

## FOOD PRESERVATION

### 25.1 Introduction

You are now familiar with perishability, selection of foodstuffs and food spoilage. If you have purchased food in bulk you can prevent it from getting spoilt. How? By preserving it. You must have seen it being done as a common activity in your homes—potato wafers dried at home, raw mango being cut and dried, tomato sauce and chutneys being made, dal wadi and papads being made.

Preserved food not only adds variety to our meals but also helps in utilising excess produce at harvest time. Let us learn more about food preservation in this lesson.

### 25.2 Objectives

After reading this lesson, you will be able to:

- define food preservation and state its need;
- explain the basic principles of food preservation;
- list and describe household methods of food preservation;
- preserve simple food stuffs at home;
- evolve recipes for preservation of jam, jelly, pickles, squash, sauce, chutney.

### 25.3 Why Should We Preserve Foods?

Let us take a very simple example of boiling milk. Why do we boil milk? To keep it for a longer period. You know that boiling delays milk from getting sour. You can say you have processed milk and preserved it even if it is for a short duration. Hence, *we can define food preservation as a form of processing of food to prevent it from spoilage and making it*

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*possible to store in a fit condition for future use.*

It may be as simple as boiling of milk or complicated like pickling of mango or lemon. By preserving foods we are also increasing their life.

**Shelf life may be defined as the time period for which a food can remain fit for human consumption.**

## ACTIVITY

There are a lot of preserved foods available in the market. List down 5 of them and state approximately the shelf life of each. Also state if there are any instructions about keeping each. Can you state one reason for doing so?

**Reasons for preservation :**

- To increase their shelf life.
- To prepare new products like jams, papads, pickles, etc. Such products are enjoyed by everyone.
- Processing reduces the bulk of the fruits and vegetables, thus storage and transporting are easier, e.g. 1 kg of carrots would take more space than 1 kg of carrot murraba.

## 25.4 Principles of Food Preservation

We have earlier said that by boiling milk we are preserving it for a longer time. But what are we actually doing by boiling? We are killing the micro-organisms by raising the temperature of milk. Micro-organisms cannot survive at very high heat. This is one of the principles of food preservation. Let us now learn about some of the other principles of food preservation.

- By killing the micro-organisms
- By preventing or delaying the action of micro-organisms
- By stopping the action of enzymes

### 1. By killing the micro organisms

You already know the example of boiling milk. Sometimes heat is applied for a shorter duration to kill only undesirable micro organisms, i.e., those which can spoil the food stuff, as is done while pasteurizing milk. The cooking that we do at home also keeps food free from micro organisms. While canning (sealing in tins) also, food is heated to high temperature.

### 2. Preventing or delaying the action of micro-organisms

We all know that a peeled apple spoils faster than one with skin on. Do you know why? This is because the apple has its skin as a protective covering which prevents the entry of micro-organisms. Similarly the shell of nuts and eggs, skin of fruits and vegetables, serve as a protective coating and prevent or delay the action of micro-organisms.

Food packed in polythene bags, aluminium foil are also protected against micro-organisms. We have read earlier that micro-organisms need air and water to grow. But if they are removed we can prevent their action and thus prevent food from getting spoilt.

Lowering temperature or freezing a food also helps in food preservation. You must have come across frozen foods. Frozen food can be kept for a longer time than fresh foods. This is because micro-organisms cannot act at low temperatures. Thus when we are putting food in the refrigerator or freezer we are preventing the micro-organism from growing. Certain chemicals like sodium benzoate and potassium metabisulphite also help in preventing the growth of micro-organisms.

Thus you have learnt that the action of microorganisms can be delayed prevented in many ways :

- by providing a protective covering
- by raising the temperature
- by lowering the temperature
- by adding chemicals.

### 3. By stopping the action of enzymes.

We have read that enzymes also cause food spoilage. Suppose the action of enzymes is stopped then what will happen? The foodstuff will be prevented from spoiling.

Enzyme action can be prevented by giving a mild heat treatment. Before canning or freezing, vegetables are dipped in hot water or exposed to steam for a few minutes. This is known as *blanching*. When we heat milk, we are not only killing micro-organisms present in it but also stopping the action of enzymes. This extends its shelf life.

