep container closed.	2 weeks	Do not freeze.
Ice Cream	Store in original container in freezer.	Do not store here.	2-3 weeks (Opened)

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			2 months (Unopened)
Yogurt	Keep covered.	7-10 days	Do not freeze.
Soft Custards, Milk Puddings, Cream and Custard Fillings for Cakes and Pies	Cool cooked dishes quickly and refrigerate within 2 hours. Refrigerate cold dishes immediately after preparation.	5-6 days	Do no

#### **1.3.** Controlling food safety hazards

#### Introduction

A food safety hazard refers to any agent with the potential to cause adverse health consequences for consumers. Food safety hazards occur when food is exposed to hazardous agents which result in contamination of that food. Hazards may be introduced into the food supply any time during harvesting, formulation and processing, packaging and labeling, transportation, storage, preparation, and serving.

## The type of hazards is categorized in six groups:

- a. Biological hazards
- b. Chemicals hazards
- c. Physical hazards
- d. Allergenic hazard
- e. Nutritional hazard

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f. Biotechnology-related hazard

#### A. Biological hazard

Biological hazards occur when hazardous or pathogenic organisms are introduced to food and thus pose a food safety concern to consumers. Occurrence of biological hazard through the following microorganism such as:-

- ✓ Bacteria
- ✓ Viruses
- ✓ Parasites
- ✓ Other biological hazards
- i. Bacteria

Bacteria are single-celled microorganisms that exist in a range of habitats and can be free-living (e.g. in soil, air, water) or symbiotic (e.g. in intestinal tract or mucous membranes of animals and humans) and have a broad range of enzymatic, biochemical and/or pathogenic properties. The principal bacteria associated with food borne illnesses include:

- ✓ Shigella spp.
- ✓ Staphylococcus aureus
- ✓ Vibrio cholerae
- ✓ Vibrio parahaemolyticus
- ✓ Vibrio vulnificus
- ✓ Yersinia enterocolitica
- ✓ Cronobacter sakazak

## ii. Viruses

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In contrast to other microorganisms, active viruses consist of unique sections of DNA or RNA enclosed in a thin coat of protein, and cannot exist independently of their living hosts. Depending on the combination of DNA/RNA and the protein coating

## ✓ Common viruses

- ➢ Bacteriophage
- > Enteric Virus (other than Hepatitis A and Noroviruses)
- ➢ Hepatitis A virus

iii. Parasites: A parasite is any organism which obtains nourishment from its host organism in order to grow and reproduce.

Parasites commonly associated with food-borne illnesses include:

- ✓ Cryptosporidium parvum
- ✓ Giardia duodenalis or intestinalis
- ✓ Taenia spp
- ✓ Toxoplasma gondii
- ✓ Trichinella spiralis etc.

## **B.** Chemical Hazards

Chemical hazards occur when chemicals are present in foods at levels that can be hazardous to humans. Contamination may occur through various pathways:

- ✓ The environment (air, soil, water),
- ✓ Intentional use of chemicals, such as pesticides and veterinary drugs,

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✓ Manufacturing processes and Addition of food additives.

#### • Types of chemical hazards

- ✓ Mycotoxins
- ✓ Natural Toxins
- ✓ Marine Toxins
- ✓ Environmental Contaminants
- ✓ Food Additives
- ✓ Processing-induced chemicals
- ✓ Pesticides/Agricultural Products and
- ✓ Veterinary Drug Residues

## C. Physical/Extraneous material hazards

Extraneous material covers all materials (excluding bacteria and their by-products (toxins), viruses and parasites) which may be found in a food that are foreign to that particular food. Some examples of extraneous materials that may be found in food are

- ✓ insects
- ✓ hair
- $\checkmark$  metal fragments
- $\checkmark$  pieces of plastic and wood chips and glass

## **D.** Allergenic Hazards

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An allergen is any protein that is capable of producing an abnormal immune response in sensitive segments of the population. Allergic reactions to food usually involve, antibodies.. Foods that represent 95% of allergic reactions. These are termed 'priority allergens'.

- ✓ Peanuts, Tree nuts ,pistachio nuts, and walnuts),Sesame seeds
- ✓ Milk, Eggs, Seafood (fish, crustaceans, and shellfish),
- ✓ Soy, Wheat, Sulphites and Mustard

#### Source: http://youtube.com/watch?v=3upQYfl\_Hfg

Milk safety hazard (video link)

#### 1.3.1. Control measure of food safety hazard

Control measures include actions that can be taken to reduce the potential of exposure to the hazard, or the control measure could be to remove the hazard or to reduce the likelihood of the risk of the exposure to that hazard being realized.

Table 1.2. Steps to hazard control measures

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1. Eliminate the hazard	Elimination of the hazard is not always achievable though it does totally remove the hazard and thereby eliminates the risk of exposure.
2. Substitute the hazard with a lesser risk	Substituting the hazard may not remove all of the hazards associated with the process or activity and may introduce different hazards but the overall harm or health effects will be lessened.
3. Isolate the hazard	Isolating the hazard is achieved by restricting access to plant and equipment or in the case of substances locking them away under strict controls.
4. Use engineering controls	Engineering Controls involve redesigning a process to place a barrier between the person and the hazard or remove the hazard from the person
5. Use administrative controls	Administrative controls include adopting standard operating procedures or safe work practices or providing appropriate training, instruction or information to reduce the potential for harm and/or adverse health effects to person(s). Isolation and permit to work procedures are examples of administrative controls.

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**Diagram 1.1. Hierarchy of hazard control measures** 

#### 1.3.2. hazard analysis of critical control points principles

Hazard Analysis Critical Control Points (HACCP) is a system which provides the framework for monitoring the total food system, from harvesting to consumption, to reduce the risk of foodborne illness. The system is designed to identify and control potential problems before they occur. In its Model Food Code, the Food and Drug Administration has recommended the HACCP system "because it is a system of preventive controls that is the most effective and efficient way to assure that food products are safe .

#### **1.3.2.1.** HACCP Terminology

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- **A. Critical Control Point** (CCP) a procedure/practice (control) in food handling/preparation that will reduce, eliminate or prevent hazards. It is a "kill" step that kills microorganisms or a control step that prevents or slows their growth.
- **B.** Hazard Unacceptable contamination, microbial growth, persistence of toxins or survival of microorganisms that are of a concern to food safety.
- **C.** Monitoring Checking to determine if the criteria established by the critical control point(s) (CCP) have been achieved.
- **D. Risk** Probability that a condition(s) will lead to a hazard.
- E. Severity Seriousness of the consequences of the results of a hazard.

## 1.3.3. HACCP principles

Practical HACCP principles adapt the seven HACCP steps into a form that is easily applied in a noncommercial setting..

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

## 1. Conduct a hazardous analysis

The purpose of a hazardous analysis is to develop a list of hazards which are likely to cause injury or illness if they are not controlled. Points to be considered in this analysis can include:

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- $\checkmark$  skill level of employees ,
- ✓ transport of food
- $\checkmark$  serving elderly,
- ✓ sick,
- ✓ very young children
- ✓ immune-compromised
- ✓ volume cooling
- ✓ thawing of potentially hazardous foods
- $\checkmark$  high degree of food handling and contact
- $\checkmark$  adequacy of preparation and holding equipment
- $\checkmark$  available, storage, and method of preparation

## 2. Determine Critical Control Points (CCP's)

A critical control point is any step in which hazards can be prevented, eliminated or reduced to acceptable levels .To determine CCP's asked the following questions:

- ✓ At this step in preparation can food become contaminated and/or can contamination increase?
- ✓ Can this hazard be prevented through corrective action(s)?
- ✓ Can this hazard be prevented, eliminated or reduced by steps taken later in the preparation process?
- ✓ Can you monitor the CCP?
- ✓ How will you measure the CCP?
- ✓ Can you document the CCP

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#### 3. Establish critical limits

A critical limit ensures that a biological, chemical or physical hazard is controlled by a CCP. Each CCP should have at least one critical limit. Critical limits must be something that can be monitored by measurement or observation. They must be scientifically and/or regulatory based.

Examples include: temperature, time, pH, water activity or available chlorine

#### 4. Establish monitoring procedures

Monitoring is a planned observation or measurement:

- ✓ to determine if a CCP is under control
- ✓ Visual observations
- ✓ Temperature measurements
- ✓ Time assessment
- ✓ pH measurements
- ✓ Water activity measurements

#### 5. Establish corrective actions

Corrective actions focus on what to do when a food does not meet the critical limit.

