UNIT 9 FOOD SAFETY IN FOOD SERVICE ESTABLISHMENTS AND OTHER FOOD AREAS

Structure

9.1 INTRODUCTION

In the units so far we have learnt about the various food hazards and their implications on food safety. Food handling practices, hygiene and sanitation in food service establishments, you would realize, also play an important role in food safety. So then, what should be the approach to food safety in this context. This unit focuses on food safety approaches in food service establishments.

The approach to food safety, you would learn, has to be initiated from the selection of a site to the construction of a food service establishment. The various features that have to be considered in selecting the site, designing the premises, kitchen, selecting the equipment, food service area, storage and drainage which have a bearing on food safety will be discussed in detail in this unit.

Other than the permanent food service establishments, there could be other different types of situations where the food needs to be prepared and served, for example, in functions, for travelling public or may be even on the roadside. The facilities to ensure food safety may not be available in these other food areas. How to ensure food safety in such situations and what are the precautions to be taken, is the other aspect discussed in this unit.

Objectives

After studying this unit, you will be able to:

- describe the various features that are involved in designing a catering establishment such as premises, layout, equipment, storage and transportation with respect to food safety,

- describe what are street foods and its basic safety measures,
- discuss about temporary food services and methods to ensure food safety, and
- explain the need of food safety in various modes of public transport.

9.2 FOOD SAFETY AND FOOD SERVICE ESTABLISHMENTS

We would like to begin our discussion on this topic by first understanding what are food service establishments and other food areas. Perhaps you would already know what a food service establishment is. Yes, it is any facility, where the food is prepared and served. To elaborate further, it is *a place where food is prepared and intended for individual portion service and includes the site at which the individual portions are provided, whether consumption occurs on or off the premises.* The term, however, excludes food processing establishments, retail food stores, private homes, where food is prepared or served for family consumption and food service operations, where a distinct group mutually provides, prepares, serves and consumes the food limited to a congregation, club or organization.

While studying about food service establishments, you might come across terms like, fixed and/or temporary food service establishments, mobile food units etc. What are these food units? Let's get to know about them. A food service establishment which operates at a specific location and is connected to electric utilities, water and sewage disposal system is called a *fixed food establishment.* A *temporary food service establishment,* on the other hand, is defined as a food service establishment that operates at a fixed location for a period of time (not more than 14 consecutive days) in conjunction with a single event or celebration. A *mobile food service establishment* is a self-contained food service operation, located in a vehicle or a movable stand, otherwise propelled, used to store, prepare, display or serve food intended for individual portion service. It is also known as a *mobile food unit.*

Next, why are we talking about food safety in food service establishments/food areas? Primarily, because most food borne illness outbreaks have involved food prepared away from home. In a study conducted in USA regarding the location of the outbreaks, it was found that a majority of the outbreaks have been reported from the food service establishments, followed by the outbreaks at home and food processing establishments. You may have visited food service establishments such as a dhaba, restaurant or perhaps eaten food from a road side vendor and often enjoyed various delicacies offered by them. But, are you aware that such places could be a major contributor to food borne diseases. How and which factors can cause such diseases? You will realize that there are several reasons for the occurrence of food borne disease outbreaks. The most important of them are the factors which contribute to the contamination of foods by microorganisms, which when ingested, will lead to an outbreak. These include:

i) factors which affect the growth of microorganisms

ii) factors which affect the survival of the pathogens, and

iii) factors which affect the contamination like food handlers and cross contamination.

Of all the factors which contributed to the outbreaks, the most important ones were:

i) preparation of foods too far in advance

ii) foods left at room temperature or foods cooked in large pots

iii) improper warm holding e.g. below 60°C

iv) improper cooling, e.g. leaving the cooked foods at room temperature or storing the foods in large containers in refrigerators

v) inadequate reheating

vi) handling of foods by colonized infected persons

vii) inadequate cleaning of equipments and utensils

viii) cross contamination from raw to cooked foods

ix) toxic containers, and

x) contaminated raw ingredients.

It can be clearly seen that the possibilities of a combinations of factors listed above, exist in the food service establishments due to the nature of their operations. Besides, various features such as the site, the premises, kitchen, equipment, food service area, storage and drainage need to be considered in order to ensure safe food.

Food stands, fixed establishments and other food sales, provide good opportunities for the organizations to raise money, but the food they prepare and offer for sale, must be safe for the consumer. When we, the customers, buy food, we have the right to expect that it will be safe and wholesome. Therefore, the approach to food safety in food service establishments has to be initiated right from selection of the site, designing the premises, kitchen, selection of the equipment to food service area, storage and drainage. Similarly, in other food areas such as mobile units or street foods, the facilities to ensure food safety must be considered. We will study about the features in a food service unit and the measures to be adopted to ensure food safety, in the next section.

9.3 FOOD SAFETY MEASURES IN A FOOD SERVICE ESTABLISHMENT

As discussed earlier, food safety in food service establishments must be initiated right from the time the establishment is being planned. The various features/requirements, from the food safety perspective, that have to be considered in selection of the site, designing the premises, kitchen, selection of the equipment, food service area, storage and drainage have been considered next. We start with the requirements specific to premises.

9.3.1 Premises

For the general cleanliness of the catering establishment, preventive measures must be implemented throughout the establishment and all outside areas, apart from food preparation and storage areas. The premises should be kept clean and free of waste materials. Only articles necessary for the operation and maintenance of the food service establishment should be stored on the premises. There should not be unnecessary movement of personnel not connected with food preparation and serving in those areas.

