Components of food

INTRODUCTION

Food is a nutritive substance taken by an organism for growth work, repair and maintaining life processes. Food is a kind of fuel for the living things. Just as petrol fuel for our car, in the same way, food is a fuel for our body.

We must eat to provide us energy s known as staple food. The study of compositions of food materials and the quantities of food materials required by our body for growth, maintenance and survival is called Nutrition. A nutrient is an organic a or inorganic substance required for the survival of a living being.

Components of food:

Food has many different components and each component is necessary for one function or the other. The major components of our food are:

1. Carbohydrates
2. Fats
3. Proteins
4. Mineral (salts)
5. Water
6. Roughage

7. Vitamin

The carbohydrates proteins, fats, minerals salts and vitamins are called nutrients because they are required for the survival of living beings like human beings. Thus water is an important constituent of our food and makes up for two third of our body-weight, it is usually not considered a nutrient. Our diet usually contains the entire nutrient in varying amounts. For example, egg or meat give us proteins, butter and ghee give us fats, whereas fruits and vegetables give use minerals and vitamins. We shall now discus all the components of food in detail, one bye.

Carbohydrates

Carbohydrates are the compound a made up of three elements: carbon, hydrogen and oxygen, proportion of hydrogen and oxygen being the same as in water (the term carbohydrates actually means hydrates of carbon)

Glucose, sucrose, and starch are example of carbohydrates. Carbohydrates are the main source of energy in our body. Though carbohydrates are not the richest source of energy, they are the cheapest source of energy. The carbohydrates produce energy when they are the oxidized in the body. I gram of carbohydrates produce kilojoules of energy and about 60 percent to 8- percent of the total energy contained in our diet (or good) comes from carbohydrates present in it. For a normal person, an about 400-500 gram of carbohydrate is requiring daily. A growing child, a nursing mother or a sports man, however, ended more carbohydrate than a cellulose, which forms the cell wall of plants, is also a carbohydrate, but is not a food this is because cellulose cannot be digested or absorbed in the body. When eaten, however, cellulose acts as a roughage & help in keeping the intestinal tract in good working order that is, cellulose helps in the maintaining healthy digestive system. For example, sugar is a type of carbohydrates which is sweat in taste There are two kinds of sugar simple sugar & compound sugar.

SOURC OF CARBOHYDRATES

The carbohydrates in our food are obtained mainly from the plant's sources like wheat, rice maize, potatoes, potatoes, sago (sabu-dana), peas, beans& fruit. Mile also contains a sugar called lactose. The sugar is also obtained from food. The world's three main cereal crops (or starchy food) which provide us carbohydrates are: wheat rice and maize. In the words, wheat rice& maize are abundant in starch. Our of these, food from wheat is prepared in the form of roti, bread. Rice is used as such or in or in various other form of food products such as rote, bread, noodles, rice, dosa, idli, potatoes.

Fats

Fats are esters of long chain fatty acids and an alcohol called glycerol. The fats are actually made of the same three elements, hydrogen, and oxygen, of which the carbohydrates are made. The difference lies in the fact that fats contain less proportion of oxygen as consists of three molecules of a fatty acid and one molecule of glycerol. Fats are the members of a heterogeneous group of organic compounds known as lipids. Like carbohydrates, the main function of fats in the body is to provide a steady source of energy, and for this purpose they are deposited in various fat depots within the body and under the skin. In fact, fats provide twice as much energy as that provided by the same amount of a carbohydrate. For example, I gram of a carbohydrates on oxidation in the body during respiration gives about 17 Kilojoules of energy whereas I gram of a fat (or oil) gives about 37Kilojoules of energy which is more than double than that given by carbohydrates. The fats provide more energy than carbohydrates because fat molecules contain higher percentage of carbon and hydrogen but less percentage of oxygen than that of carbohydrates. Due to less percentage of oxygen present in it, a fat molecule requires more oxygen for it

combustion and hence produces less heat energy. Form this discussion we conclude that both, carbohydrates and fats, serve mainly as sources of energy to our body actually, fats are the richest source of energy to our body, but they are more expensive than carbohydrates. Fats can also be stored in the body for subsequent use. The fats present in our food cannot be absorbed by our body as such because they are complex organic molecules which are insoluble in water.

Sources of fat

Fats are supplied to our body by many foods like butter, milk, egg etc. All the cooking oils provide us fats the fats which we eat in our food or dietary fats. All the above given food items contain dietary fats. We shall now discuss the major fatty acids resent in some common dietary products.