Example of a corrective action:

- ✓ The temperature of a hamburger is 140 °F after cooking (a CCP).
- ✓ The critical limit is cooking the hamburger to 155 °F or hotter.
- ✓ Continue cooking the hamburger until it is 155 °F or hotter.
- $\checkmark$  Throwing out food might be a corrective action.
- ✓ Maintain records of all corrective actions taken

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#### 6. Establish verification procedures

Four phases of verification needed for a HACCP plan:

- Determine that the critical limits at all CCPS are sound.
- Make sure that the establishment's HACCP plan is being properly implemented.
- Have regulatory personnel review the plan to make sure that it is being properly implemented.
- Check the accuracy of all monitoring equipment

### 7. Establish record keeping and documentation procedures

Record-keeping and documentation procedures should be simple to complete and include information that illustrates that the established standards are being met.

Examples of records include

- ✓ Time/temperature logs
- ✓ Checklists
- ✓ Forms
- ✓ Flowcharts
- ✓ Employee training records and SOP's.

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**Diagram 1.3. Prerequisite programmers (PRPs)** 

## **1.3.3.1.** HACCP pre-requisite program (PRP)

PRPs are considered the foundation support upon which HACCP relies. "Systems thinking" can be used to help solve complex food contamination problems, and it can help deliver a structure to model solutions to urgent food safety matters. Systems thinking include problem solving and critical thinking

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Diagram 1. 4: Systemic importance of PRPs and HACCP is outlined

## 1.4. Reporting food safety incidents and taking corrective actions

## 1.4.1. Food incidence

Food incident is a situation within the food supply chain where there is a possible or confirmed risk associated with the consumption of a food. A food incident can also relate to an issue that could, or is expected to impact on multiple government jurisdictions. A food incident may be identified from various sources, for example food recalls, a multi-jurisdictional outbreak investigation or intelligence from industry, local/state government or international counterparts.

#### Examples of food incidents reported

✓ Vibrio parahaemolyticus and raw Pacific oysters from Coffin Bay, SA (2021)

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- ✓ Salmonella Enteritidis and eggs (2019)
- ✓ Salmonella and rockmelons (2016)
- ✓ Hepatitis A in frozen berries (2015)
- ✓ Contaminated dairy products imported from New Zealand (2013)
- ✓ Listeria and soft cheeses (2013)
- ✓ Cyanide and raw apricot kernels (2011)
- ✓ Soy milk and kombu seaweed (2010)
- ✓ Melamine in products from China (2008) 1311

Source: https://www.youtube.com/watch?v=zUdmFmGvXIM

HACCP Training for the food industry safety video

#### 1.4.2. Incident Management

Incident management may mean different things to different people. As with all discussion points, it is always best to clarify the meaning of the subject under scrutiny. Therefore, before diving into this subject, here are

#### A. Definitions of the key term

- ✓ **Risk** The potential that a chosen action or activity (including the choice of inaction) will lead to a loss (an undesirable outcome)
- ✓ **Incident** An occurrence of seemingly minor importance that can lead to serious consequences
- Crisis Any event that is, or is expected to lead to, an unstable and dangerous situation affecting an individual, group, community
  or whole society

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- ✓ Management The act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively
- ✓ **Risk management** in simple terms, this would relate to practices designed to prevent a situation from occurring
- Incident management the situation in this case has occurred and it is time to limit the damage by stopping the incident from becoming a crisis
- Crisis management at this point, the damage has occurred or is continuing and the response has to be swift to clean it up and in some cases limit it (a heightened incident)

#### **B.** Causes of Incidents

The types of incidents may be separated into two groups, food related and non-food related.

#### **Food Related**

- ✓ Contamination of raw food or feed ,Consumer illness, Allergens, Chemical residues,
- ✓ Foreign objects. Packaging, Supply chain and interruption

#### **Non-Food Related**

✓ Natural disasters, Earthquake, Volcano .Flood, Storm and Famine

#### **1.5.** Recording food safety information

**1.5.1.1.** Documentation and recording

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Records help to ensure consistency of processing operations and end-product quality and safety. Maintaining adequate documentation and records of processing operations is important in the event of recall of with fresh milk. Records are most useful when they begin by including the date and time, name of person(s) who completed the record, and the activity or production station being recorded. The record should include details of the food safety breach

#### Examples of milk and milk product records including:-

- Raw milk reception records
- Equipment monitoring and maintenance records
- Equipment calibration records
- Sanitation records
- Product processing records
- Pest control records
- Recall procedures
- Employee training records
- Temperature control records

# 1.6. Maintaining workplace

Routine maintenance tasks for the dairy industry include system awareness and adjusting equipment according to manufacturers' recommendations. It's important to ensure your core system works well, has regular inspections, and receives needed maintenance.

# i. Daily Maintenance

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Having an established daily routine that involves general equipment awareness and excellent hygiene practices will go a long way in creating an effective preventive maintenance program.

#### ii.Milking Equipment Maintenance

Keeping the milking area and equipment clean will help extend the life of your assets and reduce costs of corrective chemical usage or emergency repairs.

#### iii.Regular Inspections

Whether other components of your milking system need to be inspected, replaced, or serviced will really depend on your equipment usage. In the dairy industry, tasks should be based on run time or observation of problems. For example, regularly check, clean and replace hoses as needed.

#### Facilities required in the processing room should be:

- ✓ Separate handwashing facilities for staff, with soap, clean water, nail brushes and clean towels.
- ✓ Toilets, which should be separated from the processing room by two doors or located in a nearby building.
- $\checkmark$  First aid materials.
- ✓ Appropriate storage area
- ✓ Processing area and display facilities
- ✓ Packaging and transportation facilities and also
- ✓ Cleaning and sanitizing facilities
- ✓ pests control mechanism
- $\checkmark$  Temperature controls are maintained to its standards.

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- $\checkmark$  Cleaning chemicals, stored away from the processing room
- $\checkmark$  Clean the processing room, toilets, washing facilities and storerooms every day
- $\checkmark$  Use the correct chemicals to clean equipment, make sure there are no food residues

Following minimum requirements are laid down in the dairy product processing for hygienic production and quality standards: Location and surroundings of the factory

- ✓ Sanitary and hygienic conditions of premises
- ✓ Personnel hygiene
- ✓ Portability of water
- ✓ Machinery & Equipment with installed capacity
- ✓ Quality control facility & Technical staff Product Standards
- ✓ Limits for preservatives & other additive.

# 1.7. Conducting work

While conducting work in food safety program the following are very important points to be considered. Some of them are: include all those measures and conditions required to prevent and control produce contamination hazards, mainly biological. GMP (at primary and post-harvest stages) already includes all recommendations regarding hygiene practices to produce and handle safe products. (Reference reading: Code of Hygienic Practices for Fresh Fruits and Vegetables).

Proclamation no. 513/2007 Sold waste management proclamation Food industries and restaurants shall collect, store and dispose of the food related solid waste v they generate in an environmentally sound manner. Good Hygienic Practices: Include all those measures and conditions required to prevent and control produce contamination hazards, mainly biological. In practical terms, the implementation of

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GAP and GMP (at primary and post-harvest stages) already includes all recommendations regarding hygiene practices to produce and handle safe products. (Reference reading: Code of Hygienic Practices for Fresh Fruits and Vegetables).

#### **1.7.1. Good Manufacturing Practice (GMP)**

GMP Is that a part of quality assurance aimed at ensuring that products are consisting manufactured to quality appropriate to their intended use. GMP is a term that is recognized worldwide for the control management of manufacturing and quality control of food, pharmaceutical products and medical devices.

- GMP covers following areas are.
  - Process control (including identification, verification and monitoring of critical control points in a HACCP scheme, hygienic design of plant and layouts to minimize cross contamination, cleaning schedules, recording of critical production data, sampling procedures and contingency plans to cover safety issues)
  - ✓ **Premises** (including methods of construction to minimize contamination, maintenance, waste disposal)
  - ✓ **Quality control** (including product specifications and quality standards for non -safety quality issues, monitoring and verification of quality before distribution)
  - ✓ **Personnel** (including training, personal hygiene, clothing and medical screening)
  - Final product (including types and levels of inspection to determine conformity with quality specifications, isolating non conforming products, packaging checks, inspection records, complaints monitoring systems)
  - ✓ **Distribution** (to maintain the product integrity throughout the chain, batch traceability and product recall systems).

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#### 1.7.2. Principles of GMP

- Design & construct the facilities & equipment's properly.
- Follow written procedures & instructions.
- Document work
- Validate work.
- Monitor facilities & equipment.
- Write step by step operating procedures & work on instructions.
- Design, develop & demonstrate job competence.
- Protect against contamination.
- Control components & product related process,
- Conduct plan & periodic audits.