The surroundings should be neat, clean and maintained in good repair. The entire building should be so constructed and maintained such that the dust, dirt, cockroaches and rodent harborages are eliminated. The entry of dogs, cats, rodents, birds, flies and other insects should be minimized. Drainage system should be satisfactory, with suitable traps and grills. Internal manholes should be airtight with double sealed covers. Equipment wash areas should have floor drainage with floors having an adequate gradient to drains. Separate toilets, hand washing, staff rest room, locker facilities should be available and should be disconnected from the food areas. Garbage

area should be protected against the entry of flies, cockroaches and rodents. 'No smoking' and other hygiene-related notices should be prominently displayed. Water and steam hoses, for washing and sanitizing, should be provided. An adequate supply of potable water should be there. The units should be so designed so that the work flow is satisfactory and in particular, 'dirty flow' do not cross 'clean flow' lines in order to minimize the risk of cross contamination. For example, in an abattoir, live birds are received at the dirty end and meat is outloaded from the clean side of the abattoir. Food preparation areas should be completely separated from the wash-up and garbage areas. It should have an adequate natural and/or artificial lighting and ventilation.

Next, we shall look at the other areas/objects within the premises such as floors, walls, ceilings, doors, windows, ventilation etc. for the safety features.

Floors

The floors should be durable and smooth but not slippery, non-absorbent and easy to clean and maintain. Meticulous care should be taken to ensure that crevices are not formed in the corners of the floor, which are potential pockets of dirt deposition and consequent food contamination. There should be trapped floor drains to carry away the liquid wastes.

What about the walls and ceiling? What safety features, do we need here? Let's find out.

Walls and Ceilings

Wall surfaces must be durable, smooth, non-absorbent and easy to clean. Ideally, they must be solid and covered at the junctions with floors and ceilings.

The inner walls and pillars should be preferably covered with an appropriate material to facilitate easy washing and good upkeep. Walls and ceilings in the food preparation area and washing area must be of a light colour to aid in the distribution of light to facilitate thorough cleaning. Food grade gloss paints/other suitable non-absorbent wall coverings may be used. Wherever possible, the joints of walls and ceilings should be rounded to prevent accumulation of dirt. Gaps between walls and any cladding should be small. Corner of the walls need special attention. The wall surfaces around sinks, wash basins and equipments must be specially treated to be resistant to heat and other physical damage by use of ceramic tiles or cladding. Pipe work should be bracketed at least 150 mm from walls to make the cleaning easier. All lagging should be smooth and non-absorbent. Gaps around pipes passing through the walls should be effectively sealed. The ceilings must be smooth, hard, non-absorbent and easy-to-clean. If it is suspended, access should be provided to enable pest control inspections/ treatment and cleaning. The walls, ceilings, equipments, light and other fixtures like fans etc. should be easily cleaned. From the point of view of upkeep and maintenance of hygienic conditions, steel and aluminium is preferable over wood.

Doors and Windows

All doors should be self-closing and made rodent-proof. They must be properly fitted with hard, smooth, durable, non-absorbent surfaces that are easy to clean. Doors that are required to be left open should be fitted with a suitable insect/bird proof screening.

Windows and frames must be easy to clean and maintained in a good condition. All the windows must be fitted with fly-proof screens and arrangements must be made for making them pest proof.

Ventilation

Sufficient ventilation is essential in the kitchen for avoiding the soiling of walls, ceilings and floors and also to reduce the temperature of the working areas. It

facilitates removing the contaminated air, excessive heat, cooking grids, steam, grease and condensations during food preparation, cleaning and other operations of food handling. Any screens and hoods fitted near the cooking area should be of materials and design to facilitate the cleaning operation. They should be checked and cleaned periodically. Exhaust fans have also to be provided, if possible, for good air circulation.

Lighting

Ample and properly distributed light assists in proper food preparation and handling, as well as, detects dirt and pests. Wherever possible, natural light should be provided. Fluorescent light fittings should be fitted with glare free vapour proof diffusers. Food handling areas like preparation tables, sinks etc. should be well lit. Care should also be taken to light the cold rooms and food storage areas. All the light fittings should be periodically inspected and repairs should be undertaken immediately.

In our discussion above, we have highlighted most of the features specific to the premises and its structures. Before we move on to the features of other services/areas within the establishment, we will take a break and try to recapitulate what we have read so far by answering the questions in check your progress exercise 1.

Check Your Progress Exercise 1

1) Fill in the blanks:

   a) A self contained food service operation, located in vehicle or a movable stand, used to store, prepare and serve food is known as ..... food unit.

   b) The construction and maintenance of the building should be such that it eliminates ....., ... , ... and ..... harbourages.

   c) The floors must have trapped .....to carry away liquid wastes.

   d) For ensuring hygienic conditions of walls and ceilings, ...and ..... must be used.

   e) Good air circulation can be provided by installing .....

2) What is a food service establishment? Why is food safety an important consideration in a food service establishment?

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3) Enumerate the general considerations to be kept in mind while planning clean and hygienic premises.

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Next, we shall look at safety requirements specific to equipments and utensils in an food service establishment.

9.3.2 Equipment and Utensils

Various equipments and utensils are required to run an establishment. *Equipments* include all stoves, ranges, hoods, meat blocks, tables, counters, refrigerators, freezers, sinks, dishwashing machines, steam tables and similar items, other than utensils, used in the operation of a food service establishment. *Utensils*, on the other hand, are the implements such as pots, pans, ladles or food containers used in the preparation, storage, transportation or serving of food.

