



216en05

5

PRESERVATION OF FOOD

You have already learnt that a balanced diet is drawn from various food groups which are composed of a variety of food stuffs. Very often some foods are not available through out the year because of changing seasons. We are sure that you would like to eat all vegetables and fruits through out the year. How will you eat mangoes in winter and carrots in summer? We all wish to enjoy fresh mangoes through out the year but is it possible? No, we can not relish fresh mangoes as such but preserved mango products like pickle, chutney, juice, squash and jam can be enjoyed through out the year. Therefore, preservation of food is very important to improve the nutritional content and have variety in diet. Let us learn how can we preserve vegetables and fruits when they are in abundance.



OBJECTIVES

After studying this lesson you will be able to:

- understand the terms food-spoilage and food-storage;
- categorize the food items of daily use according to their shelf life;
- define food-preservation and state its importance;
- discuss general principles of food preservation;
- know the household methods of preserving food;
- evaluate the hygiene practiced in handling food stored at home and see how it helps in preventing food spoilage and wastage.

5.1 FOOD SPOILAGE AND STORAGE

A. Food spoilage

Simply speaking food spoilage means food is no longer fit for eating. When you keep



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bread outside the refrigerator for a few days, a spongy growth is seen on it, which may be white, green or black in colour. This growth is called mould. The bread is now spoilt due to growth of mould and has become unfit for our consumption. Likewise, if cooked dal or vegetable is left outside for sometime, it develops a bad smell and bubbles due to fermentation. The dal and vegetables are thus spoilt and cannot be eaten. How can we say that a food is spoilt? Yes, you are right. Food is said to be spoilt if it changes colour and gives off a bad smell, shows signs of fermentation i.e., bubbles are seen in the food or there is growth of mould (spongy or powdery growth on the food stuff). Formation of soft spots or soft brown spots on fruits and vegetables is also an indication of food spoilage.

Reasons for food spoilage

Food get spoilt mainly due to the presence of micro organisms, enzymes (present in food), insects, worms and rats. Let us discuss these factors in some more detail.

Presence of micro-organisms: You knead the dough and keep it in the refrigerator. What do you observe? Yes, the top surface becomes black. Do you know why this is so. It is due to the presence of micro-organisms. These micro-organisms are very small organisms which cannot be easily seen. Micro-organisms spoil food items when the conditions for their growth are appropriate.

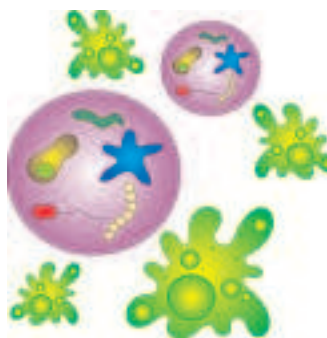


Fig.5.1

Like all living beings they require air and moisture, right temperature and food to grow and multiply. Conditions appropriate for growth of micro-organisms are:

- food having high moisture content; Can you tell which one has more moisture content Tomato or Potato. The answer is tomato and that is the main reason why it gets spoilt faster.
- air surrounding the food contains micro organisms.
- food kept for a long time at room temperature: Have you ever observed what happens to spinach kept at room temperature it turns yellow and stale.
- skin of fruits and vegetables getting damaged, if exposed to micro-organisms like banana. You may name some more fruits which get damaged.
- foods with low salt, sugar or acid content: Can you give some examples? Pickles, fruit jam etc.

Hence if you want to prevent spoilage of food by micro organisms, you must remove the conditions which are appropriate for their growth.

(ii) **Presence of enzymes:** Enzymes are chemical substances found in all plants and animals. Are enzymes harmful to foods? No, enzymes help in ripening of fruits



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and vegetables. A raw green mango after a few days becomes sweet in taste and yellow in colour due to the enzymes action. What will happen if you keep this yellow, ripe mango for a few more days? It will become soft, develop black spots and give out bad smell. This is due to continued action of enzymes. No one likes to eat such an over ripe or rotten mango. You know that even when the skin of fruits is not cut or damaged, it gets spoilt. This is due to **enzymes action**.

(iii) Insects, worms and rats:

Have you noticed small brownish black insects or small white worms in rice and dals? These insects eat the food grains. They make small holes in the grain and at times convert the grain to a fine powder. The food grains thus become unfit for human consumption.