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Self-check 1	Written test

Name.....

..... ID..... Date.....

**Directions:** Answer all the questions listed below.

#### Test I: Choose the best answer (15 point)

1. Anyone who handles packaged or unpackaged food directly as well as the equipment and utensils used to prepare or serve food

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A. tool man B. food handler C. Guard D. all

2. Among the following which one is the source of milk contamination?

A. Handler B. milking utensils C. storage condition D. all

- 3. One of the following is food safety program that contain the list of allergens food
  - A. Supplier program B. Allergen program C. calibration program D. cleaning and sanitizing E. all
- 4. The food safety defense programs include the all except

A. Visitor B. contractor physical security of the facility D. tour access E. non

- 5. Which of the following is the types of hazard caused by pathogenic organism
  - A. Chemical hazard B. biological hazard C. physical hazard D. nutritional hazard
- 6. Which of the following is natural chemical hazard produced by fungi and toxic to humanA. Food additive B. Mycotoxins C. pesticide D. veterinary drug
- 7. Chemical substance that is added to food during preparation or storage
  - A. Food additive B. Azoxystrobin on peaches C. captan on cherries D. Clethodim on beans
- 8. Among the following which one is the first steps in hazard control measure

A. Substitute B. Eliminate C. isolate the hazard D. use engineering control

- 9. Among the following which one is seriousness of the consequences of the results of a hazard
  - A. Risk B. monitoring C. severity D. all
- 10. Among the following one is food related incidence except.
  - A. Consumer illness B. Allergens C. Chemical residues D. Natural disaster

# Test II: Short Answer Questions (20 point)

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- 1. Define food safety
- 2. Mention the techniques of food handling
- 3. Explain the details of safe food handling of guideline
- 4. Discuss how to reduce food contamination
- 5. Mention the steps of hand washing
- 6. Write and mention at least five food safety programs
- 7. Mention the hierarchy of hazard control measure
- 8. List and mention the seven steps of HACCP principles

*Note:* Satisfactory rating – 20 points Unsatisfactory - below 20 points

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Operation sheet 1	Control food safety hazard		
· · · · · · · · · · · · · · · · · · ·		1.1	App

#### principles procedure

#### A. Pre requisite procedures

- Prepare tools and equipment
- Wear PPE ( personal protective equipment )
- Establish monitoring procedures.
- Establish corrective actions
- Establish verification procedures
- Establish record keeping

#### **B.** Techniques /Steps

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Applying

HACCP



- Step 1------ Identify the nature of possible hazard
- Step 2----- Identify physical, chemical and biological hazard
- Step 3 ------Identify how to prevent hazard at each step,
- Step 4 -----lists the hazard that is likely to occur
- Step 5------Identify sanitation standard operating procedures (SSOP)
- Step 6-----Determine CCPs (critical control point)
- Step 7-----Identify the level of risk caused by food safety hazard
- Step 8 ------Take Corrective Actions

Lap test-1	Apply HACCP	principles			
ID			Date	Name	
. 10	•••••		Dute	••••••	
Time started:		Time finished:			
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Instructions: Given necessary templates, tools and materials you are required to perform the following these task during your work. The project is expected from each student to do it.

# **1.** Task-1 : Apply HACCP principles

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# LG#16 LO #2:-Participate maintaining and improving food safety

#### **Instruction sheet 2**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Introduction
- Monitoring work area, materials, equipment and product
- Identifying and reporting processes and practices food safety breach
- Taking corrective action
- Raising food safety issues

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Monitor work area, materials, equipment and product
- Identify and reporting processes and practices food safety breach
- Take corrective action
- Raise food safety issues

**Learning Instructions:** 

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- 1. Read the specific objectives of this Learning Guide.
- 2. Follow the instructions described below.
- 3. Read the information written in the information Sheets
- 4. Accomplish the Self-checks

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#### **Information sheet 2**

2.1. Monitoring work area,

#### materials, equipment and product

#### 2.1.1. Monitor work area

The working environment is the setting that includes the social features and physical conditions in which workers perform their jobs. These factors can affect the labor's mental & physical state, health, cooperation, and work performance. Having a healthy and safe working environment shall help employees maintain their physical and psychotic health, prevent occupational diseases, and maximize the capacity and efficiency of each employee in particular, and the business in general.

Working environment monitoring is activities of measuring, checking, and monitoring the specific factors including microclimate, physical, dust, chemical, biological, psychophysiological, and ergonomics. Monitoring results will help businesses know the current status of their workplace, detect factors that fail or are likely to fail to get solutions, and take timely corrective and preventive actions.

#### 2.1.2. Benefits from monitoring working area

- Implementing working environment monitoring helps businesses establish and maintain a healthy & safe workplace,
- Reduce risks of affecting health and prevent occupational diseases for employees
- Helps employees are more satisfied, engaged, and devoted to the business, as well as increasing efficiency and productivity.
- Through monitoring of the working environment, elements of the environment are examined and evaluated scientifically and objectively thereby the businesses can determine.
- Besides carrying out monitoring of the working environment can help businesses comply with the law.

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#### 2.1.3. Legal basis of working environment monitoring activities

- ✓ Article 18 of the Law on Occupational Safety and Hygiene No. 84/2015/QH13 Regulations on the control of dangerous and harmful factors at the workplace.
- Decree 39/2016/ND-CP dated May 15, 2016, of the Government detailing the implementation of several articles of the Law on occupational safety and health.
- ✓ Decree 44/2016/ND-CP dated May 15, 2016, of the Government detailing several articles of the Law on Occupational Safety and Health regarding the technical inspection of occupational safety, training of occupational safety and health, occupational safety and hygiene, and monitoring of the working environment.
- ✓ Circular 19/2016/TT-BYT dated June 30, 2016, of the Ministry of Health guiding the management of occupational hygiene and workers' health.

#### 2.1.4. Monitoring parameters

The parameters to be monitored are determined in the Occupational Hygiene Profile of the enterprise. Depending on the specificity of the industry, production, and business activities, the monitored parameters at each location are determined to perform tests to ensure that all specific hazardous factors are well controlled. It is necessary to ensure that at least 70% of the following factors are satisfied:

- Microclimate factors: temperature, humidity, wind speed, and thermal radiation
- Physical factors: light, noise, vibration in the frequency band, radiation, electromagnetic field, ultraviolet radiation
- Occupational exposure factors including microbiological factors allergens sensitization, solvents
- **Psychophysiological factors of labor and Ergonomics**: Assessment of physical labor burden; neuropsychological stress assessment; assessment of the ergonomics of labor positions
- Elements of particulate dust the silica content in dust, metal dust, coal dust, talc dust, cotton dust, and asbestos dust.

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#### 2.1.5. General principles

Employers should monitor and record the exposure of workers to hazardous chemicals to ensure their safety and health. They should ensure that workers are not exposed to chemicals to an extent which exceeds exposure limits or other exposure criteria for the evaluation and control of the working environment. Based on the monitoring data, employers should assess the exposure of workers to hazardous chemicals.

- Airborne concentrations of hazardous chemicals should be measured in all places of work
- The monitoring of airborne concentrations of chemicals in the working environment should be performed only by skilled personnel
- The employer should arrange for regular inspection, maintenance and calibration of the measuring equipment.
- The service responsible for monitoring the working environment should be kept informed about any change in plant, equipment, process, materials or work practices
- Measurements of airborne contaminants are necessary if other techniques do not suffice to provide a valid estimate of the risk of exposure and control measures.

#### 2.1.6. Techniques for this risk assessment

- Information on the intrinsic health and physical hazards,
- Information on obtained from the chemical safety data sheets;
- Estimation of exposure based on the method of work and work pattern
- Advice from the supplier;

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- Experience of exposure in the workplace or of other users
- Simple qualitative tests. Simple qualitative tests include

#### 2.1.7. Monitoring methods

Sampling equipment should be compatible with the analytical methods available and should have been validated over a suitable range of concentrations above and below the exposure limits or other exposure criteria in accordance with published national or international standards.

i. **Static monitoring** should be used to determine the distribution of an airborne chemical throughout the general atmosphere of the working area and to identify problems and priorities. Air samples should be taken:-

ii. **Personal monitoring** should be used to evaluate the risk of exposure to the individual worker. Air samples should be collected in the workers breathing zone by means of personal samplers. Sampling should be carried out while the work activity is in operating.

#### 2.1.8. Monitoring strategy

Where a systematic measurement programs has been decided, it should evaluate whether the exposure of workers to certain hazardous chemicals prescribed by the competent authority or determined by the initial assessment is being kept under control.

