MPH-5161

Chapter-1; Introduction to Food Safety and Hygiene

Concept of Food:

Food is **any substance** consisting essentially of <u>protein</u>, <u>carbohydrate</u>, <u>fat</u>, and other nutrients used in the body of an organism to sustain growth and vital processes and to furnish <u>energy</u>. The absorption and utilization of food by the body is fundamental to nutrition and is facilitated by digestion.

<u>Plants</u>, which convert <u>solar energy</u> to food by <u>photosynthesis</u>, are the primary food source. <u>Animals</u> that <u>feed</u> on plants often serve as sources of food for other animals.



Categories of foods:

Food can be described in a number of different ways.

- **Perishable food**: food items that have a short storage life and will become spoiled or contaminated if not preserved and handled properly, e.g. meat, eggs, milk, fruits, vegetables and the like.
- **Non-perishable food**: foods which are not easily spoiled or contaminated, e.g. sugar and cereals.

- Wholesome food: food which is sound, clean and free from harmful ingredients it is suitable for human consumption.
- **Food hazard**: food that is contaminated with biological, chemical or physical agents and, if eaten, will cause ill health.

The seven food categories based on the sources are:



Based on the Nutrition

Type of Food Group	2	Function	 Examples
Carbohydrates		Helps your body work properly	
Protein		Needed for chemical reactions in our body	5 6 6 7
Vitamins & Minerals		Helps your body grow and repair itself	800 🚺 📷
Fats and Oils		Acts as an energy store	
Fibre		Gives you energy	
Water		Cleans our digestive system	

Components of food in a total diet:

1.water, 2. carbohydrate, 3.fat, 4. alcohol, 5. trace elements, 6. vitamins, 7. flavours (natural & addedd), 8. colours (natural & added), 9. natural poisons (e.g. cyanide), 10. pharmacologically active substances (e.g. caffeine), 11. additives (e.g. preservatives), 12. contaiminants (e.g. pesticides), 13. elements (minerals), 14. dietary fibre, 15. protein.



Functions of food

The essential function of food is to satisfy hunger and the need for essential nutrients. various functions are:

- Physiological functions
- Social functions
- Psychological functions



1.Physiological functions

Following are some physiological functions of food:

Providing Energy:

The first function of the food is to provide energy. Our body needs the energy to sustain the involuntary processes essential for the continuance of life, to carry out professional, household and recreational activities, to convert food into usable nutrients in the body, to grow and to keep warm. The energy is supplied by the oxidation of the foods consumed.

Body Building:

One of the most important functions of food is building the body. Milk, meat, eggs, fish, Pulses and nuts are rich in proteins of high quality. These foods help to maintain life and promote growth.

Regulatory Function:

Another function of food is to regulate various activities of the body such as:

- Heartbeat
- Muscle contraction
- Maintenance of the body temperature.
- Control of water balance
- Clotting of blood
- Removal of waste products from the body
- To improve our body's resistance to disease.

2. Psychological functions

In addition to the physical needs, foods also satisfy certain emotional needs of human beings. These include a **sense of security, love, and acceptance.**

-For example, the preparation of delicious foods for family members is a token of love and affection.





-The foods daily eaten by us, give us more mental satisfaction, even a nutritional balanced meal may not be satisfying to the individual if food include is unfamiliar or distasteful to him/her.

-In a friendly gathering, one may try unfamiliar foods and thus enlarge our food experiences. During the course of time and repeated experience, strange foods become familiar and new tastes are formed. For example, a person accustomed to traditional Bangladesh cuisine feels mentally satisfied. It will take time to adjust to Chinese or Japanese dishes.

-Food is used to express feelings of special attention, friendship, recognition or punishment. Some peoples are addicted to any specific food and they want that to satisfy themselves. Few have habits of dessert after every meal which is related to their psychological needs.

-Some peoples eat a lot in anger or frustration. In all these situations food has psychological importance.

