

Components Of Food 2

IN THIS CHAPTER

- *Introduction*
- *Why do we need food*
- *Components of food*
- *Test for fats and proteins*
- *Balanced diet*
- *Deficiency Diseases*

INTRODUCTION

We have already learnt that we eat different food items in our daily routine life. Some eat rice and some prefer chicken. Some drink milk and juice while some prefer tea and cold drinks. One must understand how to build up and maintain good health. A healthy body is the first step towards a happy life.



Our study help us to conclude that we should not eat the same type of food everyday.

WHY DO WE NEED FOOD

Food is required by the body for the following purposes :

- for the growth of our body.
- for getting energy to do work and play.
- for getting protection against diseases.
- for proper functioning of our body.

Do You Know ?

Water and dietary fibres are not food but they are essential to help in the movement of food along the food-pipe. Water also helps in the flow of blood in the blood vessels. The science which deals with the study and function of nutrients, is called Nutrition.



Activity Time

Ask each student of your class, what he ate in breakfast, lunch and dinner two days before. Complete the table as shown on the next page :

Name of Student	Date			Date		
	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner

COMPONENTS OF FOOD

The food that you eat gives energy. It gives you materials which make you strong and stay healthy. The essential components of food can be classified into the following groups :

Carbohydrates	Fats	Proteins
Minerals	Vitamins	Water

In addition, food contains dietary fibres and water which are also needed by our body.

Carbohydrates

Food has different constituents each of them is necessary for some function or the other. Carbohydrates are the compounds made up of carbon, hydrogen and oxygen. One simple form of carbohydrate is sugar. When sugar is burnt in air, it produces heat and light as energy. They are called simple carbohydrates.



Food containing carbohydrates

Complex carbohydrates are compounds such as starch. Starch molecules are more complex than sugar molecules.

They are made up of several sugar molecules. Since a starch molecule is like many sugar molecules put together, it contains more energy than a sugar molecule does. These are found in wheat potatoes, maize and so on. They provide more energy than sugar but do so through the breakdown of starch.

Test for Carbohydrates

Take a slice of bread or potato. Now take a dropper and fill it with iodine. Place a drop of iodine solution on the food sample. What do you observe ?

Blue and black colour, where iodine solution is applied, indicating the presence of starch.

The main food that we eat to get energy is called staple food. Rice, chapati and bread are some examples. This is why we use them as the main dish in our meals.

Fats

Fats are made up of carbon, hydrogen and oxygen. Amount of oxygen in fats is much less than those in carbohydrates. When fats breakdown, they produce greater amount of energy than carbohydrates do.

Test for Fats

Draw up a result chart.

Rub a piece of the food that you are testing with some clean dry paper. If the food material is cold it would help to warm it first.

Hold the paper against the light.

If you can see a translucent mark there may be fat in the food. To check, again make sure that the paper is completely dry or else dry it. If the mark stays then it is surely fat. If it disappears the mark was made by water from the food.



Food containing fats

Do You Know ?

More proteins are required during infancy and pregnancy period when mother is nursing a child and during convalescence period.

Proteins

We have said that the body breaks down or digests carbohydrates with the help of enzyme molecules. Proteins are the nutrients that help in the growth of the body. They help in the formation of new cells. Some proteins help in digestion and in building body materials themselves.

Proteins obtained from plants are commonly known as plant proteins. The ones obtained from animals are commonly known as animal proteins. They include milk, eggs, cheese, fish, meat etc.



Food containing proteins

Test for Proteins

Take a small quantity of a food item for testing. If the food you want to test is a solid, you first need to make a paste of it or powder it. Grind or mash the food item. Take a clean test tube and put some of this in it. Now shake the test tube. Take a dropper and add two drops of solution of copper sulphate and ten drops of solution of caustic soda to the test tube. Shake well and let the test tube stand for a few minutes.

What do you observe ? Did the contents of the test tube turn violet ? A violet colour indicates presence of proteins in the food item.