#### A. The aims of monitoring programs:

- $\checkmark$  To ensure that the health of the workers is efficiently protected
- $\checkmark$  To ensure that the preventive actions which have been taken are still effective
- $\checkmark$  To ensure that the levels, as measured previously remain unchanged or fall

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- To ensure that any changes made in manufacturing processes or work practices will not lead to an excessive exposure to hazardous chemicals
- $\checkmark$  To promote the implementation of more efficient preventive measures.

#### B. Maintaining personal hygiene

- ✓ disease control
- $\checkmark$  adequate personal cleanliness
- ✓ washing hands thoroughly before starting work, and after using the toilet, handling money, handling anything dirty use of gloves
- $\checkmark$  wear protective clothing, suitable footwear, hair coverings
- $\checkmark$  avoid smoking, eating, chewing, spitting, sneezing or coughing in the production area
- $\checkmark$  removing all unsecured jewelry and other objects that might fall into food

# C. Buildings and facilities

- ✓ located away from environmentally polluted areas,
- ✓ areas subject to flooding, areas prone to infestations of pests and areas where wastes cannot be removed effectively
- ✓ adequate supply of potable water, natural gas, electricity, fuel and other utilities
- ✓ adequate drainage and waste disposal systems, ventilation system to minimize odours and vapours, air
- $\checkmark$  walls should be smooth, waterproof, with no ledges and overhangs
- $\checkmark$  floors made of materials that are impervious,
- ✓ durable, resistant to grease, cleaning agents

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#### **D.** Equipment

- ✓ all surfaces in contact with food should be smooth not porous inert visible for inspection accessible for manual cleaning made of non-toxic material corrosion-resistant
- $\checkmark$  designed to resist the extended use cleaning compounds and sanitising agents
- ✓ equipment should be readily disassembled for inspection and manual cleaning
- designed to protect the contents from external contamination, sanitized with approved sanitizer and rinsed with potable water if required, equipped with rounded corners and edges

#### E. Production and process controls

- ✓ no raw material or ingredient should be accepted if it is known to contain parasites, undesirable microorganisms, pesticides, veterinary drugs or toxic, decomposed or extraneous substances
- ✓ checking of raw materials that come into the plant by collecting samples to decide if they should accept or reject deliveries
- ✓ raw material should be washed or cleaned (if necessary) to remove soil or other contaminants
- ✓ inspection of the overall condition of the trucks used to transport low-moisture raw materials
- ✓ food and dust collect, for insect activity (frozen raw materials and other ingredients should be kept frozen)

#### 2.1.9. Monitoring record keeping

Records should be kept by employers on measurements of airborne hazardous chemicals. Such records should be clearly marked by date, work area and plant location. Personal sampling measurements, including the exposures calculated, should be recorded..

- sources of airborne emissions, type of work and operations
- •relevant information on the functioning of the process, engineering controls, ventilation and weather conditions with respect to the emissions;

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- the sampling instrument used, its accessories and the method of analysis;
- the date and exact time of sampling;
- the duration of the workers' exposure, the use or non-use of respiratory protection

# 2.2. Identifying and reporting processes and practices food safety breach

Prosecutions for food safety breaches may be initiated where there has been serious noncompliance or a repeated failure to comply with food laws. This is an important measure taken by government to ensure that food sold in our community is safe for human consumption

# **2.2.1.** Common food safety violations and tips on how to correct them:

- Storing or using chemicals on or near food and food-contact surfaces
- Not cleaning and sanitizing utensils, equipment, or machines regularly
- Infrequent or improper hand washing
- Having ill food workers performing normal duties

# 2.2.2. Rules for food safety practice

- Choose foods processed for safety
- Cook food thoroughly
- Eat cooked foods immediately
- Store cooked foods carefully
- Reheat cooked foods thoroughly
- Avoid contact between raw foods and cooked foods
- Wash hands repeatedly

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• Keep all kitchen surfaces meticulously clean

#### 2.2.3. Breaches of the worker health and safety (WHS) Act

- exposing workers to the risk of excessive noise
- working at heights where the risk of falling is not controlled
- allowing unlicensed operators to use specified equipment (e.g. forklifts)
- not ensuring that plant is appropriately guarded to eliminate or minimize exposure of workers to moving parts
- failing to have in place safe work method statements for work carried out in or near a confined space
- redirection
- issuing of a warrant for the seizure and sale of property
- suspension of the debtor's driver's license until the debt is satisfied
- registration of the debt for enforcement interstate
- Issuing an arrest and imprisonment warrant.

# 2.2.4. Reported complaints on food safety

- Complaint from a consumer
- foreign objects found in food
- poor food premises conditions
- poor food handling practices, or
- alleged cases of food poisoning
- Complaint from the regulatory authorities

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- Often instigated by a complaint from consumers
- an incidence of food poisoning in the area
- detection of 'food fraud'
- Malicious action or intended action against the company or its products.
- A threatening message direct to the company
- An enquiry from the media
- The knock-on effect of a problem in another country
- An industry issue, such as the use of an ingredient

# 2.2.5. Taking corrective action

#### A. Corrective action

Corrective actions are the actions that must be taken if a critical limit is exceeded at any step of food production in a food business (e.g. delivery, storage, preparation). Critical limits mark the minimum or maximum acceptable level of an identified food safety hazard at each critical control point (CCP).

# ✓ Types of corrective action:

- ➢ immediate and
- ➢ preventative

# **B.** Immediate corrective actions

Immediate corrective actions are reactive, whereas preventative corrective actions are proactive. An immediate corrective action fixes an existing problem or deviation from a critical limit. It stops a food safety breach that is happening now.

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Some examples of immediate corrective actions are:

- ✓ throwing out food items that show signs of spoilage (e.g. bad smell, slimy skin)
- ✓ rejecting a food delivery with bite marks on the packaging (or other signs of pest infestation)
- ✓ transferring unrefrigerated perishable food items into cold storage (5°C or below)
- $\checkmark$  disposing of food items that have been in the Temperature Danger Zone for more than four hours
- ✓ sending an employee home if they are experiencing symptoms of food-borne illness (e.g. fever, nausea, diarrhoea

#### • Preventative corrective actions

A preventative corrective action prevents a potential problem from happening. It stops a breach from occurring in the future. Some examples of preventative corrective actions are:

- ✓ repairing broken, cracked or chipped equipment, dishware or glassware
- ✓ replacing food preparation surfaces (e.g. chopping boards, countertops) with cracks or deep scratches
- ✓ changing work procedures to improve food safety and / or quality
- ✓ appointing a Food Safety Supervisor to manage food safety risks in the business
- ✓ ensuring that all staff receive comprehensive food safety training

# **2.2.6.** HACCP in corrective action plan

A corrective action plan is an outline of steps needed to resolve errors or non-compliance. In terms of the HACCP principles, a corrective action plan is created in preparation for any deviations from established critical limit. any industry having corrective action plan SMART goals.

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- Specific
- Measurable
- Attainable
- Relevant
- Time-based

# 2.2.7. Corrective action plan writing

A corrective action plan is used to resolve systemic problems and any core issue. As such, it tries to target the root cause of potential problems.

- corrective action guide
- $\checkmark$  Identify all deviations from critical limits
- ✓ Appropriate corrective actions to resolve non-compliance
- $\checkmark$  Determine the cause of deviation
- $\checkmark$  Decide on a disposition for the non-compliant food products
- $\checkmark$  Validation methods for the effectiveness of the corrective action and record

# Table 2.1. Corrective action format

# What is the problem? Significant deviation from the critical limit 28°F to 32°F (-2°C to 0°C). What should be done? (Corrective action)

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Check if the refrigerator is malfunctioning. If yes, evaluate all wholesome food and transfer them to a functioning refrigerator and send
the malfunctioning fridge to maintenance.
Discard foods that have been spoiled because of the deviation.
Why should this action be done? (Justify corrective action)
Food spoilage is time-sensitive. If the raw materials are left at an unsafe temperature, the risk of causing foodborne illness increases.
To prevent this from happening again, the refrigerator must be sent to maintenance for proper repairs.
Who will do it?
Food handler assigned with monitoring storage temperatures.
Where will it be done?
Storage area.
When will it be done?
Immediately upon detection.

# **2.2.8.** Recording corrective actions

Corrective actions must be recorded and communicated to the appropriate person(s) in the business. The record should include details of the food safety breach (e.g. what critical limit was exceeded at what critical control point), details about the corrective action that was taken and why it was taken. Recording corrective actions makes it possible to identify recurring problems and trends that could be putting customers at risk and sending operational costs.