Selection of the equipments, which can meet sanitation standards, is essential to ensure food safety. The basic safety criteria to be considered while selecting an equipment are highlighted herewith. The equipment should be such that it:

- has as few parts as possible
- be easy to take apart
- have smooth surfaces with no pits, crevices, ledges, bolts and rivet heads
- have rounded edges and corners inside with smooth surfaces
- be coated with materials, that do not crack or chip, and
- be made of materials that are not toxic, do not absorb liquids or fats and do not colour or flavour the food.

As for installing and laying out the equipment, remember it should be so arranged that food is not easily contaminated and all areas are easy to reach and clean. For example, dirty dish table should not be next to the vegetable preparation sink. The equipment should be 1.5 feet away from the walls, so that the staff can go round and clean.

What about utensils? Materials used for making utensils should not allow the migration of deleterious substances or impart colours, odours, or tastes under normal conditions of use. It should be:

- safe
- durable, corrosion resistant, non-absorbent
- sufficient weight and thickness to withstand repeated ware/wash
- finished to have a smooth, easily cleanable surface
- resistant to pilling, chipping, crazing, scratching, scoring, distortion and decomposition
- lead-free i.e. ceramic, china and crystal utensils that are used in contact with the food should be lead-free, and
- specific, for example, galvanized metal should not be used for utensils that are used in contact with the acidic foods.

After learning about safety measures specific to equipments and utensils, we will look at the features of the kitchen.

9.3.3 Kitchen Layout

Generally, enough attention is not paid for the layout of kitchen as compared to the dining and customer-related areas. Kitchen should never be used as a thoroughfare to other parts of the establishment. An illustration of a kitchen layout is presented in Figure 9.1.

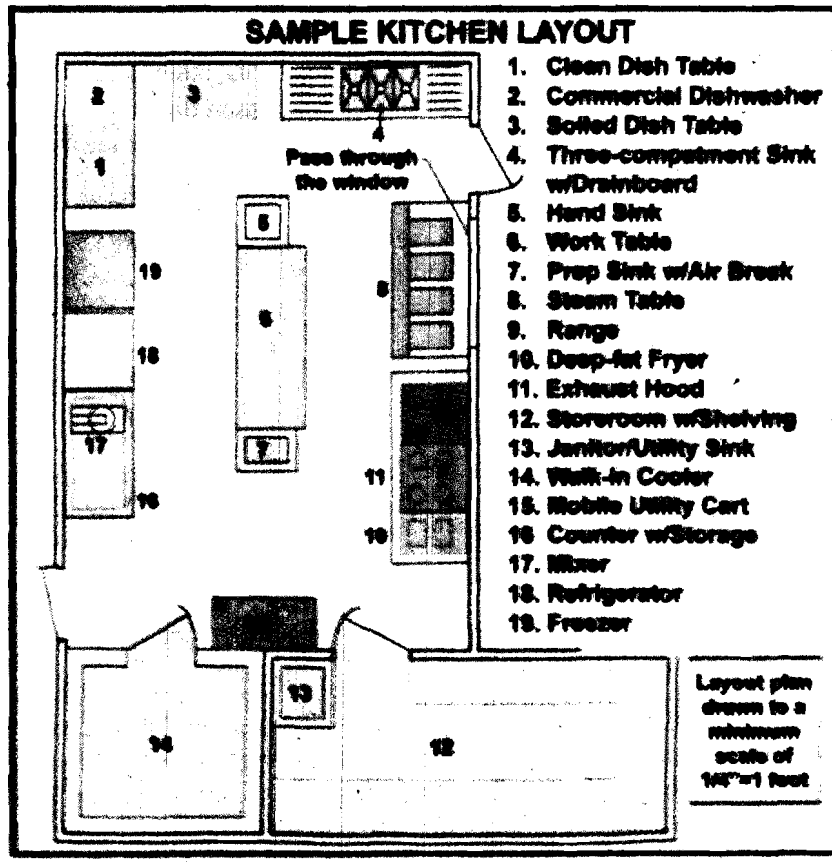

Figure 9.1: Kitchen layout

While designing the kitchen, the chief factors to be considered are the work-flow, the nature of the work and position of the windows, doors and drains. Fullest use of natural lighting and efficient use of drainage should be done. Free-standing kitchen units are much more hygienic than those filled close to walls or corners. "Island" layout is easier to clean. Ovens, stores and mixing machines should be in the center of the room. Cooking stoves and cooking ranges need a canopy and an exhaust fan ventilation system to draw off the fumes. Processing areas of vegetables, raw meat and fish should be clearly demarcated. Cooking units, where steam is produced, should be located near the house side wall to avoid long drainage channels running through the kitchen. Pots and pans should be stored on racks or slatted shelves.

Next, let us study what should be the optimum storage facilities for different types of foods that could help in the prevention of food borne illnesses.

9.3.4 Storage

Proper storage of raw materials procured for food preparation is very essential in preventing food borne illness. You have already learnt earlier that foods are classified into non-perishable, perishable and highly perishable commodities from the storage point of view. Each of these food types requires different conditions of storage. Non-perishable foods like food grains, spices etc. need to be stored at a room temperature in metal or plastic bins with proper lids. They should be at least 6 inches above the floor in a manner that protects food from splash or other contamination and also permits easy clean up.

Perishable foods like fruits, vegetables, butter, eggs have to be stored in refrigerators. It is important to know the most appropriate positions for each of the food in the refrigerator. Food that is to be stored for a long time needs to be stored in deep

freezers in the refrigerators, if it is a domestic refrigerator. Deep freezers specially meant to keep the food at –18°C, are separate in the commercial establishments.