#### Intext Question 25.1

1. If you want to arrest the action of micro-organisms on tomatoes do not do the following:
  - (a) put them in boiling water
  - (b) put them in a freezer
  - (c) leave them on the shelf.
2. List four ways of delaying action of micro organisms on apples.
3. Define preservation and shelf life.

### 25.5 Household Methods of Food Preservation

Some of the practical methods which can be used for preserving food at home are :

- (i) Drying or dehydrating
- (ii) Pickling with salt, spices and/or oil
- (iii) Making jams, jellies, murabbas.
- (iv) Bottling of squashes and juices
- (v) Freezing

**Drying or dehydrating:** means drying up of the water in the foodstuff. When there is no water in the foodstuff micro-organisms cannot act. Packing, transport and storage of food

becomes easier after a foodstuff has been dried. When these dried food stuffs are soaked in water for some time, they regain their original shape.

Can you think of the easiest method of drying? Sun-drying is the easiest and cheapest method of drying foods. You can make various types of papads, amchur, potato, banana and tapioca chips, badis, by sun-drying at home. Vegetables can also be sundried by first blanching and then drying. You can sun-dry beans, peas, potatoes, cauliflower, ladiesfinger, garlic, onion and all leafy vegetables. Fruits like apricots, bananas, dates, grapes, peaches, pears, apples, etc. can also be sun-dried. Let us now learn how sun-drying is done by an example of potato chips.

## POTATO CHIPS

### Ingredients

Potatoes

Water

Salt

Potassium metabisulphite

Polythene bags

Trays or big plates or large polythene sheets.

Muslin cloth

### Method

Wash potatoes, peel, and cut into circular pieces of 2-3 mm thickness. Dip the pieces in boiling water for 3-4 minutes. Take out and dip the potato chips in cold water containing little salt and potassium metabisulphite (For 1 kg of water add 20g salt and 3g potassium metabisulphite) for 10 minutes. This is done to prevent blacking of the vegetables. If you are drying green leafy vegetables dry them directly in the sun but after washing and cutting.

Strain and arrange the potato slices on a tray or polythene sheet. Cover with muslin cloth and place in the sun for several days till completely dry. Store in airtight containers or pack in polythene bags.

## ii) Pickling with salts spices and/or oil

In India, there will be rarely any house where pickles are not eaten. List down 3 pickles that are eaten at your home.

Do you know how salt, spices and oil help in preserving the pickle? We know that every foodstuff has some amount of water in it, which helps micro-organisms to grow. When salt and spices are added, they draw out the water from the foodstuff, thus micro-organisms cannot grow. Moreover, they improve the flavour of the food being preserved. Spices such as chillies, mustard and pepper are used in pickling.

You must have observed that the pickle is usually covered with a layer of oil. Why? Because the layer of oil prevents the foodstuff from coming in contact with the air, thus preventing the entry of micro-organisms which can spoil the pickle.

Foodstuffs that can be pickled are lemon, mango, amla, tomato, greenchilli. etc. You can surely add many more to this list.

Now let us learn how a pickle is prepared

Wash the vegetable



Dry with a clean napkin



Cut into pieces on a clean board.



Mix with salt and spices



Place in a dry sterilised container



Cover with salt and/or oil



Close with a tight fitting lid and store.

Now let us see how sweet lemon pickle is prepared. You can prepare other pickles in the same way as explained above.

### SWEET LEMON PICKLE

#### Ingredients

Lemon	1 kg
Salt	150 g
Black salt	100 g
Cloves (powdered)	2
Ajwain	40 g
Hing	1 g
Black pepper powder	40 g
Sugar	200 g

#### Method

Select round, fully mature and juicy lemons. Wash well and dry. Cut each lemon into 8 pieces. Put in a clean jar. Add all the spices and sugar. Shake well. Keep the pickle in sun for 10-12 days, occasionally shaking it.