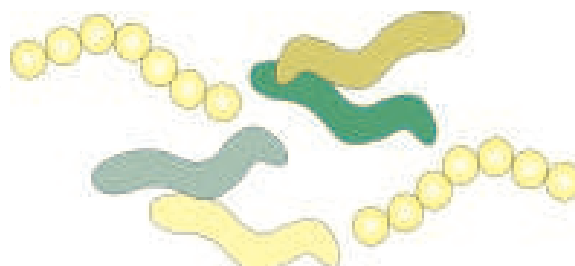


Fig.5.2

You must have also seen rats damaging the food.

You have just learnt the three main causes of food spoilage. These are micro organisms, enzyme action and insects, worms and rats.



ACTIVITY 5.1

Make a note of spoilage of food in your house, in the following table.

<i>Food</i>	<i>Spoilage</i>
1. Milk	
2. Rice	
3. Orange	

Now after learning about the reasons for food spoilage, let us see, how food can be stored to keep it fit for consumption for a long time.

B. Food storage

Food storage simply means keeping food in a special place until it is needed for consumption. For example you buy cookies or snacks and leave them in air tight container till you want to use them. You buy milk and boil it or you store it in cool place to grow. You buy pulses, rice and wheat flour and store them in air tight containers. Why do you do this? Well, because you want your food to remain as fresh as possible and protect it from being spoilt.

The quantity of food you buy depends on:

- your requirements
- how soon it is likely to be spoilt or what we call the **shelf life** of the food.

5.2 CLASSIFICATION OF FOOD ITEMS ACCORDING TO SHELF LIFE

You must have noticed the different food items take different length of time to get spoilt. Can you name three food items that spoil quickly and three which do not get spoilt for a long time?

No.	Spoil quickly	Spoil late
1.		
2.		
3.		

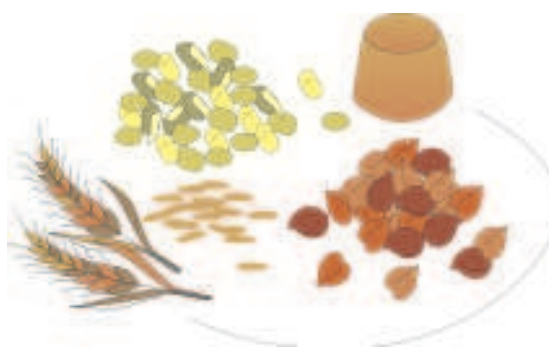


Fig.5.3

The time for which a food can be kept fresh is called its '**shelf life**'. It is also known as stability of food during storage. Food items are classified on the basis of their stability during storage into non-perishable, semi perishable and perishable foods.

Non-perishable food include whole grain cereals, pulses, nuts and oil seeds, sugar and jaggery.

Semi perishable food include processed cereals and pulse products (e.g. maida, suji), eggs, potatoes, onions, biscuits and cakes.

Perishable foods include green leafy vegetables, peas, beans, tomatoes, apple, bananas, bread, butter and cream.

As a guide to consumers, now it is mandatory for manufacturers to provide detailed labels on processed food items indicating their date of expiry. If you read the label on any packed food you will find written on it 'consume before' or 'best before' (a specified date). This is nothing but the shelf life of the food item as after that date the food may not look or taste the same as fresh and also start decomposing.



ACTIVITY 5.2

Look at the label of three packed food items you bought recently and see if 'shelf life' is mentioned on them. Enter the information in the table below:

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S.No.	Item	Best before
1.		
2.		
3.		

5.3 FOOD PRESERVATION

Have you ever wondered why you boil milk or refrigerate food or put dry ingredients in the sun or store food items in air tight containers? Yes, you are right. These practices help in increasing the shelf life of food or preserve it. In other words to **preserve** is to keep food safe, retain quality, and prevent decomposition or fermentation. Thus food preservation can be defined as:

A process by which food items are prevented from getting spoilt for a short or long period of time. The colour, taste and nutritive value of the food are also preserved as far as possible.

Remember that

- Some food items spoil earlier than the others.
- Colour, taste and nutritive value of food can be preserved.

Preservation implies prevention of decay or spoilage of food either by avoiding contamination or inhibiting enzymatic or chemical reactions or changes. It helps to increase shelf life of food and thus food can be stored for future use.

5.3.1 Importance of food preservation

Now that we have understood the concept of food preservation, can you reason out why you should preserve foods? Well, here are some of the reasons.