- Corrective action record
  - ✓ ineffective inventory management (e.g. ordering too much)

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- ✓ poor stock control (e.g. not practicing First In, First Out)
- ✓ gaps in employee food safety knowledge or skills (e.g. poor understanding of food safety risks and how to prevent food safety hazards)

#### 2.3. Raising food safety issues

#### Introduction

Food safety is an issue of growing importance due to several world-wide trends that contribute to increasing safety risks in food systems, such as the growing movement of people across borders; increased movement of agricultural and food products across borders; rapid urbanization; changes in food processing and handling practices; and the re-emergence/emergence of diseases, pathogens, toxins and other issues. Issues relating to food safety will therefore impact on agricultural production, agro processing, the food service industry, trade and commerce, public health and overall economic development.

Its establishment of the National Agricultural Health and Food Safety Coordinating Committee (NAHFSCC) has proven to be an effective organ in the coordination of food safety issues. However there is a need for the NAHFSCC to be accorded the legal underpinning to undertake the necessary oversight and national coordination of food safety issues.

# 2.3.1. Implementation of food safety issue

The food safety functions will be coordinated through three institutional arrangements, namely:

- ✓ Inter-Ministerial Food Safety Committee (IFSC)
- ✓ National Food Safety Council and secretariat

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#### A. Inter-ministerial food safety committee

The Inter-Ministerial Food Safety Committee will comprise the Ministers of Agriculture; Health; and Investment, Industry and Commerce.

The Committee will meet quarterly or semi-annually to:

- ✓ provide high level oversight, coordination and direction regarding food safety protection and control
- ✓ review and approve work plans and budgets of the food safety agencies
- ✓ review high level reports of performance
- $\checkmark$  resolve policy and operational conflicts among agencies as necessary
- ✓ take policy decisions and provide instructions to regulatory agencies as appropriate
- $\checkmark$  discharge other high level functions as deemed appropriate
- In case of a food safety emergency, the Inter-Ministerial Food Safety Committee will meet more frequently as appropriate to take policy decisions, monitor agreed interventions and report to Cabinet as necessary

# **B.** National Food Safety Council

The National Food Safety Council, the coordinating agency, will consist of the heads of the six food safety regulatory agencies

- The functions of the National Food Safety Council
  - ✓ rationalize roles and functions of regulatory agencies to avoid duplication of functions
  - ✓ monitor agreed roles and functions of each agency to prevent "function creep"
  - ✓ share work plans and budgets
  - $\checkmark$  agree on sharing of common infrastructure, equipment and personnel
  - $\checkmark$  identify priority interventions in food safety and agree on joint collaborative effort

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✓ provides policy advice to the Inter-Ministerial Food Safety Committee

#### C. Food Safety Secretariat

The Secretariat will be responsible for the following:

- ✓ Organizing meetings of the Inter-Ministerial Food Safety Committee and the National Food
- ✓ Safety Council
- ✓ prepare minutes of meetings of the Committee and Council
- $\checkmark$  circulate information as instructed by the Committee and Council
- $\checkmark$  follow up on common administrative actions as instructed
- $\checkmark$  other functions as appropriate

# 2.3.2. Role of producers in food safety issue

Producers shall take responsibility for the production of safe food. This will entail:

- Recognition and observance of food safety as an important national issue;
- Implementation of on-farm food safety programmes and good agricultural/manufacturing practices;
- Compliance with existing food safety legislation; and
- Establishment of systems of traceability for food/feed products.

# 2.3.3. Top ten food safety issue in Ethiopia

• Improper hand washing: Good hand hygiene is the first line of defense in preventing foodborne illness.

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- Improper sanitation: Keep food service equipment and surfaces clean using proper washing and sanitizing procedures.
- Same cutting board : Use separate chopping boards and utensils for raw and cooked/ready-to-eat foods.
- Improper Cooking Temperature Ensure cooked items reach proper temperatures.
  - ✓ Ground and wholePoultry:165°F
  - ✓ Whole Cut Beef, Pork, Lamb: 145°F
  - ✓ Ground Meat: 155°F
  - ✓ Vegetables, Rice, etc: 135°F
  - ✓ Seafood: 145°F
- Confusing Labeling Any food item not stored in its original packaging must be labeled to avoid confusion.
- Washing meat & poultry: Bacteria in raw meat and poultry can spread to sink and countertops causing cross-contamination.
- Untrained employees each kitchen staff member should be regularly given training and reminders on proper cleaning and sanitizing protocols.
- Unsafe food holding: Keep hot food hot and cold food cold. Bacteria that cause food poisoning multiply quickest in the "Danger Zone" between 40°F and 140°F.
- Sick employees preparing food : food workers should stay home when sick and for at least 24-48 hours after symptoms stop.
- Unsafe food storage raw foods, such as meat, should never be stored above ready-to-eat foods like fresh fruit, salads, or desserts.

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Diagram 2.1. Food safety issues in developed and developing countries

Source: Public health risks related to food safety issues in the food market, Article number: 68 (2019)

# 2.3.4. Important food safety issues

- Food Safety :Food safety refers to all those hazards, whether chronic or acute, that may Make food injurious to the health of the consumer.
- Quality: Quality includes all other attributes that influence a product's value to the
  - Consumer **such** as:
  - $\checkmark$  Negative attribute : spoilage, contamination with filth, discoloration, off-odours
  - ✓ Positive attributes: origin, colour, flavour, texture and processing method of the food.

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• Food control it is a mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that all foods during production, handling, storage, processing, and distribution are safe, wholesome and fit for human consumption.

#### Factors to contribute potential hazards in foods include

- Improper agricultural practices
- Poor hygiene at all stages of the food chain
- Lack of preventive controls in food processing and preparation operations
- Misuse of chemicals
- Contaminated raw materials
- Ingredients and water
- Inadequate or improper storage, etc.

#### Specific concerns about food hazards have usually focused on:

- ✓ Microbiological hazards
- ✓ Pesticide residues
- ✓ Misuse of food additives
- ✓ Chemical contaminants, including biological toxins; and Adulteration.

# 2.3.5. The food safety system in Ethiopia

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In Ethiopia food safety not organized and developed as in developed countries. Thereby, there are limited data on the burden of FBDs and food poisoning caused by poor food safety practices. Moreover, problems of the growing population, urbanization, lack of resources, lack of adequate knowledge, and poor attitude, are aggravating poor food hygiene and safety practice issues.

Ethiopia has introduced a new initiative, the Health Extension Program (HEP) as a means of providing a comprehensive health service for the urban population, including food hygiene and safety in health extension packages to prevent and control FBDs and food poisoning. As one strategy of this program, households have graduated as model families: household heads were selected and given basic training on the 16 health extension packages.

Self-Check – 2	Written test	Name
		ID

Date.....

**Directions:** Answer all the questions listed below.

# Test I: Multiple choice (10 point)

- 1. Which one is the technique of risk assessment?
  - A. information on the intrinsic health and physical hazards,
  - B. information on obtained from the chemical safety data sheets;
  - C. estimation of exposure based on the method of work and work pattern
  - D. advice from the supplier
  - E. all
- 2. Among the following one is the example of complaints from consumer except.
  - A. poor food premises conditions

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- B. poor food handling practices, or
- C. alleged cases of food poisoning
- D. As a result of routine monitoring and premise visits
- 3. Which of the following is proper cooking temperature for ground nut and poultry
  - A.  $165^{\circ}F$  B.  $145^{\circ}F$  C.  $155^{\circ}F$  D.  $135^{\circ}F$
- 4. Which of the following is the is important to maintaining personal hygiene ?
  - A. Disease control B. washing hands thoroughly before starting work
  - C. Wear PPE D. avoid smoking in the production area

# Test I: Short Answer Questions (15point)

- 1. list and explain the two methods of monitoring work environment
- 2. write the aim of monitoring program
- 3. mention the common food safety violence
- 4. what are the rules for food safety practice explain
- 5. Write and define the two types of corrective action
- 6. List the top ten food safety issue in Ethiopia

# *Note:* Satisfactory rating – 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

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# Instruction sheet 3

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Introduction
- meeting personal hygiene
- Reporting health conditions
- Wearing appropriate clothing and footwear
- Organizing workplace movement

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Meet personal hygiene
- Report health conditions
- Wear appropriate clothing and footwear
- Organize workplace movement

**Learning Instructions:** 

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# LG #17 LO #3:-Comply with personal hygiene standards

- 1. Read the specific objectives of this Learning Guide.
- 2. Follow the instructions described below.
- 3. Read the information written in the information Sheets
- 4. Accomplish the Self-checks
- 5. Perform Operation Sheets
- 6. Do the "LAP test"

Information sheet 3

3.1. Meeting personal hygiene

Introduction

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Personal cleanliness cover hair; do not sneeze or cough over food; cover cuts and sores; and do not wear jewellery. Wear protective clothing — wear suitable clean protective clothing and Food handlers personal hygiene tips never smoke, chew gum, spit, change a baby's nappy or eat in a food handling or food storage area. Never cough or sneeze over food, or where food is being prepared or stored.