Some general requirements, specific to storage of foods are highlighted herewith:

a) Containers of food are to be stored a minimum of six inches (14.24 centimeters) above the floor to protect the food from splash and other contamination, and at a height to permit easy cleaning of storage area.

b) Food, containers of food and food wrapping materials are not to be stored under exposed or unprotected sewer lines. The storage of same in toilet rooms is prohibited.

c) Food not subject to further washing or cooking is to be stored and protected against cross-contamination from food requiring washing and cooking.

d) Packaged food is not to be stored in contact with water or undrained ice. Ice intended for human consumption is not to be used as a medium for cooling stored food, food containers or food utensils.

e) Food which is not readily identifiable is to be stored in properly labeled original product containers or in containers labeled to identify the food by a common name.

Besides storage, there are other services like transport and sanitary facilities, which require special attention. Let us learn about them.

9.3.5 Transportation

The protection of food from contamination and the maintenance of food at the proper temperatures are critical for the safety of a food. During transportation, cross contamination can cause disease. To ensure safe food, the general requirements of containers for food transport have been stipulated which include:

1) It should not contaminate the food or packaging for e.g. tanker used for non-food transport should not be used to transport food.

2) It can be effectively cleaned, kept in good condition and whenever necessary, can be disinfected.

3) It should provide effective protection from contamination, including dust and fumes.

4) It should maintain the temperature, humidity, atmosphere and conditions necessary to protect food from harmful or undesirable microbial growth and deterioration likely to render it unsuitable for consumption, for example, insulated tankers for chilled milk transport etc.

During transportation, including transportation to another location for service or catering operations, food is to meet the requirements relating to food protection, temperature, handling and storage. The challenge is to maintain proper refrigeration temperature and to keep the cold-chain from breaking during steps such as staging, loading and unloading of containers and in storage. Food, utensils, equipments and tableware are to be protected from contamination during transportation by the use of covered containers, complete wrappings or packagings.

Lastly, let us review the sanitary facilities.

9.3.6 Sanitary Facilities

The sanitary facilities like toilets, wash basins, hand dips and rest rooms should be provided to the food service establishment personnel. Let us learn about these facilities.

Washrooms, Lunchrooms, Change Rooms

Self-closing doors must be provided for all washroom facilities. Washrooms, lunchrooms and change rooms must be separate from and not directly entered from food processing and handling areas. Such facilities are to be properly ventilated and maintained.

Hand Washing Facilities

Sufficient numbers of handwashing sinks, with hot and cold potable water, soap, sanitary hand drying supplies or devices, must be provided in washrooms. A sufficiency of suitably located handwashing sinks are also necessary in food processing and handling areas. Hand-washing sinks should be separate from sinks used for equipment cleaning and other operations.

Check Your Progress Exercise 2

1) Give the basic criteria to select:

   a) Equipments

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   b) Utensils

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   c) Containers for food transportation

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2) List the chief factors to be considered while planning the kitchen layout.

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3) Explain the various storage techniques for different foods.

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4) Enlist a few general requirements that are specific to the storage of foods.

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So far we have looked at the features specific to food service establishments. Now we shall review the safety measures in other food areas, such as temporary food services, street foods etc. We start with street foods.

9.4 STREET FOODS – FOOD SAFETY MEASURES

The rapid urbanization has led to a sudden and unprecedented urban growth along with an increase in the size of the labour force in the cities. All these changes have brought about a marked difference in the life-style of the people. There is an increased demand for ready-made foods or fast foods. Studies on dietary trends are showing an increase in the consumption of street foods in urban areas. The vast segment of the population in the country is consuming what we call as street foods. You must have seen, as well as, sometimes consumed street foods. What are '*street foods*' or what foods come under these? Are these foods safe for us? Let us find out.

The term *street foods*, primarily, describes a wide range of ready-to-eat foods and beverages sold and sometimes prepared when the customer orders the meal, and which can be consumed where it is purchased or taken away. It is low in cost compared with restaurant meals and offers an attractive alternative to home-cooked food. Street foods are defined by Codex Alimentarius *as ready-to-eat foods and beverages prepared and/or sold by vendors and hawkers especially in the streets and other similar public places.*

Street foods often reflect traditional local cultures and exist in an endless variety. There is much diversity in the raw materials, as well as, in the preparation of street food beverages, snacks and meals. Some of the foods sold on the streets are – fried snacks, noodles or cereal-based meals, cakes and pastries, soups, porridges, drinks, fruits, meat, poultry, fish, eggs etc. Street foods are also prepared in a variety of ways such as boiling, frying, baking, steaming etc., as well as, served raw. Vendors' stalls are usually located outdoors or under a roof which is easily accessible from the street and have low-cost seating facilities. Street food vending actually assures food safety for low income urban dwellers. It provides an affordable source of nutrients to many sectors of population, including the urban poor. On the other hand, street food vending also provides a livelihood for a large number of workers. It offers business opportunity for developing entrepreneurs. So then what is the problem with street foods? The major concern is of their safety. Street foods are perceived to be a major public health risk. Why? Primarily, because they may cause serious health hazards as proved by the presence of pathogenic organisms, especially *E. coli, micrococci, Klebsiella* and *Proteus* etc. in the food samples. How does this happen? This is due to the fact that the street food vendors lack basic infrastructure and services such as potable water supplies. Further, it is also recognized that street food vendors are often poor, uneducated, lack appreciation for safe food handling and have a poor knowledge in basic food safety measures. These various factors which contribute to street foods posing significant health problems are summarized herewith:

- Lack of basic infrastructure and services, such as potable water supplies.
- Difficulty in controlling the large numbers of street food vending operations because of their diversity, mobility and temporary nature.
- Insufficient resources for inspection and laboratory analysis.
- General lack of factual knowledge about the microbiological status or the precise epidemiological significance of many street-vended foods.
- Poor knowledge of street vendors in the basic food safety measures.
- Inadequate public awareness of hazards posed by certain street foods.