1. Preservation takes care of the excess produce.

Can you think of some products which are made with mangoes? Yes, these may be juice, murraba, squash, aam papad, pulp, chutney, pickle and raw mango powder. You may be able to add a few more to the this list. Mango is a summer fruit and grows in large quantities in India during the months of April to August. Different varieties of mango are grown in different parts of our country.



Fig.5.4



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Usually all the quantity of food grown in a region cannot be consumed by the people staying there as there is usually excessive production. What do the farmers do with this excess production? They make arrangements to transport the excess quantity to regions where either mango is not grown or where that particular variety of mango is not available. If they do not do this, the excess produce will rot and go waste. The farmers will then lose money. Often there is still some quantity left after the fresh produce is consumed by the people in a region. It is this quantity which has to be preserved so that it is available for consumption during the months when mango is not available. Preservation of food is done during the months when food is available in large quantity and is therefore priced very low. This helps in making preserved foods economical.

2. Preservation adds variety to our meals.

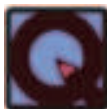
Have you ever got tired of eating the same vegetables in a particular season? Is it not nice to eat peas when they are either very expensive in the market or are not available? Eating cauliflower in pulav or cauliflower vegetable during the summer months adds variety and interest in meals. In the same way, eating some chutney, papad or pickle along with the meals adds to the variety in our meals. Preserving food items when they are in season makes this possible.

3. Preserved food items are sent to places where they are not grown.

In some areas of Rajasthan which are desert areas and in Himalayan regions that are covered with snow most of the time, very few food items can be grown. Therefore preserved food items can be sent to such places.

4. Preservation of foods makes transportation and storage of foods easier.

Preservation also reduces bulk of a food item. For example, if you dry green leafy vegetables such as mint, fenugreek, coriander, etc, their weight and volume reduces, thus making their storage and transportation easy.



INTEXT QUESTIONS 5.1

1. Choose the correct answer to complete the incomplete statements below:
 - i) Food spoilage is due to
 - a) micro-organisms and enzymes
 - b) micro-organisms and excess production
 - c) enzymes and excess production
 - d) all the above



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- ii) Non-perishable food items are those which
 - a) do not spoil at all
 - b) take long time to spoil
 - c) spoil easily
 - d) spoil according to where they are kept
- iii) Preservation of food means
 - a) to keep food safe
 - b) to retain quality of food
 - c) to prevent decomposition of food
 - d) all the above
- iv) Shelf life of food is related to
 - a) freshness of food
 - b) quality of food
 - c) decomposition of food
 - d) time limit for which food can be used
- v) the main reason for preserving food is to
 - a) improve its colour and taste
 - b) increase its shelf life
 - c) make costly food available
 - d) change its texture

5.3.1 Principles of Food Preservation

You have learnt earlier that by boiling milk we are preserving it for a longer period. But, what are you actually doing by boiling? You are killing the microorganisms by raising the temperature of milk. Micro-organisms cannot survive at very high temperature. This is one of the principles of food preservation. Let us now learn about the principles of food preservation:

- (i) killing the micro-organisms.
- (ii) preventing or delaying the action of microorganisms.
- (iii) stopping the action of enzymes.

(i) Killing the micro-organisms

You already know that boiling of milk kills microorganisms. Sometimes, heat is applied for a shorter duration to kill only undesirable microorganisms that is those



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which can spoil the food stuff. It is done while pasteurizing milk. The cooking that you do at home also keeps food free from microorganisms. In canning (sealing in tins) food is heated to high temperature to prevent growth of micro-organisms in food.

(ii) Preventing or delaying the action of micro-organisms

You all know that a peeled apple spoils faster than the one with skin intact. 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 delay the action of micro-organisms.

Food packed in polythene bags and aluminium foils are also protected against micro-organisms. You have read earlier that micro-organisms need air and water to grow. But if these are removed, you can prevent the action of micro-organisms and ensure that food does not get spoilt.

Lowering temperature or freezing a food also helps in delaying the action of micro-organisms and therefore in preserving the food. You must have seen frozen food items. Frozen food can be kept for a longer period than fresh food. This is because micro-organisms cannot act at low temperatures. Thus, when you are putting food in the refrigerator or freezer, you are preventing the micro-organism from growing. Lastly, certain chemicals like sodium benzoate and potassium metabisulphite also help in preventing the growth of micro-organisms. These chemicals are called **preservatives**.