#### 3.1.1. Food handler's personal hygiene

Practices and cleanliness must minimize the risk of food contamination. The most important things a food handler needs to know.

- Prevent their body, anything from their body or anything they are wearing coming into contact with food or food contact surfaces
- Stop unnecessary contact with ready-to-eat food
- Wear clean outer clothing appropriate for the type of work they do
- Make sure bandages or dressings on any exposed parts of the body are covered with a waterproof covering
- Not eat over unprotected food or surfaces likely to come in contact with food
- Not sneeze, blow or cough over unprotected food or surfaces
- Not spit, smoke or use tobacco or similar preparations where food is handled
- Not urinate or defecate except in a toilet

#### 3.1.2. Health of food handlers

Food handlers are required to inform the food safety supervisor or license when they are ill. There are requirements for health of food handlers that require a person to be excluded from handling food if they are ill with vomiting, diarrhoea, fever or jaundice, food-borne disease, sore throat with fever, infected skin lesions or have discharges from eyes, nose or ears

#### 3.1.3. Hand washing

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Food handlers are expected to wash their hands whenever their hands are likely to contaminate food.

# • Time to washing their hands:

- ✓ Immediately before working with ready-to-eat food
- ✓ Immediately after handling raw meat or processed food and using the toilet
- $\checkmark$  before starting to handle food or returning to handling food after other work
- immediately after smoking, coughing, sneezing, using a handkerchief or disposable tissue, eating, drinking or using tobacco or similar substances

#### • Steps to food handlers wash their hands

Use the hand washing facilities provided by the business. Sinks used to prepare food or wash dishes, must not be used to wash hands. Hand washing facilities must have warm running water, soap and single-use paper towels or other means of effectively drying hands. There are five steps that should be followed when washing hands:

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Figure 3.1. Hand washing steps

# 3.1.4. Cleaning and sanitizing program

• Definitions

Cleaning is the complete removal of food soil using appropriate detergent chemicals under recommended conditions. Since cleaning and sanitizing may be the most important aspects of a sanitation program sufficient time should be given to outline proper procedures and

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parameters. Detailed procedures must be developed for all food-product contact surfaces (equipment, utensils, etc.) as well as for nonproduct surfaces such as non-product portions of equipment, overhead structures, shields, walls, ceilings, lighting devices, refrigeration units and heating, ventilation and air conditioning (HVAC) systems, and anything else which could impact food safety.

# • The objective of cleaning and sanitizing food contact surfaces

- $\checkmark$  To remove food (nutrients) that bacteria need to grow, and to kill those bacteria that are present.
- ✓ Stored dry so as to prevent bacterial growth.

# • The correct order of events for cleaning/sanitizing

- ✓ Rinse
- ✓ Clean
- ✓ Rinse
- ✓ Sanitize.

# • Cleaning methods

Equipment can be categorized with regard to cleaning method as follows:

- ✓ Mechanical Cleaning: often referred to as clean-in-place (CIP).
- ✓ Clean-out-of-Place (COP): Can be partially disassembled and cleaned in specialized COP pressure tanks.
- ✓ Manual Cleaning: Requires total disassembly for cleaning and inspection.

# • Terminology:

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- ✓ Sterilize refers to the statistical destruction and removal of all living organisms.
- ✓ **Disinfect** refers to inanimate objects and the destruction of all vegetative cells (not spores).
- ✓ Sanitize refers to the reduction of microorganisms to levels considered safe from a public health view point.

# • General types of sanitization

- ✓ Thermal Sanitization involves the use of hot water or steam for a specified temperature and contact time.
- ✓ Chemical Sanitization involves the use of an approved chemical sanitizer at a specified concentration and contact time.

# **Examples of chemical sanitizer**

- ✓ Chlorine
- ✓ Chlorine dioxide
- ✓ Iodine
- ✓ Acid –Anionic sanitizer
- ✓ Hydrogen peroxide etc.

# • Ideal chemical sanitizer should be:

- ✓ Approved for food contact surface application.
- $\checkmark$  Have a wide range or scope of activity.
- ✓ Destroy microorganisms rapidly.
- ✓ Stable under all types of conditions.

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- ✓ Tolerant of a broad range of environmental conditions.
- ✓ Readily solubilized and possess some detergency.
- ✓ Low in toxicity and corrosivity.
- ✓ Inexpensive.

#### • Factor affecting chemical sanitizer effectiveness

- ✓ Surface characteristic
- ✓ Soil
- ✓ Exposure time
- ✓ PH, Temperature
- ✓ Water properties
- $\checkmark$  Concentration and Inactivators

# 3.2. Reporting health conditions

# Introduction

- Food infection and poisoning occur as a result of people eating food contaminated by microorganisms such as bacteria, viruses, and other food-borne pathogens or their toxins, which can pose a threat to the health of consumers. Food-borne-related illnesses have increased over the years, and negatively affect the health and well-being of people globally, and especially in developing nations, but evidence on food borne disease (FBD) in low- and middle-income countries are still limited. Contamination is caused by:
  - Improper preservation methods
  - Unsanitary handling and storage
  - Cross-contamination of food contact surfaces or

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• Unhealthy practices during preparation. This can lead to large-scale outbreaks of food-borne illness and poisoning, often accompanied by high mortality

#### 3.2.1. Causes and symptoms of foodborne Illness

Foodborne illness is caused by consuming contaminated foods or beverages. Many different disease-causing microbes or pathogens can contaminate foods, so there are many different types of foodborne illnesses. Most foodborne diseases are infections caused by a variety of bacteria, viruses, and parasites. Other diseases are poisonings caused by harmful toxins or chemicals that have contaminated food.

**Note:** many foodborne pathogens also can be acquired through recreational or drinking water from contact with animals or their environment, or through person-to-person spread.

#### • Common symptoms of foodborne illness

- ✓ Diarrhea and/or vomiting, typically lasting 1 to 7 days.
- ✓ Abdominal cramps, nausea, fever, joint/back aches, and fatigue.
- ✓ What some people call the "stomach flu" may actually be a foodborne illness caused by a pathogen
- The incubation period (the time between exposure to the pathogen and onset of symptoms) can range from several hours to 1 week.

#### • Commonly recognized foodborne infections

✓ **Campylobacteriosis** (Campylobacter)

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- Symptoms: diarrhea, abdominal pain, cramps, fever and vomiting
- > **Duration of Illness**: Symptoms typically last 1 week
- Transmission: Infections are often associated with international travel, undercooked poultry, unpasteurized milk, untreated water, and contact with farm animals
- Prevent campylobacteriosis by:
  - **4** washing hands carefully
  - ♣ keeping your food preparation areas clean
  - avoiding unpasteurized milk
  - **4** cooking your food at the appropriate temperatures
  - **4** being careful when dealing with animals
  - **4** using caution when swimming

#### ✓ Cryptosporidiosis (Cryptosporidium)

**Common cause** of waterborne illness and is the most common cause of recreational water illness (RWI).

#### > Transmission

- **4** Swallowing contaminated water while swimming or drinking.
- ↓ Drinking raw (unpasteurized) milk and apple cider.
- **4** Eating foods contaminated with the parasite.
- **4** Exposure to fecal material during sexual activity.

# > Symptoms

**4** Watery diarrhea, Stomach cramps, Loss of appetite, Weight loss, Slight fever and Vomiting

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# ✓ Escherichia coli O157:H7 Infection (E. coli O157)

Escherichia coli (E. coli) is a bacteria species that normally lives in the intestines of healthy people and animals.

- > Common symptoms :severe bloody diarrhea, abdominal cramps,little or no fever
- > **Duration of Illness**: The illness usually resolves in 5 to 10 days.

# ✓ Giardiasis (Giardia)

Giardiasis is a diarrheal illness caused by Giardia intestinalis (also known as Giardia lamblia or Giardia duodenalis), a one-celled, microscopic protozoan parasite.

#### Transmitted include:

- **4** Swallowing contaminated water while swimming or drinking.
- **4** Having contact with people who are sick with giardiasis, especially in child care settings.
- **4** Swallowing Giardia organisms picked up from contaminated surfaces, like changing tables, door handles, and toys.
- **4** Eating foods contaminated with the parasite.
- **4** Exposure to fecal material during sexual activity.
- Symptoms:-Diarrhea, Gas and bloating, Loss of appetite, Weight loss and Slight

# Prevention:-

- **4** Wash hands after using the bathroom and changing diapers, and before handling or eating any food.
- ♣ Do not swallow water while swimming.

