CHAPTER : 17

FOOD PRESERVATION

Our country faces the problem of less food and low nutrition, at the same time food also gets wasted in some parts. This from a physical, moral and social view is an unforgiveable crime. Food is our basic necessity. Food or a balanced diet is necessary to keep body healthy and fit. Preserving food means keeping food free from bacteria, viruses and to provide energy, strength to the body for performing daily physical and mental activities. That is why it is very important to preserve food.

Sometimes the food is balanced but if proper care is not taken in choosing, cooking and preserving of food, it may get infected with microorganisms and its consumption may cause diseases. All food items are not grown in all seasons. For example, pulses, oilseeds, wheat is grown in Rabi season while other cereals are grown in Kharif season. Therefore these foods should be preserved so that they can be consumed all the year round.

Food preservation— food preservation is the process of treating and preserving food from getting rot as well increasing the quality and nutritive value of food. Some micro-organism reduce the quality and nutrition of food but some other help to preserve food and also add some special qualities to food- like yeast.

To increase the nutritive value and taste of food, it is necessary to preserve food.

Food preservation involves preventing the growth of bacteria, fungi (such as yeasts), or other micro-organisms (although some methods work by introducing benign bacteria or fungi to the food), as well as slowing the oxidation of fats that cause rancidity.

Food can be divided into 3 types—

1. **Perishable food–** Perishable food like milk, curd, meat, fish, green leafy vegetables (spinach, fenugreek, coriander) etc. gets spoiled easily when at room temperature. This is because they have large quantities of water. Therefore, we can cool the boiled milk and refrigerate it to increase its life.
2. **Semi-perishable food–** Semi perishable foods have less water compared to perishable foods. Ex- potato, cabbage, onion, taro root, etc. these can be preserved for a period of 7 to 15 days.
3. **Non-perishable food–** These foods have very little quantity of water and their life is of 1-2 years. Ex- wheat, rice, millets, maize, pulses, etc.

Factors responsible for spoiling food—

1. **Self- spoiling of food–** Because of the enzymes present in the food, the food automatically gets spoiled. For example, the

enzymes present in fruits and vegetables spoil them. When fruits get ripened then also the enzymes remain activated and therefore more ripened fruits get spoiled.

2. **Biochemical changes–** In food items like fresh fruits and vegetables many changes occur even at room temperature. Biochemical changes inside the food items is responsible for these changes. For example if fruits and vegetables are over-ripened, they start giving an unpleasant odour and many fruits and vegetables show changes in colour and taste when they are kept sliced or cut.

3. **Spoiling of food because of insects and birds–** Insects, birds harm food. These insects and birds spoil dry fruits, sesame, seeds, and cereals more than they eat. They lay the eggs on food items, defecate on them or leave their hair on them thus making food poisonous.

4. **By micro-organisms–** The micro-organisms responsible for poisoning of foods are–

1. Fungus/molds
2. Bacteria
3. Virus
4. Yeast

These micro-organisms enter food and then grow rapidly inside them and use the nutritive elements of food for their own growth. Micro-organisms are small unicellular or multicellular organisms that we cannot see but can identify them through a microscope. These micro-organisms make food toxic and the person consuming them can fall ill.

The micro-organism especially responsible for spoiling cereals is fungus or molds. Temperature of food items increase because of fungus and food smells awful. The nutrition and taste of food reduces. Micro-organisms can be divided into 3 types on the basis of their requirement of oxygen– aerobic, anaerobic and optional anaerobic organisms. In the same way, on the basis of heat resistance capacity organisms are mesophilic and thermophilic.

The main points to identify spoiled food are–

1. Change in color and taste.
2. Reduction in aroma and nutrition
3. Development of cotton like fungus on food items like bread, pickle, etc.

Therefore, by identifying spoiled and poisoned food we must avoid eating them so that our body remains disease free and we stay healthy and fit.

Principles of food preservation—

1. By preventing food from getting self-spoiled– Sometimes food gets spoiled due to presence of organic catalysts or oxidation of free fatty acids in food. These can be prevented by two ways:

(a) Deactivation of organic catalysts

(b) Prevention of chemical reactions in food

2. By preventing growth or activity of micro-organisms in food

(a) Using preservatives

(b) Using high temperature

3. By preventing physical or mechanical damage
4. By preventing foods from attacks of mice, insects, wasps, birds.

Methods of preservation—

Micro-organisms reduce or change taste, colour, aroma and nutrition of foods. Because of this food no longer remains healthy and instead becomes toxic and harmful. To keep food healthy and nutritious

for a long time food preservation techniques are used. These methods increase shelf-life of foods enabling it to be consumed even in off-season.