3. Social functions

-Food has always been the central part of our community, social, cultural and religious life.

-It has been an expression of love, friendship, and happiness at religious, social and family get-togethers.

-Food is served almost on all social events like Holi festival, marriages, parties, gettogether, official meetings, etc., in the form of tea, breakfasts, banquet, dinner, etc.

-On all these occasions, food indirectly serves as a powerful and effective instrument for developing social rapport.

- Foods help to strengthen mutual friendship.

-Food also has a specific significance and meaning in the religious context. Further, people of a given religious community share a common eating pattern. This is because religious texts and practices strongly recommend some foods while rejecting others.

-The social function of foods can be seen daily like in many of the family there is a dining culture as all the family members unite to have dinner which creates a good relationship among them.

-Food thus becomes an integral part of the family, social and religious life of people.

What is Food Safety?

Food safety is a set of practices which ensures that the food in cafes, food trucks, delis, supermarkets, and restaurants is safe to eat. In addition, place of food handling, storing and preparation must have to be free from hazards.

- Food safety is about **handling**, **storing** and **preparing** food to prevent infection and help to make sure that our food keeps enough nutrients for us to have a healthy diet. (Food & Agricultural Organization)
- Unsafe food and water mean that it has been exposed to dirt and germs, or may even be rotten, which can cause infections or diseases such as diarrhea, meningitis, etc. (Food & Agricultural Organization)



What is Food Hygiene?

Food Hygiene: WHO

- Food hygiene are the conditions and measures necessary to ensure the safety of food from production to consumption i.e. 'from farm to fork' or 'from farm to table'.
- Food can become contaminated at any point during slaughtering or harvesting, processing, storage, distribution, transportation and preparation.
- Lack of adequate food hygiene can lead to foodborne diseases and death of the consumer.



• An essential aspect of food safety is food hygiene. <u>Food hygiene</u> ensures that customers will receive food that is safe to consume by making certain that everyone follows hygiene practices.

• Sometimes even the largest companies fail in practicing good food hygiene and their products turn out unsafe.

Main Elements of Food Safety

In order to better understand the similarities and differences between food hygiene and food safety, we need to look at their key elements.

The main elements of food safety are-

- Ensuring that the food is safe for consumption- This is the key element that is the main function of food practices and regulations.
- Implementing proper systems for food management- Companies need to implement a system that will keep the food safe. The main system is **HACCP**, but this also refers to supply and delivery, record keeping, staff training, etc.
- **Traceability of food-** If anything goes wrong during the farm-to-table process, it is important that a business can identify where all their food comes from. This is beneficial for businesses whether they are involved in the foodservice, food retail, or food manufacturing.
- Following good hygiene practices- Businesses need to make sure every employee or person who comes in contact with the food follows good personal hygiene practices.
- Another element of this is the maintenance of the facility which means general upkeep and cleanliness of the building, having proper ventilation, waste management, pest control, etc.

*[Note. **HACCP** (Hazard Analysis Critical Control Point) is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.]

Food that is not safe to eat!!!

Although food is essential for life and good health, there are some foods that are not safe to eat.

Misbranding Food: Food must be labelled correctly. When any label, writing or other printed or graphic matter on a food container is false or misleading this is known

as **misbranding**. Misbranding violates food safety regulations and is unlawful. Food labelling should include the following facts about the food:

- character (type of food)
- origin (country)
- constituents (what is in the food)
- amount in the container
- date of production and expiry date (this is the date when the food is no longer safe to eat).

Adulteration is when the normal content of the food has been intentionally changed by adding something to it that is not essential; for example, diluting milk with water and selling it as whole milk. Adulterated food could be unsafe for a number of reasons. These include poor nutrition; Unsafe ingredients may have been used, for example unclean water or other harmful ingredients might have been added.

Contamination is the undesired presence of harmful microorganisms or substances in food. Food can be contaminated by unhygienic practices in storage, handling and preparation, and may compromise food safety and palatability.