Activity Time

Complete the given table which represents different nutrients. Write Yes.

Food item	Starch (Present)	Protein (Present)	Fat (Present)
Milk		Yes	Yes
Groundnut			
Cooked rice			
Dry coconut			
Cooked dal			
Slice of mango			

Minerals

Minerals are nutrients that the body needs in small quantities. They are obtained from various kinds of food items. Some of the minerals the body needs are calcium, iron, potassium and iodine. There are the elements of minerals. The food we eat includes compound containing these elements.

For example, common salt contains sodium and chlorine.

Minerals their sources, importance, deficiency diseases and symptoms :

Minerals	Sources	Deficiency diseases	Symptoms
Iron	Bread, flour, green vegetables	Anaemia	Number of RBC reduced
Calcium	milk and its products	Rickets	Weak bones, Bleeding gums
Potassium	eggs, cheese, potatoes	—	—
Iodine	Sea fish, salt	Goitre, Abnormal metabolism	Thyroid gland swells up.

Vitamins

Vitamins are organic substances that protect the body from diseases. Different vitamins have been named as A, B, C, D, E and K. Each type of vitamin is very specific in its function. For example, vitamin A keeps our eyes and skin healthy while vitamin B helps the body to use calcium for bones and teeth.

We will suffer from deficiency disorders if we do not consume vitamins in adequate quantity.

Vitamins	Sources	Essential For	Deficiency Diseases	Estimated daily needs
Vitamin A	milk, cheese, sugar, oil, yellow fruits	Eyes	Night-blindness	750 mg
Vitamin B	milk, egg, cheese, meat, pulses	Digestion growth	Beri-beri, paralysis, neurones	20 mg
Vitamin C	green vegetables, tomatoes	Muscles and teeth	Scurvy	30 mg
Vitamin D	milk, yolk of egg, fish	Bones	Rickets	2.5 mg
Vitamin E	vegetables, oils, milk, butter, grains	Keeps skin healthy	Difficulty in walking	4 mg
Vitamin K	leafy green vegetables	Blood clotting	Haemorrhage in large intestine	138

Water

A person can live without food for several weeks but would die in a few days from lack of water. We all know that water makes up 75% of earth's surface and 70% of the human body weight. Water is indispensable. It helps the body to perform different functions. It helps to maintain body temperature. An adult cannot survive more than a week without water. We should take 6-8 glasses of water each day.

Do You Know?

About 70% of our body weight is water. A normal healthy person excretes about 1.5-3.0 litres of water everyday.

Roughage (Fibre)

We cannot digest cellulose, the carbohydrate. Whereas the walls of plant cells are made of it. It is thrown out as waste. Yet, it is a necessary part of our diet. Fibre is present in whole grain flour, all pulses, green peas, leafy vegetables and fruits.

BALANCED DIET

The food we normally eat in a day is our diet. For growth and maintenance of good health. Our diet should have all the nutrients that our body needs, in right quantities. Not too much of one and not too little of the other. The diet should also contain a good amount of roughage and water. Such a diet is called balanced diet.

Minerals and roughage, and some carbohydrates and proteins as well very little fat.

A balanced diet contains proper quantity of food items from each group so that the body gets the components of food.

Generally, a balanced diet includes a specific number of servings from each food group so that the body gets all the components of food.

Generally, a balanced diet includes a specific number of servings from each food group, as follows :

- (i) Four servings from the milk group,
- (ii) Two servings from the pulses and meat group,
- (iii) Four servings from the bread or cereal groups and
- (iv) Four servings from the fruits and vegetable groups.

Mid-Day Meal Programme (MDM)

The Mid-Day Meal Programme is also called school lunch or school meal programme. The aim of this programme is to provide additional meal to children studying in primary classes. The diet of these children often lacks in essential components of food. The purpose of MDM is to provide such a meal which will overcome the deficiencies in their diets at home. In rural area, many children come to school partly hungry and some even come with an empty stomach. MDM is useful in the proper growth and development of such children.