Thus you have learnt that the action of micro-organisms can be delayed or prevented in many ways like-

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

(iii) Stopping the action of enzymes

Enzymes also cause food spoilage. They are naturally present in food. Take the example of fruits. Keep a raw banana for a few days and observe what happens to it. Yes, the banana will turn ripe, become yellow and then start decaying. All this happens due to presence of enzymes. What will happen if the action of enzymes is stopped? The foodstuff will be prevented from being spoilt.

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



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INTEXT QUESTIONS 5.2

1. Which of the following will not help to arrest the action of micro-organisms on tomatoes :
 - (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.

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3. Define the terms preservation and shelf life.

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5.3.2 Methods of Preserving Food at Home

Food can be preserved at home by using the following methods-

- (i) Exposing food to low temperature
- (ii) Exposing food to high temperature
- (iii) Using preservatives
- (iv) Dehydrating food

Let us now discuss each of these methods in some detail.

(i) Low Temperature

You have already learnt that food stays longer at low temperature i.e., in a cold environment. Using low temperature to preserve food works on the principle that low temperature slows down microbial and enzyme action. The food is thus prevented from spoilage. Do you use this method of preservation at home? Yes, if you have a refrigerator you can use it because a refrigerator helps to keep food at low temperature. Food can be preserved at low temperature by:

- Refrigeration- keeping food between 40⁰ C- 70⁰ C
- Cold storage - keeping food between 10⁰ C- 40⁰ C
- Freezing- keeping food between 180⁰C or below

The duration for which the food can be preserved by using low temperature varies with the type of food and the temperatures. The lower the temperature, longer is the duration for which the food can be preserved. Of the three methods, freezing uses the lowest temperature. Since both cold storage and freezing are not used very commonly at home as methods of preservation, (we will not discuss their details in this section. You have already learnt about refrigeration in the previous section.)

Freezing of Peas

Method

- Step 1: Select about half a kilogram of fresh tender peas and shell them.
- Step 2: Take enough water in a stainless steel pan in which the peas can be completely immersed. Add one teaspoon of salt for half a litre of water, dissolve and bring the solution to boil.
- Step 3: Completely immerse the peas in the boiling solution for about two minutes.
- Step 4: Drain the peas immediately on to a stainless steel sieve and let them cool for 10-15 minutes.
- Step 5: Pack the peas in polythene bags, remove the air by pressing and seal the bags.
- Step 6: Put the packets of peas into a freezer.

Note: Similarly other vegetables such as cauliflower, beans and carrots can also be frozen.

Using Frozen Vegetables

1. Take out the frozen packet from the freezer one or two hours before use and let the food thaw at room temperature. Put peas in a sieve and keep under tap water for a few minutes. Drain and use.
2. Frozen vegetables can be stored up to six months in a freezer.

Precautions while freezing Fruits and Vegetables

1. Packaging material, that is, polythene bags should be strong enough to withstand expansion of food material on freezing.
2. The food once brought out of the freezer and brought to room temperature should not be refrozen.

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3. Small packets should be prepared, as food once thawed must be consumed. So there is less chance of the remaining food material being spoilt. This also helps to avoid refreezing of the unutilized food material.
4. Exclude the air carefully and completely from the package before sealing.
5. The freezer should not be opened too frequently.

Thawing is the process of removal of ice from frozen food.

(ii) High Temperature

Micro- and enzymes are destroyed at high temperature, thus food is safe and does not spoil. Do all organisms get killed by increasing temperature? No, there are some micro-organisms which do not get destroyed at high temperature.

If these organisms are not killed, they can spoil food items once the temperature is decreased. There are two methods of preserving food by using high temperature-

- Pasteurization
- Sterilization

Pasteurization: When you think of pasteurization, which food item comes to your mind? Yes, its milk. We have often heard about pasteurized milk packets. In this method food is heated to a high temperature and then quickly cooled. The micro-organisms are not able to withstand the sudden change in temperature and are destroyed. However, some organisms still survive in this method.



Fig.5.5

Sterilization: This is done to prevent any spoilage of food items due to microorganism. What does the word sterilization mean? It means free from any living organism. The high temperature used in this method destroys all the micro-organisms in the food. The food items are exposed to high temperature for longer period and in some cases under pressure. e.g. when a pressure cooker is used for cooking, the food lasts longer because most micro-organisms get destroyed. You can also sterilize bottles and other equipments used for preservation.