The **potentially hazardous food**; this term is sometimes used to describe perishable foods because they are capable of supporting the rapid growth of microorganisms. If microorganisms are allowed to multiply, this will have the potential to cause disease if the food is eaten.

Principles of safe food preparation

Four Steps to Food Safety: Clean, Separate, Cook, Chill



Following four simple steps at home—Clean, Separate, Cook, and Chill—can help protect you and your loved ones from food poisoning.

Step-1. Clean: Wash your hands and surfaces often.

- Germs that cause food poisoning can survive in many places and spread around your kitchen.
- <u>Wash hands</u> for 20 seconds with soap and water before, during, and after preparing food and before eating.
- Wash your utensils, cutting boards, and countertops with hot, soapy water after preparing each food item.
- Rinse fresh fruits and vegetables under running water.

Step-2. Separate: Don't cross-contaminate.

- <u>Raw meat, poultry, seafood, and eggs can spread germs</u> to ready-to-eat foods unless you keep them separate.
 - Use separate cutting boards and plates for raw meat, poultry, and seafood.
 - When grocery shopping, keep raw meat, poultry, seafood, and their juices away from other foods.
 - Keep raw meat, poultry, seafood, and eggs separate from all other foods in the refrigerator.

Step-3. Cook to the right temperature.

- Food is safely cooked when the internal temperature gets high enough to kill germs that can make you sick. The only way to tell if food is safely cooked is to use a food thermometer. You can't tell if food is safely cooked by checking its color and texture (except for seafood).
- Use a food thermometer to ensure foods are cooked to a safe internal temperature.
 - Whole cuts of beef, veal, lamb, and pork, including fresh ham (raw): 145°F (then allow the most to rest for 2 minutes before corrige or esting)
 - (then allow the meat to rest for 3 minutes before carving or eating)
 Fish with fins: 145°F or cook until flesh is opaque
 - Ground meats, such as beef and pork: 160°F
 - All poultry, including ground chicken and turkey: 165°F
 - Leftovers and casseroles: 165°F

Step-4. Chill: Refrigerate promptly.

Bacteria can multiply rapidly if left at room temperature or in the "Danger Zone" between 40°F and 140°F.

- Keep your refrigerator at 40°F or below, your freezer at 0°F or below.
- Divide warm foods into several clean, shallow containers so they will chill faster.
- Refrigerate perishable food within 2 hours. If the food is exposed to temperatures above 90°F (like a hot car or picnic), refrigerate it within 1 hour.
- Thaw frozen food safely in the refrigerator. Never thaw foods on the counter because bacteria multiply quickly in the parts of the food that reach room temperature.

The key elements of food hygiene are:

- **Personal hygiene.** This includes handwashing, protective clothing, illness procedures, and other duties (such as avoiding smoking).
- **Preventing cross-contamination.** This includes preventing bacterial, physical, chemical, and allergenic contamination, particularly by having appropriate equipment in place (such as separate cutting boards).
- **Cleaning procedures.** Thorough cleaning of the kitchen, equipment, and kitchenware (including plates and cutlery) is vital.
- Allergen control. All businesses must clearly explain which foods are allergenic and must prevent allergens from cross-contaminating other food.
- Safe storage of food. This includes storage locations and containers, labelling, and temperature control.
- **Cooking temperatures.** Businesses must ensure they cook and hold food at appropriate temperatures to prevent bacterial risks.

0. Thorough cooking



Food Hygiene guidelines and principles for food business

Food hygiene can be applied in almost all areas of a food manufacturing business. From the actual production of your raw materials to the delivery of your products, food hygiene is very much applicable. Consumers should also be aware of what is food hygiene is. It is a role that is played by everyone.

Below, we give you a few key food hygiene behaviors, principles and guidelines to **apply in your business**.