Considering these factors, there is an urgent need to create awareness among the vendors, as well as, among the consumers about the concept of safe food. Street food vendors need to be educated regarding the following factors as they are vital in the maintenance of food safety. Let us get to know these.

A) *Raw Materials*

The raw material itself is the most common source of contamination. The ingredients can carry harmful or potentially harmful microorganisms and toxins. The type and extent of biological contamination of raw materials used in street food vending will differ little from those used in other food service sector. The greatest difference will be noted when vendors purchase raw materials of a lower grade because of their lower cost. Raw materials need to be observed for visible deterioration and off-odours. Raw materials need to be examined for the presence of physical hazards and also signs of chemical contamination. It is advised to buy AGMARK/BIS certified products for quality assurance. Vendors should pay attention to the containers of chutneys, pastes, sauces and other food supplements, where there is a chance of fungal growth and visible deterioration.

B) *Water and Ice*

One of the most critical problems in street food vending is the supply of water in sufficient quantities of an acceptable quality for drinking, washing, cleaning and other operations. Water used for drinking and preparation of foods should be potable otherwise it can contaminate food. Water used for washing utensils, foods and hands should be safe and should not be reused. A bucket or a similar container can be used for washing, but it should be emptied and cleaned after every wash. Ice (that is used in beverages) and foods should be prepared from potable water.

C) *Preparation and Processing*

Preparation and processing is a critical area in the series of steps to which the foods are subjected, before their sale and consumption and is an important aspect in deteriorating the safety of foods.

How can then, we ensure the safety of foods while preparing and processing them? Well, to begin with, foods that are eaten raw e.g., salads, peeled and cut fruits should be washed sufficiently with safe water to reduce contamination on the surface. Food should be processed by heat treatment. It should be thoroughly cooked, which means that the temperature of all pails of the food must reach at least 70°C.

D) *Transportation, Handling and Storage of Prepared Foods*

The prepared foods have to be transported from the place of production to the point of sale/consumption. You must have noticed people on bicycles or in auto rickshaws who transport prepared food items. Have you ever wondered that these could be a potential hazardous source of various contaminants? So, how to prevent prepared foods from spoilage during transport? First of all, the vehicle used for transport should be clean and should not carry animals, toxic chemicals and contaminating materials along with the prepared foods. The time required for transporting the preparations and vending units should be such that the bacterial proliferation does not reach hazardous levels. Problems of transport are minimized if the point of sale is near the place of preparation.

After the food is transported safely, handling practices and storage facilities must be considered. This would also account to holding of prepared foods at appropriate temperatures where the growth and action of microorganisms is the least.

Prepared foods served hot should be kept at a temperature of at least 60°C to prevent microbial growth, particularly if the sales period exceeds 4-5 hours. Prepared foods which are to be served cold and which may support the growth of pathogens should, if the cooling capacity is available, be stored at less than 10°C. The vendors should be encouraged to discard leftovers.

E) *Equipment, Utensils and Containers*

Now let us see what measures should be taken in account of ensuring food safety with respect to equipment, utensils and containers of street foods. Note the equipment, utensils and other containers should be made up of materials which do not release toxic and hazardous metals like copper, lead, cadmium etc. into food and beverages, especially when the foods are acidic. The design, construction and maintenance of equipment are also important to food safety. The use of inappropriate materials and poorly maintained materials may hamper proper cleaning and sanitization of surfaces, leading to microbial growth and an increased likelihood of contamination. If raw meat, poultry and fish are handled, their preparation should be carried out using separate equipment and utensils.

F) *Vending Units*

You would have seen vending units for various food items at food service establishments. What food items are delivered through these? What should be its features and how should it be cleaned so as to minimize chances of contamination? These are the issues which are discussed here.

A typical vending machine is illustrated in Figure 9.2. During the recent years, the use of such vending machines for quick dispensing of foods is on an increase. The most popular items dispensed with vending machines include milk, coffee, tea, fruit juices and ice cream. The food safety problem may be confronted with the increasing use of such machines which could be due to: (i) usage of substandard raw materials (ii) lack of periodical cleaning/servicing of machines, and (iii) non-usage of disposable receptacle or containers.

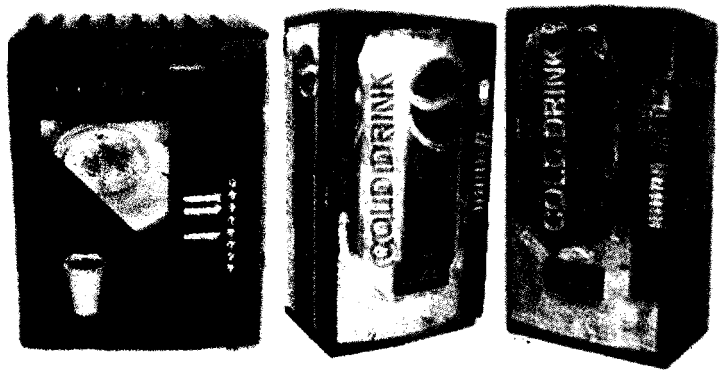

Figure 9.2: Vending unit

The usual care taken during preparation of food article by conventional methods such as use of potable water, adequate washing and cleaning of raw materials like fruits etc. has to be ensured. Regular cleaning of the vending machines and servicing of machinery should be undertaken. All machines should be regularly restocked, cleaned and maintained to ensure that the highest possible standards are achieved. Where necessary, temperature controls in these machines should be maintained. Only disposable cups should be preferred in places where the vending machines are placed. A proper recording of cleaning and maintenance is essential.