(iii) Use of Preservatives

Now let us learn about the chemicals which can be used to increase the shelf life of processed food products. These are called **preservatives**. Any substance that is added to food to make it last for a longer period is called a preservative. You have learnt that

increasing the concentration of salt, sugar or acid in a food prevents its spoilage. Therefore, salt, sugar or acid are substances which act as preservatives.

Types of preservatives:-

List some preservatives found in pickles. Some of them are salt, sugar, lemon juice, vinegar, oil and spices. These are natural preservatives.

Read the label of a jam/squash/ketchup/chips label. Write the preservatives mentioned on the label. Enter the information in the table below.

Name of the product:	Pickle	Jam	Sauce
Preservatives present:			

You may find names of some of the chemicals like, potassium metabisulphite, citric acid and sodium benzoate. These are called chemical preservatives.

Natural Preservatives

- (a) **Salt:** When you make pickle at home, salt is one of the ingredients used. Do you think that salt is added only for taste? Besides adding taste, salt has a specific function, i.e., to act as a preservative. If the proportion of salt in pickles is less, it can get spoilt after sometime.

How does salt act as a preservative?

Increasing the quantity of salt in the food changes its composition. Due to the presence of salt in the food, osmosis takes place. As a result, water comes out of the food. When there is no or less water in the food, the microorganisms are not able to grow and the food becomes safe. Salt also reduces the activity of enzymes, thus preventing the food from getting spoilt. Salt is used as a preservative in pickle, chutney, sauce and canned food. Salt is rubbed on fish which helps to preserve it.

- (b) **Sugar:** Can you think of some preserved foods where sugar is used as a preservative?

Yes, these are jams, jellies, murabbas and squashes. Like in pickle and chutney, sugar is added to these foods not only for taste but also as a preservative. The proportion of sugar has to be correct to protect such foods from spoiling. How does sugar prevent food spoilage? Sugar dissolves in the water in the food item. This results in less water being available for the growth of micro-. Hence the food becomes safe.

- (c) **Acids:** Can you think of any sour food items used as preservatives? These are lemon juice, vinegar and citric acid. Vinegar is used to preserve onions and tomato ketchup; lemon juice is used in pickles; citric acid is used in squashes. Acids increase the acidic content of food items, thus preventing the growth and activity of micro-organisms.



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- (d) **Oils and spices:** These are used as preservatives in pickles. Can you think of spices which are commonly used as preservatives? Yes, mustard powder, turmeric and red chilies are a few of them. These prevent the growth of micro-organisms, thus preventing spoilage. When pickle is made at home, have you observed that oil is poured to cover the mango, lemon or other vegetables which are being pickled? The oil makes a protective covering and has two advantages-
- (i) prevents contact of micro-organisms with the food, hence they can not spoil the food.
 - (ii) prevents contact of air with food, hence the micro organisms can not grow and spoil the food.

You have learnt about some of the common methods of food preservation. Generally, a combination of the principles of preservation is used. For example, in pickles you use large amounts of salt, spices and oil. In the same way, acids and a lot of sugar are used for making squashes. Thus, when the seasonal fruits and vegetables are available at a lesser price, they can be stored for future use and add variety to our meals.

Will you like to learn about the procedure of making a jam and a squash? Alright, let us first learn how to make apple jam.

Method of making apple jam**Ingredients:**

Apples: 1 kg

Sugar: 750 gms

Citric Acid: 1 teaspoon

Water: 150 ml

Method:

- Step 1: Select firm apples and wash them thoroughly.
- Step 2: Cut them into small pieces. While cutting, remove the core and hard seeds.
- Step 3: Cook in water till apple pieces are tender (you can also pressure cook them for 2 minutes.)
- Step 4: Sieve the pulp carefully.
- Step 5: Add sugar stir constantly and add citric acid.
- Step 6: Cook till the mixture obtains thick consistency and do the plate test (refer to fig.5.6) to check that the consistency of the jam is gel like.
- Step 7: Pour hot jam into wide mouthed, sterilized bottles and cool.
- Step 8: Store in a cool place.



Fig.5.6

Test for Doneness: Drop Jam in ice cold water. If it disperses, it needs to be cooled further and if it solidifies in one place jam is ready.

Use of Chemical Preservatives

Orange Squash

Ingredients:

Orange juice: 1 litre

Sugar: 2 kgs.

Water: 1 litre

Potassium Metabisulphite (KMS): $\frac{1}{2}$ teaspoon

Orange essence: 1 teaspoon

Citric acid: 30 gms

Method:

Step 1: Select juicy oranges and extract the juice.