Cleaning; Effective cleaning is vital to ensure that all equipment and surfaces are free from contamination. This principle applies to kitchen utensils, working areas and even your raw materials. Some of the essential activities include:

- scheduling regular cleaning activities;
- set-up monitoring forms to ensure that the cleaning schedule is followed;
- making cleaning procedures accessible for all food handlers.
- using food grade chemicals and disinfectants;
- sanitize working area before starting processes;

- wash ingredients before cooking such as fruits and vegetables; and
- regularly wash and sanitize all cooking materials before and after using.

Cooking; Cooking is necessary to **kill harmful bacteria** that potentially cause food poisoning. Each food item requires a different amount of cooking time and safe and adequate temperature up to the center of your product.

Chilling; Proper chilling is crucial to stop bacterial growth and keep food safe, particularly for perishable food such as ready-to-eat salad, cooked meat, etc. Storing your food products before use or even after using prevents the multiplication of harmful microorganisms. Chilling means storing your food in conditions with temperatures around or equal to at least **35°F to 40°F** (2°C to 4°C).

*[Note. Suitable temperature for bacterial growth in food. $37^{\circ}C$ - Best temperature for the growth of most poisoning bacteria (body temperature) $20^{\circ}C$ - $50^{\circ}C$; Bacteria growth quit quickly $5^{\circ}C \sim 63^{\circ}C$; Danger Zone $1^{\circ}C - 4^{\circ}C$; Sleepy $-18^{\circ}C$; No growth]

Cross-contamination; This issue occurs when **bacteria spread** among food, equipment and work areas. Cross-contamination occurs as a result of improper segregation of materials, using similar utensils for raw and cooked food, improper wiping of working area and others. **Proper segregation** is one of the best ways to avoid cross-contamination.

Safe Transport; Improper handling during transport from your premises to stores may lead to contamination and spoilage. Therefore, it is **vital to ensure** that the containers provide adequate protection from potential contamination, keep the appropriate temperatures for chilled or frozen products (refrigerated vans, cool bags) and separate raw products from ready-to-eat ones.

Personal Hygiene; Every personnel working in food handling areas is responsible for maintaining personal hygiene. Some of the essential practices include:

- proper wearing of clean and protective clothing at all times;
- keeping hair tidy and covering it with a hat or hair net;
- properly washing hands thoroughly before and after handling food;
- abstaining from eating, smoking, chewing gum, sneezing, spitting and touching face or hair

Proper waste management; A food business is always expected to generate waste. These wastes can be fruit peels, raw material packaging, bones, seeds, and even spoiled foods. The mentioned list of wastes includes **both biodegradable and non-**

biodegradable materials. These wastes must be kept far from the working area to prevent possible contamination. In addition, biodegradable wastes attract all types of pests. Their clearance must be more frequent than other waste materials to prevent any pest from residing around your production area.

Safe water; Safe drinking water is one of the most widely used ingredients in all businesses. It is not only used for formulations and food preparation such as in juices or in cooking for a restaurant. Water is also used for **cleaning raw materials** and utensils alike. As such, the quality of water in all areas of your food business must have a clean and potable source.

Pre and post-operation sanitation; Before operations, your working area must be cleaned and sanitized properly to ensure that no contaminants are present. During off working hours, dust may build up in the countertops as a result of a **lack of proper air ventilation**. Similarly, it is equally important to **sanitize your working area** after work. This assures you that no waste or leftover food is left anywhere around your working area. Pre- and postoperation checklists must be provided to the sanitation crew.

Staff Training; Food businesses are required by law to **provide adequate food hygiene training** for food handlers and staff. It is crucial that every person has comprehensive knowledge and knows their roles in maintaining food hygiene and safety.

Good Documentation; Part of a working food hygiene system is properly monitoring and documenting these activities as proof of compliance.

Levels of food hygiene and safety training

The extent of knowledge is based on the roles and job description of your business. For example, a food quality manager should know how to implement a food safety management system, such as **HACCP or ISO 22000**, whereas a food handler who has direct contact with food on a daily basis must know the foundation of food hygiene rules and how to implement them.