Vending units should be designed and constructed so that they are easily cleaned and maintained. Preparations should not be carried out on or near the ground. Bowls and dishes should be stored upside-down to prevent the accumulation of dust and foreign matter.

G) *Requirements at the Point of Sale*

Food vendors are generally seen at the roadside under the tree or on a pavement from where the traffic passes by, rain and wind often comes and accumulates dust

on uncovered foods. These may act as a source of contamination for even hygienically prepared foods. So what place and conditions should be considered for reducing the risk of contamination? To begin with, the foods should be prepared and sold in a clean, well-lit place, protected from strong sun, dust, rain and wind. It should be away from the sources of contamination such as solid and liquid wastes and from animals, including pets as well as pests.

Sales point, stationary and/or ambulatory should be located in a place where the risk of contamination from rubbish, sewerage and other materials and toxic substances is absent or minimal. If such risks cannot be completely eliminated, at least care should be taken to ensure that the prepared food offered for sale is suitably covered from contamination. When required, food should be wrapped in a clean paper, plastic or foil and other suitable material. Newspaper and other unsanitary wrapping materials should not be used for packing or serving the food.

Vendors who are patronized by high risk groups e.g. schools, hospitals should be particularly vigilant in controlling food safety.

Finally, a word about waste disposal and pest control.

H) *Waste Disposal and Pest Control*

You will realize that the possible causes of street food contamination include:

- absence of proper hygiene and sanitation
- improper food handling practices
- use of contaminated water and poor quality raw materials
- use of ice made from contaminated water
- exposure to dust and flies
- poor packing and storage
- improper environment, and
- inadequate facilities for garbage disposal.

Yes, as you can see unclean environment and inadequate facilities for garbage disposal along with pest control are the major areas of concern in ensuring food safety, especially in a country like ours. Waste products and left-over foods, if not disposed off hygienically, would pose a great threat to the food safety. It is essential to maintain adequate hygienic and sanitary conditions to avoid contamination of any type and spreading of harmful food borne diseases.

Finally, pest control is also a crucial factor in determining the safety of prepared foods. You would agree, this too is linked to the waste disposal strategies. An effective waste control system, itself would help in controlling the degree of pest growth and infestation. Hence, it becomes all the more imperative to ensure that all waste is handled and disposed off in such a manner so as to avoid contamination of food, water and the environment. Liquid waste should be emptied into the nearest drain. Remaining foods may be separated and kept for feeding animals. Animals should not, however, be allowed to eat from utensils used to serve customers. Solid waste should be kept in covered containers to be removed at least once daily.

With this, we come to an end of our study of factors influencing the food safety of street foods. Before we move on to the other topic, we would like you to take a look at a few simple tips to make sure that contamination does not occur by the consumption of street foods. Here are some key Do's and Don'ts for the food handlers.

Plan carefully

- Don't prepare/cook foods too far in advance.
- Don't buy more food than can be stored safely.

Temperature control

- Do keep hot food hot (above 63°C) and cold food cold (below 8°C).
- Don't leave food around on the stall for several hours.
- Do cook food thoroughly.
- Don't cut the cooking time because of a long queue of people.
- Make sure food is thoroughly thawed before cooking.

Avoid contaminating food

- Don't let raw foods or unwashed fruit come into contract with food that is ready-to-eat.
- Do use separate utensils, chopping boards and knives for raw and cooked foods.
- Do display food off the ground.
- Do cover food with cling film, foil or place food in plastic containers.

Personal Hygiene

- Do wear clean over clothing.
- Do wash hands regularly, especially after handling raw food or refuse.

Check Your Progress Exercise 3

1) What are street foods? Why is the safety of street foods a major concern?

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2) How can we ensure safety and quality of raw materials used in preparation of street foods?

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3) Discuss a few ways of waste disposal.

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4) What food safety problems are usually encountered with vending units?

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We have studied about food safety measures in permanent and mobile food service units so far. Some units, you would have noticed operate at a fixed location for a period of time in connection with an event or function. What safety measures are needed in such temporary food service units? The next section focuses on this aspect.

9.5 TEMPORARY FOOD SERVICE

We often participate in many social gatherings, be it weddings, birthday parties or religious functions etc. Food service during such occasions have become an inseparable part, and so with it comes the possibility of food getting contaminated. Here, we shall look at the various measures that need to be considered for preventing the chances of food getting contaminated. We already know that the temporary food service units operate at a fixed location for a period of time, in conjunction with a single event or celebration. Normally, it is arranged with a specific purpose meant to cater to a group of individuals for a day or two. These are arranged invariably in the public places earmarked for such functions where specific provisions for preparation of foods (kitchen) are available or make shift cooking facilities are created.

Under such circumstances, the management should ensure that there is an adequate space for cooking, proper utensils, storage and water facilities. The kitchen or cooking area should be properly ventilated with adequate exhaust facilities. Proper covers should be provided for all utensils. Sufficient water sources should be made available with the provision for washing utensils and crockery before and after use. Care should be taken that potable water is made available for drinking purposes.

It is pertinent to mention here that if cooled water is to be provided by the addition of ice blocks, it is desirable to ensure that: (1) the ice is prepared from potable water in the ice factory (2) ice blocks are thoroughly washed with potable water before being placed in stored drinking water in order to eliminate extraneous matter, like saw dust/husks (3) after washing the ice blocks, these are placed in the water rather than kept on the floor, and (4) the water container is appropriately covered. Remember, ice not prepared from potable water under hygienic circumstances is the potential source of health hazard.