### 3. Making jam, jellies and murabbas

You can make jam by boiling the fleshy part (pulp) of the fruit with sufficient quantity of sugar to a thick mixture. You can make jams with papaya, pineapple, raw mango, etc.

Jellies are prepared by boiling the fruit with or without water, straining and mixing the strained and clear juice extract containing pectin (helps to set the jelly) and acid with sugar and boiling the mixture to a stage at which it will set to a clear jelly like substance. A well made jelly is transparent, well set and has the original flavour of the fruit.

Murabbas are made by boiling the fruit in sugar solution, till they become soft. Murabbas are popular for eating with chapatis, puris etc.

Let us now learn how to make mixed fruit jam.

### MIXED FRUIT JAM

#### Ingredients

Mixed fruit pulp	500 g
Sugar	500 g
Citric acid	4 g (1 teaspoon)
Water	100 ml
Fruit essence	few drops
Red colour	1/2 teaspoon.

#### Procedure

Wash the fruits, peel them and cut them into small pieces. You can use banana, apple, sapota (Cheeku), mango, etc.

Convert fruit pieces into pulp by mashing them manually or in a mixer. Boil the apple peels and seeds in 100 ml of water. Strain it and add the water to fruit pulp (This will extract pectin from peel. Pectin is a substance which helps in setting the jam). Boil fruit pulp for about 15 minutes. Add sugar. Continue boiling with stirring. After about 30 minutes, when the mass starts thickening add citric acid dissolved in small amount of water. Continue boiling till the pulp falls from the spoon in the form of a flake or sheet. When you put a small amount of this into a plate of cold water, it will settle in one place. *This shows the end point or the point at which the jam is ready.* Remove the jam from fire and add essence and colour. Fill hot jam into clean, sterilized bottles and cool the bottles. While filling hot jam, place the bottles over a wooden board. If you want to keep the jam for a long time, pour a layer of melted paraffin wax over it and cover the bottles tightly. This can be removed at the time of use.

**Sterilization of bottles :** for preserving any product it is essential that bottles should be properly sterilized. For this, fill a big vessel with water in which bottles can be dipped. Put a layer of cloth at the bottom. Place bottles over it. Bottles should be left in boiling water for 20 minutes. After sterilization keep the bottles well covered so that they do not get contaminated again.

#### 4. Bottling of squashes

A glass of cold lemon squash is always welcome in summers. Lemon squash or any other squash can be easily prepared at home. For preparing squash, fruit juice is mixed with sugar solution. The quantity of sugar depends on the quantity of fruit juice. Squashes should be stored in bottles with a narrow mouth and tight fitting lid. You can prepare squashes with mango, grapes, pineapple, etc.

Let us now learn how squashes are made.

Ingredients	Fruit Juice					
	Lemon	Orange	Lichi	Mango	Pineapple	Lemon
Fruit juice (kg)	1	1	1	1	1	1
Sugar (kg)	1 ½	1 ½	1 ½	1	1 ½	2
Water (kg)	¾	¾	¾	1	¾	1
Citric acid (gm)	—	25	25	30	25	—
Colour	—	1 tsp	—	—	1 tsp	—
Essence	—	1 tsp	—	—	1 tsp	—
KMS	½ tsp	½ tsp	½ tsp	½ tsp	½ tsp	¾ tsp

(tsp - tea spoon)

### Method

Mix sugar, water and citric acid. Boil till sugar completely dissolves. Remove from fire, strain and cool. Add fruit juice, colour and essence. Dissolve KMS in a little water and mix in the squash. Pour in sterilized bottle and seal cap by dipping in hot melted wax. Label and store in a cool place.

## 5. Freezing

Freezing fruits and vegetables in season can be of great benefit when they are not in season. For example, freezing of peas in winter when they are cheap and of good quality, can be of great use in summer when they are very expensive. Let us learn how freezing of peas is done.

### FREEZING OF PEAS

Select fresh, tender peas and shell them. Take sufficient water to completely immerse the peas. Add 10 gm salt for every 1 litre of water and boil. Add peas to the boiling water and keep for 2 minutes. Drain and cool immediately. Pack in small polythene bags, remove air by pressing and seal the bags. This is done so that no micro-organisms remain in the packet. Place the packets in the freezer.