Step 2: Take water, sugar and citric and boil the mixture till the sugar is completely dissolved.

Step 3: Add orange colour, essence and juice.

Step 4: Dissolve the potassium metabisulphite in a little juice and mix it into the prepared squash.

Step 5: Pour it into sterilized bottles. Allow to cool. Seal it or close the bottle tightly.

Step 6: Store the bottles in a cool place away from the sun.

You can use the same procedure to make lemon squash too.

(iv) Dehydration

Can you name some dried food items that are stored in your kitchen for a period of one year or more? Are these potato chips, sevian (vermicelli), fenugreek (methi), cauliflower, papad or onion? These are food items which have been preserved by the



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dehydration method. The word **dehydration means removing water or moisture from foods**. The home method of dehydration is sun drying. We will now discuss this method in detail.

Some food items like green leafy vegetables (methi, pudina, coriander etc.) cauliflower, grapes, amla, onion and raw mango are dried. Some food are cooked and then dried. For example potato-chips, papad, banana-chips and wadis. The most appropriate weather to dry foods is when the air is dry and there is strong sunshine.

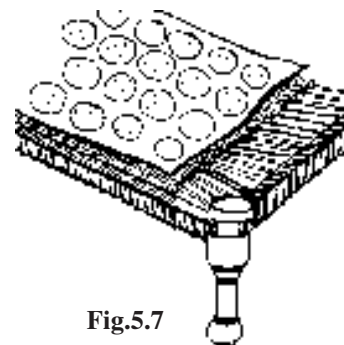


Fig.5.7

Method of dehydration

- Step 1 Clean all tins, plates, etc, to be used to dry and store the food. Dry in the sun. Storage tins should have air tight lids.
- Step 2 Wash the vegetables/fruits to be dehydrated. Cut, if required. Remove the stem, seeds and skin. Remove any decaying portions.
- Step 3 Blanch vegetables, i.e. put them in boiling water. The time for blanching varies with hardness of fruit/vegetables. Remove when the food is soft (blanching reduces enzyme activity).
- Step 4 Put vegetables in cold water containing salt and Potassium Metabisulphite (popularly known as KMS) for 5-10 minutes. This prevents blackening of foods. Green leafy vegetables and other dark vegetables should not be put in KMS solution as it will bleach the colour of vegetables.
- Step 5 Spread the vegetables on a clean cloth in the sun. Cover it with a thin cloth to avoid dust and flies getting into the food.
- Step 6 When the food is dry (test by looking at hardness) cool it to room temperature. Store in an air tight container. When you want to use dehydrated fruits and vegetables, wash and soak them in water for some time.

Now let us look at how you can use this method to preserve fenugreek (methi) and potato.

1. Dehydrating fenugreek (methi)

1. Remove the stems and wash fenugreek thoroughly.
2. Put on a cloth in the sun, cover it with muslin cloth.
3. Keep it in sun till it is dried.
4. Cool to room temperature and store in air tight containers.



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2. Making Potato chips

1. Wash and peel potatoes. Cut in thin slices.
2. Put in boiling water for 3-4 minutes.
3. Make a solution in cold water with 5 tsp salt, 1 tsp potassium metabisulphite (for 5 kg potato).
4. Put the blanched potato chips in this solution for 10 minutes.
5. Spread each potato chip separately on a cloth in the sun. Cover with a thin cloth.
6. When dry, cool and store in air tight containers.

Remember, even if the basic principle of dehydration remains the same, you have to adapt the method depending on the food you are preserving.

5.4 SOME USEFUL TIPS

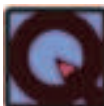
Let us discuss some tips which will be useful for taking care of the preserved food items.

1. Take care of hygiene while preparing the food and storing it. The utensils and containers used to cook and store food items should be thoroughly cleaned and dried in sun. The containers should have air tight lids.
2. While preserving pickles take care that a layer of oil is above the vegetables, so that these do not come in contact with the air.
3. While using the preserved food items, take care to use clean spoons. Close the lid immediately after removing the required quantity.
4. For foods like sauces and squashes, the bottles should be sterilized and kept in hot water till they are needed. You could first put the preserved food in the bottles and then sterilize the bottles by heating them in water for 30-40 minutes.



ACTIVITY 5.3

With the help of your mother prepare apple jam and lemon squash in your kitchen. Follow each step carefully and take all the precautions. Get these tasted by two family members and friends and note their comments.