Regarding water and waste disposal, the waste water should not be allowed to stagnate in and around the area lest it becomes a breeding ground for insects and poses a health hazard to the community. Special attention has to be paid for the disposal of left-over foods. It should not be used for human consumption.

The garbage disposal, including left-over food (in the plates), poses a serious health hazard in the transmission of food borne diseases. It is often noticed that no care is taken to ensure proper disposal and it is a common sight to see the garbage piling on the road side. It would be ideal to provide incinerator in each function hall. Alternatively, the management should ensure appropriate disposal of wastes.

Next, let us look at the food safety measures on wheels, wings and waves. What do we mean by wheels, wings and waves? You will soon find out.

9.6 FOOD SAFETY ON WHEELS, WINGS AND WAVES

Today, people are travelling from one place to another for various reasons like business, pleasure or even otherwise on a holiday. With an increase in travel and tourism, there is a need for extra care in the food safety practices to be adopted to ensure safety of the commuting passengers. The main modes of transport for long

distances are buses, railways, airlines within the country, and airlines and ships for going abroad. Hence safety on wheels, wings and waves is crucial. The foods served on wheels, wings or waves have to be prepared under the supervision of trained personnel who are well versed in the safety methods to be adopted in food preparation. If not, the contaminated food can affect simultaneously few hundred persons at any given time on a train, air craft or ship.

The food handlers should be educated in the proper handling techniques and especially should be made aware of the risks involved in storing foods at room temperature for longer periods. They have to be educated with regard to personal hygiene. We shall learn about these safety measures next, starting with the railways.

9.6.1 Railways

Normally, when we decide to dine out, we have a choice of either going to a restaurant or a hotel or a fast food joint etc. However, while travelling, one has to depend entirely on the food available on the trains or on canteens or food vendors at the railway stations.

The railways serve food to passengers on the train at selected places. The foods to be supplied are prepared in advance. Therefore, it is important to ensure that the food should not be prepared too early before the arrival of train. The cooking and packing time has to be kept to a minimum to ensure that the food is fresh. Adequate cooling and hot storage facilities for the food prepared in bulk has to be installed, as there is always the danger of trains getting delayed by several hours due to various reasons. In such cases, any lapse in the storage of cooked foods exposes the passengers to a great risk of contamination.

It is the duty of the railway catering services to install adequate hot and cold storage facilities and also to instruct the personnel in-charge of preparation and selling of food at the railway station, to safeguard the foods sold on a platform from exposing to environment by proper covering of the foods. To avoid contamination, the foods have to be served in a packed form or single use paper plates etc. to avoid contamination while washing and re-use.

While packing foods, adequate precautions have to be taken in selecting the packing material. Packing in old newspaper or other material which has the possibility of contaminating the prepared food, has to be avoided. Finally, enough care has to be taken to supply potable water for drinking purposes. Railways, with a casual catering work force of about 20,000, is one of the biggest employers in the catering field. The education of food handlers is hence a challenging problem.

What about other services like airline catering? Read and find out.

9.6.2 Airlines

In the case of airlines, the commuting passengers in domestic flights stay abroad the air craft only for a few hours. In some international flights, the passengers travel for much longer periods. The passengers of the airlines are quite educated and are generally safety conscious unlike the majority of the railway passengers. There have been several instances in the past of huge compensatory claim suits due to serving of unsafe food. As such, like in any other system, the safety precautions like avoiding cooking far in advance of the flight, proper packaging and storing etc. can go a long way in ensuring the safety of the passengers. As the passengers in air flights can be from Indian citizens to foreign nationals, the serving of safe food enhances not only the Indian culinary talents but also the reputation of airlines.

Finally, food safety on waves i.e. abroad ships.

9.6.3 Food Safety Abroad Ships

Unlike the journey in railways or airlines, the time for travelling abroad a ship may extend from several days to several weeks. The food safety practices adopted abroad a ship has to be of a high order, otherwise, there is a danger of passengers getting sick, which will have a great impact. If the crew gets sick due to contaminated food, it poses a major problem. The danger of infected food handlers has an important role to play in the safety of foods prepared. The foods purchased for the long journey have to be of best quality and packed and stored properly.

We hope the discussion above would have given you a good insight about food safety measures to be adopted on wheels, waves and wings.

Check Your Progress Exercise 4

1) Fill in the blanks:

   a) The water to be used for preparing foods and beverages must be ..... .

   b) The processed foods must be thoroughly cooked to reduce the risk of ..... .

   c) The vehicles used in transportation of prepared foods should be ..... and should not carry ....., ... and ..... material.

   d) Acidic foods should not be prepared in utensils made up of materials that release ..... and hazardous..... .

   e) Prepared food that is offered for sale should not be wrapped in ....., ...paper and other ..... wrapping material.

2) What factors should be kept in mind to ensure food safety in temporary food service?

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3) What precautions must be taken to prevent contamination of foods served in railways?

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4) What measures should be considered to prevent and control the occurrence of food borne illness on wheels, waves and wings?

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9.7 LET US SUM UP

In this unit, we studied about various features that need to be considered while planning a catering establishment. The various factors included ways to maintain a clean and hygienic premises, which further involved parameters such as floors, walls and ceilings, doors, windows, ventilation and lighting. Selection of equipments and utensils to adequately suit the requirements, as well as, meet sanitary standards, installing and laying them was described. Considerations to be kept in mind while planning the kitchen layout, sufficient storage and transportation facilities were the other factors that were briefly dealt with.