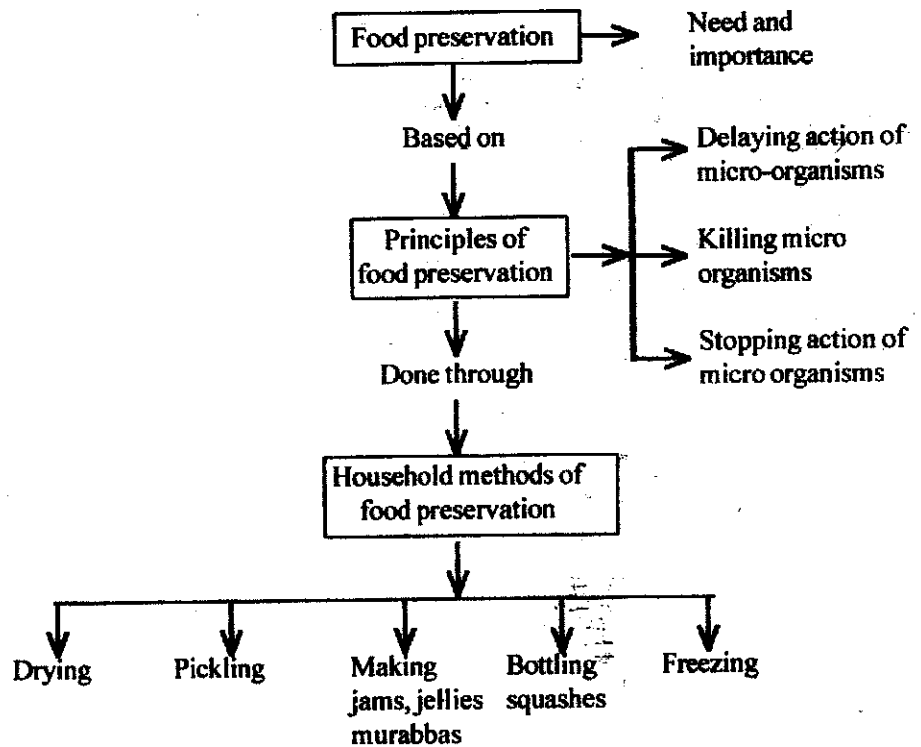
You can also freeze cauliflower, beans, carrots, capsicum, ladies finger, green chana, corn, spinach, methi, etc. in the same way.

### Intext Questions 25.2

- In drying, the principle of food preservation that is used is
  - Delaying the action of micro-organisms.
  - Killing the micro-organisms.
  - Stopping the action of enzymes.

2. Oil in pickles
  - (a) delays the action of micro-organisms.
  - (b) kills the micro-organisms.
  - (c) stops the action of microorganisms.
3. Freezing helps in preserving food by
  - (a) delaying the action of micro-organisms.
  - (b) killing the micro-organisms.
  - (c) stopping the action of micro-organisms.
4. Write the steps for preparation of mango pickle.
5. Write the steps in freezing methi leaves.

## 25.6 WHAT YOU HAVE LEARNT



## 25.7 Terminal Exercise

1. What is food preservation?
2. Give four reasons why we preserve food.
3. Suggest the best method to preserve the following foods and give one reason for each selection :

- (a) Orange juice
- (b) Raw mango
- (c) Apple
- (d) Karela (Bitter Gourd)
- (e) Carrots

### 25.8 Answers to Intext Questions

- 25.1
1. (c)
  2. (a) Do not remove the peel  
(b) Pack apples in polythene/aluminium foil.  
(c) Keep in the refrigerator  
(d) made jam
  3. Refer to text
- 25.2
1. (c)      2. (c)      3.(c)
  4. Wash mangoes ; wipe with clean cloth ; cut into pieces ; mix in salt and spices ; place in clean bottles ; cover with oil Close with tight fitting lid
  5. Wash methi well ; pluck the leaves and tender stems ; pack in small polythene packets and seal ; place in the freezer.