INTEXT QUESTIONS 5.3

1. Fill in the blanks using appropriate words.
 - (1) Papad is an example of preservation by.....
 - (2) Refrigeration reduces the activity of and.....
 - (3) Dehydration is based on the principle of removal of.....



Notes

2. Write True and False against the following statements:
 - (i) Addition of spices to pickles allows the micro organisms to grow quickly.
 - (ii) When making squashes, we make use of an acid and a lot of sugar for preservation.
 - (iii) Sterilization increases the activity of enzymes and micro-organisms.
3. Write down the steps you will follow to preserve cauliflower by the dehydration method.

4. Match the following

i Jam	a. Spices
ii Papad	b. Sugar
iii Pickle	c. Citric acid
iv Milk	d. Removal of moisture
v Dried-methi	e. Pasteurization
vi Squash	f. Oil, salt
	g. reducing temperature
5. In your garden you have plenty of lemons. List the products you can prepare to preserve them. Describe the process of preparing any one preserved product using lemons.

6. Match the following:

Foods	Preservatives
i Apple jam	a. Citric acid
ii Lemon pickle	b. Potassium Metabisulphite
iii Potato chips	c. Sodium Benzoate
iv Squash	d. Salt
	e. Sugar

5.5 HYGIENE IN HANDLING STORED FOOD

Your family members must be doing bulk purchase of food and storing it at home. You know that they need to be stored properly to be available in good form, when you need them. You have also learnt that food items have a limited shelf life.



ACTIVITY 5.2

Let us do an exercise about refilling your food store. What shall we do?

1. Remove all the bottles and tins to clean the space. Why do you do that?
2. You can wash all the bottles which are empty and dry them completely. You do not need to wash tins. Why? Wipe them with clean clothes.
3. Replace them on the shelf and clean the floor area. Throw anything which is very old and is spoilt or does not look fresh.
4. Make a list of supplies you need to buy and decide the quality you will buy.

Your store is now clean and you are ready to bring in new food supplies. You need to plan before you go to the market. What information do you need before buying? Yes, you will need to mention the name of the food item its quantity and quality. Where will you go to buy the listed food items? Why? How you will store each item after bringing it home?



WHAT YOU HAVE LEARNT

1. Food preservation adds variety in the diet, increases shelf life and helps to avoid wastage of food.
2. You can preserve fruits and vegetables by using salt, sugar, oil, spices by
3. dehydration.
4. Microorganisms, presence of enzymes and insects are causes of food spoilage.
5. Salt, sugar and oil are natural preservatives used for preparation of pickles, jams and
6. squashes.
7. Sodium benzoate, potassium metabisulphite, citric acid are chemical preservatives
8. used in products like tomato ketchup, potato chips and jams.



TERMINAL EXERCISE

1. Write whether the following statements are true (T) or false (F). Give reasons for your answer.
 - (i) Oranges can be kept for a long time without getting spoilt.
 - (ii) While dehydrating fenugreek (methi) leaves these should be put in potassium metabisulphite for 5-10 minutes.



Notes



Notes

2. Write down the steps in preserving pudina (mint) leaves by dehydration method.

3. Match the statements in Column A with those in Column B

Column A

- (a) Natural preservative
- (b) Chemical preservative
- (c) Dehydration
- (d) Increasing temperature

Column B

- (i) potassium metabisulphite
- (ii) sunlight
- (iii) removing microorganisms
- (iv) salt
- (v) citric acid
- (vi) vinegar



ANSWER TO INTEXT QUESTIONS

5.1 i) a ii) b iii) c iv) d v) a

5.2 1. (c)

- 2. (a) Do not remove the peel
- (b) Pack apple in polythene or aluminium foil
- (c) Keep in the refrigerator
- (d) Make jam

3. Refer text

5.3 1. (i) Dehydration

- (ii) enzymes and microorganisms
- (iii) moisture

2. (i) False (ii) True (iii) False

- 3. (i) Clean and dry the plates and tin for drying and storing cauliflower.
- (ii) Wash and cut cauliflower. Remove stems and any decaying portion.
- (iii) Put the cauliflower pieces in boiling water. Take off when they are a little soft.
- (iv) Take out from water and spread on a clean cloth in the sun. Cover with a thin cloth.
- (v) When pieces are dry, cool and store in tins.

4. i) b ii) a iii) f iv) e v) d vi) c

6. i) e ii) d iii) b iv) a