Diseases Due to Imbalance in the Diet

Many diseases are known to occur just because of imbalance in the diet. Imbalance in the diet may be due to following three reasons :

1. Inadequate quantity of food (**under-nourishment** or **undernutrition**),
2. Excess of food (**overnutrition**), or
3. The food lacks in some essential component, i.e., (**nutrient**).



Balanced Diet

The condition of nutrition in which the food is either in inadequate quantity or in excess, or it lacks in some essential nutrient is called malnutrition. In simple terms the condition arising out of inadequate or unbalanced food is called malnutrition.



Activity Time

1. Write down the menu for your breakfast, lunch and dinner. Indicate the principal food substances present in each component of the meal. Analyse if you had been taking a balanced diet or not.
2. Make a list of the diet during breakfast, lunch and dinner of three of your classmates/ friends of your age in your locality on a particular day. Indicate the principal food substances present in each meal. Record your observation in the table given below.

S.No.	Name of student/ friend	Breakfast			Lunch			Dinner		
		Energy giving food	Body building food	Protective food	Energy giving food	Body building food	Protective food	Energy giving food	Body building food	Protective food

The diseases which occur because of (i) inadequate quantity of food, or (ii) the lack of some essential nutrient are called **deficiency diseases**.

Overnutrition results in overweight or **obesity**. Consumption of too much fats is one of the main causes of obesity.

When a person takes in more energy than he is able to spend on his daily activities, he accumulates fat in the body and his weight increases. The accumulation of fat in the body in limited quantity helps in many ways :

- (i) It works as a cushion and protects the body organs from injury.
- (ii) It prevents heat loss from the body.

If the weight increases enormously, the person becomes obese. Obesity contributes to various problems like heart disease, high blood pressure and diabetes.

Some of the diseases due to imbalances in the diet are given in the next table.

DISEASES DUE TO IMBALANCE IN DIET

A. Food deficiencies	Diseases
(a) Protein and carbohydrates	Kwashiorkor, marasmus
(b) Vitamins	Night blindness, scurvy, beri-beri
(c) Minerals	Anaemia, goitre
B. Excessive intake of food	Disease
Overnutrition	Obesity

Deficiency Diseases

The main cause of deficiency diseases in our country is **poverty**. A vast majority of our people are not able to buy quality food items in desired quantities. In the long run they become weak and sick. Its effect on children is more serious.

Diseases due to Deficiency of Carbohydrates

Carbohydrates are the chief sources of energy for the body. This energy is used by the body for performing its various functions.

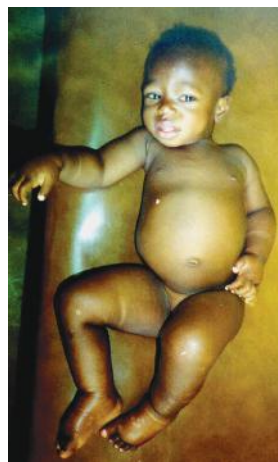
Deficiency of sufficient carbohydrates in the diet leads to (i) body weakness and (ii) loss of stamina, as sufficient quantity of energy is not available to the body for performing various functions.

Diseases due to Deficiency of Proteins

Proteins are body-building foods and serious diseases, like **kwashiorkor** and **marasmus**, develop in case of children if the proteins are not sufficient in their diet. It is for this reason that the children are often advised to take a protein-rich diet– enough milk, pulses, eggs, meat and fish.

Symptoms of Kwashiorkor

1. Protruding belly
2. Dark and scaly skin, brownish hair
3. Stunted growth; usually underweight
4. Swollen legs due to accumulation of water
5. Loss of appetite
6. Anaemia
7. Mental retardation
8. Reduced resistance to diseases



Infant suffering from kwashiorkor

Symptoms of Marasmus

1. Poor muscle development
2. Bones shown through the skin; no fat
3. Weak legs
4. Loss of appetite
5. Anaemia
6. Grossly underweight
7. Mental retardation
8. Reduced resistance to diseases



Infant suffering from marasmus

Protein Energy Malnutrition (PEM) is a term used to describe diets which lack proteins and energy-giving carbohydrates. Diseases caused by PEM are common among children.