Food hygiene and safety training is generally **divided into three levels** with an occasionally offered **4th level**. Learn the difference below, so you can choose which level fits your requirements best.

Level 1

A basic level courses. This level is **intended for personnel who don't have** direct contact with food but work in food preparation/ handling areas or where the food is handled elsewhere. The main objective is to raise food safety awareness in the workplace. **Training courses include** basic food and hygiene practices, keeping the working area clean, minimizing contamination in served food, and acquaintance with key food safety issues. This food hygiene course is suitable for bar workers, warehouse staff, waiters, kitchen porters, food delivery riders, etc.

Level 2

This level is **designed for anyone who has** direct contact with food whether in preparing, handling, or packaging the food. These employees are normally responsible for the implementation of critical control points approved in the HACCP food safety plan of your business. **This course is perfect for** production staff, cooks, and kitchen assistants. It applies to businesses including hotels and restaurants, food manufacturers, hospitals and cafeterias. This level of training is the minimum standard for most businesses to operate.

Level 3

The content is **similar to the Level 2 food hygiene course** with some additional materials on implementation of food safety management system, auditing and training staff. This course is **designed for** supervisory and managerial roles for retail, manufacturers, and catering service.

Level 4

The level 4 training course **applies to managers** as well in the food manufacturing industries. A minimum of level 3 training is required prior to access to level 4 and this course needs physical appearance to participate. This level **deals with more technical aspects** of food safety and contamination, microbiology and foodborne illnesses, hazards and their control (HACCP), advanced sanitation strategies, and roles of managers in food safety.

Food Hygiene Rating Scheme

To inform consumers about the level of competency of a business in terms of food hygiene and food safety, food hygiene **ratings are given** to food businesses depending on their level of maintaining food hygiene.

Food hygiene ratings helps to understand the quality and environment of various

types of food establishments, such as:

- Restaurants, cafes, pubs, and bar
- Food stalls, trucks and takeaways
- Supermarket, grocery stores and specialty food stores
- Bakery
- Canteens, catering and hotels
- Schools, hospitals and care homes

Food hygiene rating is **on a scale of 0 to 5**, with 0 being the lowest (need urgent improvement) and 5 being the highest (very good).

Rating 5 – very good

Rating 4 – good

- Rating 3 generally satisfactory
- Rating 2 some improvement is necessary
- Rating 1 major improvement is necessary
- Rating 0 urgent improvement is required

Food poisoning

Food poisoning is an acute illness, which usually occurs within 1 to 36 hours of eating contaminated or poisonous food.

Symptoms and Cause of Food Poisoning:

Symptoms normally last from 1 to 7 days and include one or more of the following-Abdominal pain diarrhea vomiting fever collapse

Food poisoning rarely occurs of a single isolated mistake. Food poisoning results from management failing to identify hazards and/or failing to control these hazards.

The food poisoning chain consists of 3 major hazards. The contamination high – risk food The multiplication of bacteria within the food The survival of bacteria within the food



controlling these hazards breaks the chain and prevents food poisoning.

Food poisoning may be caused by:

- 1. Bacteria or their toxins
- 2. Moulds (mycotoxins)
- 3. Chemicals such as insecticides, cleaning agents and weed killers.
- 4. metals such as lead, copper and mercury
- 5. Poisonous plants such as deadly nightshade and toadstools
- 6. Poisonous fish or shellfish

Protected food from contamination and controlling of poisoning;

-Purchasing food from reputable supplier

-Effective instruction, supervision and training of food handlers

- -Maintaining high standard of personal hygiene and good hygiene practices
- -Well designed and constructed food premises and food rooms
- -Effective pest control
- -The separation of raw and high risk food at all stages of delivery
- , storage, preparation, serving and distribution.
- -Effective storage and disposal of waste and unfit food
- -Well designed and proper use of suitable equipment/utensils



Thank You!