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Use caution when traveling in countries with minimal water treatment and sanitation systems by avoiding tap water, fountain drinks, ice, and raw foods.

#### ✓ Listeriosis (Listeria monocytogenes)

Listeriosis is a rare, but serious infection caused by eating food contaminated with the bacterium Listeria monocytogenes. Groups at high risk for invasive listeriosis:

- > Pregnant women and their newborns
- > Older adults
- > Individuals with weakened immune systems
- Common food borne illness prevention methods
  - ✓ Keep your food preparation areas clean
  - $\checkmark$  Cook and store your food at the appropriate temperatures

# 3.3. Wearing appropriate clothing and footwear

# 3.3.1. Introduction

In the food manufacturing industry, workers are at a surprising risk of exposure to harsh and toxic chemicals and at risk of contaminating the foods they produce. From anhydrous ammonia used in cooling systems to disinfectants used to clean equipment, there are many hazardous chemicals found in food plants, points out a food Industry Executive article. "Workers who may come into contact with these chemicals must be informed use proper work practices and wear appropriate personal protective equipment.

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Food Manufacturing PPE: Balancing Worker and Food Protection In food manufacturing, PPE must play a unique balancing act. Not only must manufacturers protect their workers, they must also protect the food. Protective clothing and its use are critical factors in reducing harm to the worker and contamination of the food product. Workers in the industry use a wide array of protective clothing, including suits, overalls, smocks, jackets, aprons, sleeves and hair covers. Gloves both those resistant to cuts and chemicals as well as disposable are also critical. And, if the potential for toxic fumes is a risk, respirators also may be required. For clothing, the specific materials can be critical in food processing and manufacturing.

PPE needs to conform to each employee's body dimensions to be effective, otherwise it can be a safety hazard itself.

#### 3.3.2. Factors to be consider for avoiding of contamination in food Manufacturing

The hazard assessment should begin with a walkthrough survey of the facility to develop a list of potential hazards in the following basic hazard categories:

- ✓ Impact ,Penetration , Compression (roll-over), Chemical, Heat/cold, Harmful dust
- ✓ Light (optical) radiation, and Biologic

# • Potential physical contamination risks:

- ✓ Damaged or torn plastic gloves.
- ✓ Loose threads falling from clothing or aprons.
- ✓ Head coverings not effectively restraining hair.

# • Potential microbiological contamination risks:

- Gloves not changed between raw and ready-to-eat foods.
- > Boots not cleaned between low-risk and high-risk production areas.
- > Overalls not removed prior to visiting the restrooms.

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Both employers and employees do the following:

- ✤ Understand the types of PPE.
- ✤ Know the basics of conducting a "hazard assessment" of the workplace.
- Select appropriate PPE for a variety of circumstances.
- ◆ Understand what kind of training is needed in the proper use and care of PPE.

# 3.3.3. The Requirement for PPE

- $\checkmark$  To ensure the greatest possible protection for employees in the workplace,
- ✓ Establishing and maintaining a safe and healthful work environment.

# • Responsibilities of employers

- ✓ Performing a "hazard assessment" of the workplace
- $\checkmark$  To identify and control physical and health hazards.
- ✓ Identifying and providing appropriate PPE for employees.
- $\checkmark$  Training employees in the use and care of the PPE.
- ✓ Maintaining PPE, including replacing worn or damaged PPE.

# • Evaluating the effectiveness of the PPE program.

- ✓ Properly wear PPE,
- ✓ Attend training sessions on PPE,

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- $\checkmark$  Care for, clean and maintain PPE, and
- $\checkmark$  Inform a supervisor of the need to repair or replace PPE.

#### **3.3.4.** The role of PPE in food safety

The Occupational Safety and Health Administration (OSHA) recommend using personal protective equipment (PPE) to enhance the safety of the food, workers, and customers.

#### A. Protecting the food

Using appropriate PPE during food preparation and handling helps minimize the risk of cross contamination and unnecessary food spoilage. By providing their employees with high-quality PPE, food companies are less likely to experience contamination in their products through parasites, bacteria, dust, mold, and other human-related debris.

#### **B.** Protecting the workers

Employees in the food service industry are at risk of exposure to harmful chemicals and toxic materials. Ammonia from cooling systems, disinfectants and other chemicals found throughout food manufacturing plants pose health risks to anyone who comes in contact with them.

#### C. Protecting the Customers

The food service provider is found to be negligent regarding the safe preparation and provision of food to their customers. They can face penalties that may ultimately result in the closure of the premises. Business owners or managers must provide staff with adequate PPE to prevent contamination and the spread of foodborne illnesses.

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• Types of PPE used in the food service industry

PPE recommended in the food service industry depends on the nature of the business, the work environment, and the employees.

# • Some of the most critical pieces of PPE for the food service industry are:

- ✓ **Gloves:** Handling food with bare skin is a significant contributor to transmitting harmful pathogens.
- ✓ Face Shields: protect against the spread of pathogens via large respiratory droplets in food processing plants.
- ✓ **Respirators:** such as N95 masks, protect the wearer from inhaling contaminated air.
- ✓ **Disposable Face: Masks:** protect barrier to stop large droplets from entering or exiting through the nose and mouth.
- ✓ **Overall** : Cover and protect the whole body from chemical hazards and protect product from contamination
- ✓ Hat : cover hairs and head protecting product from physical hazards substance like hair
- ✓ **Rubber boot**/ foot wear which protect foot from chemical hazards

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Figure 3.1. How to wear PPE

# **3.3.5.** Selecting appropriate PPE

Selecting the right and most suitable PPE for employees should be considering the following elements.

- Ability to protect against specific workplace hazards.
  - ✓ Thermal Protection.
  - ✓ Cut Protection
  - ✓ Asbestos Management
  - ✓ Noise Protection

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- ✓ Chemical Hazards
- ✓ Injury Protection
- Should fit properly and be reasonably comfortable to wear.
- Should provide unrestricted vision and movement.
- Should be durable and cleanable.
- Should allow unrestricted functioning of any other required PPE.



Figure 3.2. Select and wearing PPE

Figure 3.3. safely handled dairy product

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#### The most important factors for selecting PPE

- Climate. One of the first things you need to consider when selecting the right PPE is the climate that people will be working in
- Threat Level
- Balancing Comfort & Safety
- Presence of Vehicles & Forklifts
- Sizing & Proper Fit
- Industry
- Cost of PPE

# **Training Employees in the Proper Use of PPE**

Employers are required to train each employee who must use PPE. Employees must be trained to know at least the following:

- When PPE is necessary.
- What PPE is necessary?
- How to properly put on, take off, adjust and wear the PPE.
- The limitations of the PPE.
- Proper care, maintenance, useful life and disposal of PPE

# https://www.youtube.com/watch?v=DMBrRNV9HrkRNV9Hrk

( access date, Nov 24/2022)

PPE video

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#### 3.4. Organizing workplace movement

Staying organized and productive at work helps you stay focused and complete tasks on time.

When you are organized and productive you can prioritize work and excel which aids your career progress and success.

# • Consider the following ways to stay organized at work:

- ✓ Set goals
- ✓ Track program
- ✓ Use in agenda
- ✓ Create to-do lists
- ✓ Practice accountability
- ✓ Limit distractions

# A. Goal

Achievable goals can help you stay focused and productive. When you set specific goals with steps and a timeline, you can organize your work into more manageable tasks. Create both long and short-term goals and add milestones to your calendar to make sure you stay on task.

# **B.** Track progress

Tracking progress can also help you identify when you're most productive. For example, you might notice you accomplish more at the start of the week or in the morning.

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#### C. Use an agenda

An agenda is an excellent tool to evaluate your work organization and productivity. When using a planner, write down specific events and their details throughout the days, weeks, and months. Think about what kind of planner would best suit you and your work. If you work on your computer often, consider using a digital plan to add events to specific dates.

#### **D.** Create to-do lists

Try to organize your work based on urgency. For example, you can add what you need to complete by the end of the day at the top of your list and what can wait until the next day toward the bottom. Consider writing your to-do lists on a sticky note or in a notebook. When using this approach, think of ways to organize your to-do list.

#### E. Practice accountability

When you hold yourself accountable, you reflect on your to-do list, evaluate your progress toward goals and identify ways to improve your performance. Regularly check in with yourself to determine your progress and find areas where you can approve. You can also develop a system of accountability with your coworkers by holding regular check-ins with each other.