Kwashiorkor and **marasmus** are diseases which result from PEM.

Diseases due to Deficiency of Vitamins

Table gives the deficiency diseases caused by various vitamins. Vitamins are required in small quantities for proper functioning of our bodies. Vitamins help in keeping our eyes, bones, teeth and gums healthy.

Should we eat polished rice and wheat flour ?

Much of the food we eat is “processed” food. Polished rice and wheat flour (maida) are the examples of “processed” foods. Processing removes many of the B vitamins. Beri-beri is caused by a lack of vitamin B. We should, therefore, try to eat foods that are not processed or polished.

Diseases Due to Deficiency of Minerals

Deficiency diseases due to minerals have been listed in table. Like the vitamins, minerals too are required in small quantities and are important for the normal functioning of our body.

VITAMIN DEFICIENCY DISEASES

Vitamins	Deficiency diseases
Vitamin A	Night blindness (Poor night vision)
Vitamin B ₁	Beri-beri (Nervousness, loss of appetite, paralysis)
Vitamin B ₂	Skin diseases
Vitamin C	Scurvy (Bleeding of gums, swelling of joints)
Vitamin D	Rickets (Weak bones, decaying teeth)
Vitamin K	Haemorrhage (Clotting of blood affected)



Know the Keywords :

Carbohydrates : It is compound made up of carbon, hydrogen and oxygen.

Protein : Protein helps in digestion and in body building material.

Water : Water makes up 75% of earth's surface and 70% of the human body weight.



Point to Remember

- The major nutrients in our food are carbohydrates, proteins, vitamins, fats, minerals.
- Carbohydrates and fats mainly provide energy to our body.
- Proteins and minerals are needed for growth and the maintenance of our body.
- Vitamins help in protecting our body from diseases.
- Balanced diet provides all the nutrients that our body needs in right quantities along with adequate amount of roughage and water.
- Deficiency of one or more nutrients in our food for a long time may cause certain diseases or disorders.

EXERCISE TIME

A. Answer the following questions :

1. What is meant by food ?
2. What are carbohydrates ?
3. How will you test the presence of starch in any food item ?
4. What is a balanced diet ? What should it contain ?
5. What do you understand by the term deficiency disease ?
6. What is roughage and how is it useful for our body ?
7. Write a short note on the importance of water for human body.

B. Match the following :

Column 'A'

1. Scurvy
2. Goitre
3. Rickets
4. Beri-beri
5. Anaemia

Column 'B'

- (i) Iodine
- (ii) Iron
- (iii) Vitamin D
- (iv) Vitamin C
- (v) Vitamin B

C. Give the symptoms of the following diseases :

- a. Beri-beri
- b. Loss of vision
- c. Anemia
- d. Rickets

D. Tick (✓) the correct option :

1. Bones and teeth remain healthy with the consumption of :
(i) potassium (ii) iron (iii) calcium
2. Scurvy is due to the deficiency of :
(i) vitamin C (ii) iron (iii) none of these
3. Water helps us :
(i) to maintain temperature of body
(ii) to grow
(iii) to avoid scurvy
4. The proper functioning of thyroid gland requires :
(i) calcium (ii) iodine (iii) iron
5. The mineral required in maximum quantity by our body is :
(i) calcium (ii) iodine (iii) iron
6. Night blindness is caused due to deficiency of :
(i) vitamin C (ii) vitamin A (iii) vitamin B
7. Which of the following is not a symptom of Marasmus ?
(i) poor muscle development
(ii) reduced resistance to disease
(iii) swollen legs due to accumulation of water



Creative Work

- **Write short note in the space below on deficiency diseases and how can they be prevented :**