In food preservation methods, growth of micro-organisms like bacteria, fungus and other organisms is controlled. In addition, helps in reducing factors which are responsible for bad smells in food and for oxidation of fats in food. The methods of food preservation are—

1. High hydrostatic pressure, vegetable bacteria, pressurized deactivation of yeast or molds
2. Killing micro-organisms or boiling for element radiation

For preservation, food is boiled in water at very high temperature (100^0C) for 1-2 minutes so that all the germs, bacteria present in food get destroyed. Even the spores of organisms are destroyed and the life of food increases.

Fruits and vegetables are boiled at high temperatures for 1-3 minutes before they are preserved. After boiling they are immediately cooled which is known as blanching.

3. **Drying or dehydration–** This is the oldest method of preserving foods in which the activity of water is considerably reduced and bacteria stops growing in food.

   Two main methods of dehydration are–

(a) Natural drying (drying in sun, dehydration at an industrial level)

(b) Artificial drying (drying by solar dryer)

4. **Low temperature deactivation (refrigeration) –** Refrigeration is a common and most used method at industrial and domestic level. Both moisture and heat present in food spoils food because micro-organisms grow in high temperature and in the presence of moisture. If we remove moisture from food then food can be preserved for long. But there are some foods in which moisture has to be maintained such as milk, curd, fruits, eggs and vegetables.

To preserve fruits, green leafy vegetables, meat, fish, eggs, milk, curd. Cottage cheese, etc. at home refrigerator is used. Cold storages, chill storages are used at industrial levels. The temperature in this method is maintained at 4^0 C – 10^0 C.

5. **Vacuum packing–** Food items should be stored in air-tight bags or bottles. Vacuum packing reduce the air required for bacterial growth so that the bacteria cannot grow or survive in such an environment. Vacuum packing is mostly used in storage of nuts.
6. **Preservation using salt–** Salt binds the moisture present in foods. That is why free moisture is not available in food for bacteria to grow. To maintain the concentration of food the fluids move out from bacterial body into the food. This process is known as osmosis.
7. **Preservation using sugar–** Sugar is used for preserving fruits. If we mix sugar in fruits and vegetables then the sugar destroys activity of micro-organisms by osmosis and food remains preserved for a long time. Ex- jam, jellies, marmalade, sauce, etc
8. **Preservation by pickling–** Pickling is the process of preserving or expanding the lifespan of food by either anaerobic fermentation in brine or immersion in vinegar. The resulting food is called a pickle. The preserving agents in pickles are– vinegar, sodium benzoate, etc. They increase the shelf-life of food.
9. **Potting–** One of the ways of preserving meat

is putting meat in a pot and sealing its cover with a layer of fats.

10. **Jugging–** Jugging is the process of stewing whole animals, mainly game or fish, for an extended period in a tightly covered container such as a casserole or an earthenware jug.

IMPORTANT POINTS:

1. On the basis of time required by food for getting soiled, foods are perishable, semi-perishable and non-perishable.
2. If the color, taste, aroma, structure, nutrition of food changes, it is a spoiled food.
3. Preservation is preventing food from action of micro-organisms, fungus, and virus for a long time.
4. Preservation increase shelf-life of foods and then they can be consumed even in off-season.
5. Food can be preserved by chemical preservative or many preservatives present in our kitchen– sugar, salt, vinegar.
6. Food can be preserved by drying it in sun or by a solar dryer.
7. Different methods of preservation are– dehydration, refrigeration, boiling, vacuum packing.

EXERCISE:

1. Choose the correct option–

(i) Which is a semi-perishable food?

(a) Milk (b) Cereals

(c) Potato (d) Pulses

(ii) What is the required temperature in refrigeration method?

(a) $4^0 - 10^0$ C (b) $15^0 - 20^0$ C

(c) $20^0 - 25^0$ C (d) $1^0 - 4^0$ C

(iii) The organisms which poison food are

(a) Bacteria (b) Viruses

(c) Yeast (d) All the above

(iv) The temperature required for preservation at very high temperatures is

(a) 100^0 C (b) $100^0 - 150^0$ C

(c) $100^0 - 170^0$ C (d) 200^0 C

2. Fill in the blanks–

(i) The main methods of dehydration are ——— — and ————-

(ii) The colour of a sliced apple changes to brown due to ——————— changes.

(iii) The unwanted change in colour, shape, and aroma is known as ———————

(iv) Preservation of food in an air-tight bag is known as ———————-

(v) The technique of preserving meat in a pot sealed with fat is called ———————

3. Define blanching.
4. Explain food preservation.
5. Explain process of osmosis.
6. Write in short principles of food preservation.
7. Write in detail various methods of food preservation.

ANSWERS:

1. (i) c (ii) a (iii) d (iv) a
2. (i) natural, artificial (ii) biochemical
   (iii) food spoilage (iv) vacuum packing
   (v) Potting