#### F. Limit distractions

It is much easier to concentrate on work for extended periods in an organized workspace. When you limit distractions, you maintain your focus on your current task. Limit distractions by keeping your space organized and straightforward. Keep common distractions, like your phone, in your desk or a different room.

# G. Incorporate a timer

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Keep track of how much time you spend on different tasks to see areas where you can better use your time. When you start and end a task, start and end your timer. Consider using time-keeping applications to see how much time you spend on specific tasks. At the end of the week, reflect on your use of time and be more productive.

#### H. Keep a clean environment

In an organized office, you find supplies and materials efficiently, which makes your workflow more consistent. Keeping a clean environment includes putting items back where they belong, disinfecting your desk with cleaning wipes, and opening your windows for fresh air. A clean environment is a comfortable one, which makes staying productive easier.

#### H. Use labels

Labels are a practical approach to organizing your files. Clearly label each file, and arrange them in a way that makes the most sense to you. For example, you could manage your files in alphabetical order or by year.

# • Organize the work place through the following manner such as:-

- ✓ **Registration**: The FSMA requires all food manufacturing, processing, packing and storing facilities to registered.
- ✓ **Prevention plan**: Facilities must provide a comprehensive, written plan detailing every perceivable food problem.
- Training: Education and training are a vital part of the FSM (Food safety management) strategy. Every employee involved in food handling needs sufficient training on their tasks and safety procedures to prevent contaminated food.
- ✓ **Inspection:** There's an old saying that people don't do what you expect they do what you inspect.

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Recalls: The FSMA gives FDA inspectors full authority to recall any unsafe food product released from a warehouse into the mainstream market. That's not just cross-contaminated or perishing products. Mislabeled and improperly packaged products that pose a public safety risk are immediately recalled.

#### 3.4.1. Organizing of food and material handling safety

- Prevent contamination
- Pay attention to packaging
- Use sanitary food distribution equipment
- Use stainless steel equipment
- Use aluminum safe food handling equipment
- Consider wire container and shelving
- Control temperature
- Watch for pest
- Train your worker
- Create standard operating procedures (SOP) or sanitary operating procedure
- Cleaning and sanitize material handling equipment.

# • Correct the unsafe condition

- ✓ Warn others
- ✓ Inform your supervisor

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- $\checkmark$  Inform those who caused the safety violation
- ✓ Inform the safety officer or repair staff
- $\checkmark$  Check to be sure the violation has been corrected

# 3.4.2. Organize time Management

Wasting company time like missing work costs the employer money. Some tasks have assigned deadlines whereas others do not. For tasks that do not have assigned deadlines, employers expect you to set goals for yourself.

# • Getting your work done on time helps you to keep your job.

- ✓ Set priorities
- ✓ Begin the job right away
- $\checkmark$  Keep working until the job is done
- $\checkmark$  Keep deadlines in mind and stick to them
- ✓ Use resources efficiently
- Job Satisfaction : Job satisfaction is influenced by a number of factors, such as:
  - ✓ Pay, Benefits, Working conditions ,Opportunities for advancement and Job security

# 3.4.3. House keeping

Maintaining a clean workplace is vital for employers to reduce their workers compensation claims and keep efficiency high. When employees work in a messy environment, they may not notice all hazards, which increase the risk of an accident. 5S or good housekeeping involves the principle of waste elimination through workplace organization.

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Good housekeeping program: identifies and assigns responsibilities for the following:

- clean up during the shift
- day-to-day clean up
- waste disposal
- removal of unused materials
- inspection to ensure clean-up is complete
- Poor housekeeping can be a cause of incidents such as:
- tripping over loose objects on floors, stairs and platforms
- being hit by falling objects
- slipping on greasy, wet or dirty surfaces
- striking against projecting, poorly stacked items or misplaced material
- cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

# 3.4.4. Safety before operation

- Short term training is necessary for the operators
- Become familiar with the safe operation of the equipment, operator must know the machine working principle and operation
- All operators should train.
- Check bolts and other loosen parts and tighten it before operation will start.
- When maintaining, inspecting, attaching and detaching parts, park the machine at flat and safe place.
- Use proper tools to maintain the machine and check working area is safe.

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• During Operating only allow responsible person, who are familiar with the instructions, to operate

# • Effective housekeeping results in:

- ✓ Reduced handling to ease the flow of materials
- ✓ Fewer tripping and slipping incidents in clutter-free and spill-free work areas
- ✓ Decreased fire hazards
- ✓ Lower worker exposures to hazardous products (e.g. dusts, vapors)
- $\checkmark$  Better control of tools and materials, including inventory and supplies
- ✓ Efficient equipment clean up and maintenance
- ✓ Better hygienic conditions leading to improved health
- ✓ More effective use of space
- ✓ Reduced property damage by improving preventive maintenance
- ✓ Less janitorial work
- ✓ Improved morale
- ✓ Improved productivity (tools and materials will be easy to find)

# 3.4.5. Basic layout of the facility during the movement on the work place

- Sources of electricity
- Sources of motion such as machines or processes where movement may exist that could result in an impact between personnel and equipment.
- Sources of high temperatures that could result in burns, eye injuries or fire.

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- Types of chemicals used in the workplace.
- Sources of harmful dusts.
- Sources of light radiation, such as welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.
- The potential for falling or dropping objects.
- Sharp objects that could poke, cut, stab or puncture.
- Biologic hazards such as blood or other potentially infected material

# • Application helps for organizing work

- ✓ Forecasting
- ✓ Resource allocation
- ✓ Production planning
- ✓ Flow and process management
- $\checkmark$  Inventory management and control
- ✓ Customer delivery
- ✓ After-sales support and service

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Self-Check – 3

Written test

Name.....

..... ID..... Date.....

**Directions:** Answer all the questions listed below.

# Test I: choose the correct answer for the following questions

- 1. What are most important things that a food handler needs to know
  - A. do whatever is reasonable to stop unnecessary contact with ready-to-eat food
  - B. wear clean outer clothing appropriate for the type of work they do

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- C. make sure bandages or dressings on any exposed parts of the body are covered with a waterproof covering
- D. not eat over unprotected food or surfaces likely to come in contact with food
- E. all
- 2. which one is the first steps for cleaning/sanitizing of food product contact surfaces

A. Rinse B. Clean C. disposing D. Sanitize

3. Which one is the cleaning method that can be partially disassembled and cleaned

A. CIP B. COP C. mechanical cleaning D. A&B

- 4. All are chemical sanitizer used for dairy plant "except"
  - A. Chlorine B. Iodine C. Nitric acid D. Hydrogen peroxide E. None
- 5. Which of following is the role of PPE in food safety?
  - A. protecting the food B. protecting the workers C. protecting the customer D. all

# Test II. Give short answer for the following questions (15point)

- 1. Define the following terminology
  - a. Sterilize b. Disinfect c. Sanitize d. Thermal sanitizer e. Chemical sanitizer
- 2. Mention the factor that affecting chemical sanitizer
- 3. List and factor affecting chemical sanitizer effectiveness
- 4. Mention the common symptoms of food borne illness
- 5. List out the potential physical contamination risks
- 6. List out the different types of PPE and their uses
- 7. Discuss the selection parameters of PPE

*Note:* Satisfactory rating - 5 points Unsatisfactory - below 5 points

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**Operation sheet 3** 

# 3.1. Procedures

hand

of

# washing methods

- A. tools and equipment
  - Potable water
  - Soap
  - Sink
  - Towel

# **B.** Steps/procedures

Step 1: Wet Hands. Wet your hands and apply enough liquid soap to create a good lather

- Step 2: Rub Palms Together
- Step 3: Rub the Back of Hands.
- Step 4: Interlink Your Fingers
- Step 5: Cup Your Fingers
- Step 6: Clean the Thumbs
- Step 7: Rub Palms with Your Fingers

# 3.3. Apply house cleaning and sanitizing procedure

- A. Tools and equipment
  - Potable water

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- Cleaning equipment
  - ✓ Brush, Broom and Towel
- Sanitizer solution
  - ✓ Sodium hydroxide and Nitric acid
- **B.** Procedures
  - Remove the visible dirty
  - Formulate the solution with water ratio ,Add 1-2 tablespoons of Caustic Soda per 5

Liters of water

	Lap test-3	Performance Te	st			
						Name
•	ID			Da	ate	
Time	e started:	T	me finished:			

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1hrs minute. The project is expected from each student to do it.

Task-1 practice hand washing procedures

Task -2 Perform house cleaning and sanitizing

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