Further, in this unit, we studied about the concept of street foods and the various measures that are involved in ensuring their safety. These included raw materials, water and ice, preparation, processing, transportation, handling and storage methods. Apart from these, the requirements at the point of sale and methods of waste disposal and pest control were discussed. The food safety factors specific to temporary food service establishments were also discussed. Finally, the methods to ensure food safety on public transport modes were dealt with. The major modes of transport included were short and long distance covering i.e., railways, airlines and ships.

9.8 GLOSSARY

BIS/Agmark / Certified Foods : certification of certain food products of being of good quality under the provision of PFA Act and Rules/ Standards.

Equipment : it includes stoves, ranges, hoods, meat blocks, tables, counters, refrigerators, freezers, sinks, dishwashing machines, steam tables and similar items, other than utensils, used in the operation of a food service establishment.

Food borne illness outbreak : an incident in which two or more persons experience a similar illness, usually gastroenteritis, after ingestion of a common food which is identified as the source of food borne illness.

Processing : to manufacture, compound, intermix or prepare food products for sale or for customer service.

Personnel In-charge : the individual present in a food service establishment who is the apparent supervisor of the food service establishment at the time of inspection. If no individual is the apparent supervisor, then any employee present is the personnel in-charge.

Utensils : any implement used in the storage, preparation, transportation, or service of food.

Vending machines : a self-service device that, upon insertion of a coin, paper currency, token, card or key or by optional manual operations disperses unit servings of food in bulk or in packages without the necessity of replenishing the device between each vending operation.

9.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

1) a) mobile

   b) dust, dirt, cockroaches, rodent

   c) drains

   d) steel, aluminium

   e) exhaust fans

2) A food service establishment is a place where food is prepared and intended for individual portion size and includes the site at which the individual portions are provided, whether consumption occurs on or off the premises. Food safety is an important consideration in food service establishment because most food borne disease outbreaks have involved foods prepared away from home.

3) The general considerations to be kept in mind while planning clean and hygienic premises are that it:

   - should be kept clean and free of waste materials
   - unnecessary movement of personnel not connected with food preparation and serving should not be there
   - eliminates the entry of dogs, cats, rodents, birds, flies and insects
   - has satisfactory drainage system
   - has separate toilets, hand washing, rest rooms and locker facilities
   - has provision of water and steam hoses
   - has separate food preparation areas, wash-up and garbage areas.

Check Your Progress Exercise 2

1) a) The basic criteria to be considered while selecting equipments are such that the equipment should:

      - have few parts
      - easy to take apart
      - have smooth surfaces
      - have rounded edges and corners, and
      - be made of non-toxic coated materials.

   b) The basic criteria to select utensils are that these should be:

      - safe, durable, corrosion-resistant and non-absorbent
      - sufficient weight and thickness
      - smooth, easily cleanable surface
      - resistant to piling, chipping, crazing, scratching, scoring, distortion and decomposition
      - lead free, and
      - avoid use of acidic food in galvanized metal utensils.

c) The containers for food transportation must be selected on the criteria that they:

- shouldn't contaminate food/packaging
- should be cleaned/disinfected effectively, and
- protect temperature, humidity atmosphere and conditions necessary to protect food.

2) The chief factors to be considered while planning the kitchen layout are work flow, nature of work, position of the windows, doors and drains and use of natural lighting and drainage.

3) The various storage techniques for different foods include:

- Non-perishable foods: room temperature, in metal or plastic bins with proper lids.
- Perishable foods: refrigerated.
- Highly perishable foods: deep-freezers.

4) A few general requirements that are specific to the storage of foods are:

- containers of food to be stored 6 inches above the floor
- food and containers of food and food wrapping material not to be stored under exposed sewer lines
- storage and protection of food not subject to further washing or cooking against cross contamination from food requiring it
- packaged food is not to be stored in contact with water or undrained ice, and
- properly labeled containers to identify the foods.

Check Your Progress Exercise 3

1) Street foods are ready-to-eat foods and beverages prepared and/or sold by vendors and hawkers especially in the streets and other similar public places. The safety of street foods is a major concern because vendors lack basic infrastructure and services and they have a poor knowledge of basic food safety measures.

2) The safety and quality of raw materials can be ensured by:

- observing for visible deterioration and off-odours
- examining for presence of physical hazards and signs, and
- certified products- Agmark/ BIS

3) A few ways of waste disposal are:

- liquid waste should be emptied into drain
- solid waste should be kept in covered containers to be discarded regularly, and
- left overs to be separated and kept for feeding the animals.

4) Usage of substandard raw materials, lack of periodical cleaning/servicing of machines and non-usage of disposable receptacle or containers are the food safety problems usually encountered with vending units.

Check Your Progress Exercise 4

1) a) potable

b) contamination

c) clean, animals, toxic chemicals, contaminating

d) toxic, metals.

e) newspaper, used, insanitary

2) The factors to be kept in mind to ensure food safety in temporary food service are adequate space, well-ventilated kitchen, tinned utensils with adequate covers, sufficient water sources, both for washing and drinking, and adequate arrangements for waste disposal.

3) The precautions must be taken to prevent contamination of foods served in railways are:

- foods should not be prepared too early
- cooking and packing time must be kept to a minimum
- installation of adequate cooling and hot storage facilities
- supervision of the foods prepared and sold on platform, and
- provision of potable water.

4) The measures that should be considered to prevent and control the occurrence of food borne illness on wheels, waves and wings are preparation of foods under the supervision of trained personnel and education of the food handlers in proper handling techniques, personal hygiene and risks involved in storing foods at room temperature.