IN BUTTER: The major fatty acid present in butter is butyric acid. Butyric acid is a fatty acid because it contains a single bond.

IN COCONUT OIL: The major fatty acid present in coconut oil is octanoic acid. This is also a saturated fatty acid.

IN ANIMAL FATS; The major fatty acid present in animal fat is stearic acid.

IN PLAN T FATS: The major fatty acid present in plant fats is oleic acid. It will be good to note here that the fatty acid containing only single bond in their molecules are called saturated fatty acid.

Proteins

Proteins are highly complex organic compound made up of carbon, hydrogen, oxygen and nitrogen. some of the protein also contain elements such as Sulphur and phosphorus. protein is very important in our food for growth and repair of the body. In other words, protein are the materials required to build and repair our body. protein is essential for the growth of the child and teenagers, and protein are needed for maintenance and making good the wear and tear of body tissues in adults. In addition to all this, proteins also supply some energy to the body. Protein are made up of nitrogen containing compounds called amino acids. Amino acids link through peptide bonds to fro m protein molecules. There are more than 20 of these amino acids and they all occur in almost all proteins. But the relative amount of each amino acid present differs in different proteins. Most of the proteins which are required to perform different function in our body are prepared with in the body form the unbounded amino acids.

It should be noted that the proteins consumed in our food are not used by our body in their original from. This is because of two reasons. Firstly, because proteins are insoluble in water and secondly because they are very complex molecules. We shall now describe what happens when a protein-containing food is consumed by us. When the food is digested in small intestine, the proteins present in the food are broken down into simpler substances called amino acids. The amino acids are water soluble and less complex molecules. The amino acids thus formed are absorbed from the intestine into the blood. The blood carries these free amino acids to the various body cells where they are regrouped to form specific proteins such as skin, muscle, blood & bones.

Some Important proteins and their Functions

The properties or function of food proteins depend on the amino acids of which they are made some proteins contain all the amino acids required by our body where as others contain only some of them. Some of important type of proteins required by our body is; Enzymes, Hormones, Transport proteins, contractile proteins, structural proteins & Protective proteins.

1. The function of enzyme proteins is to catalyzed the biochemical reaction like digestion taking place in the body. Pepsin & trypsin are enzyme proteins.

2. The function of hormone proteins is to regulate the various body functions. Insulin is a protein hormone.

3. The function of transport proteins is to carry different substances from the blood the various tissues of the body. Hemoglobin is an example of transport proteins

4. The function of contractile proteins is to help in the contraction of muscles and other cells -- of our body. Myosin and Actin are contractile proteins

5. The function of structural proteins is to from the structural elements of the cells and tissues of our body. Collagen is an example of structural proteins.

6. The function of protective proteins is to help fight infection in our body. Gamma globulins present in blood is an example of protective proteins.

SOURCES OF PROTEINS

We can get proteins from plant sources as well as animal sources. Some of plant proteins are; Ground-nuts, Beans, Whole Cereals like

Wheat and Maize, and Pulses. Some of the best sources of animal proteins are; Lean Meat (meat without fats), Fish, Eggs, Milk and Cheese. These are all body building foods. The most valuable proteins are found in milk, eggs. They contain all the amino acids required by our body. These proteins are particularly need by children.

COMPOSITIONS OF FOOD; - Most of the foods contain all the major nutrients like carbohydrates, fats, proteins but in the varying amounts. Some foods contain more of carbohydrates where as others may contain more of fats. So, by eating a variety of different foods, we can ensure that our body gets all the essential nutrients in adequate quantity. The amount of major nutrients like carbohydrates, fats and proteins in some the common food item is given below;

FOOD	**CARBOHYDRATES%**	**FAT%**	**PROTEINS%**
BREAD	52	3	9
RICE	23	0.1	2.2
BANANA	20	0.5	1.0
POTATO	19	0.1	2
PEAS	16.7	0.5	5.2
APPLE	12.8	0.5	0.3
CABBAGE	5.5	0.3	1.2
SPINACH	3.2	0.3	1.6
EGGS	0.7	12	13
MILK	4	4	3
BUTTER	2	81	0.6

Ground nut is however, one food which contains a good percentage of the three major nutrients, carbohydrates, fats, as well as proteins. In this respect, ground-nuts

is a more nutritious food than wheat because wheat contains some proteins but very little fats.

FUNCTION OF THE DIGESTION PROCESS

So far, we have discussed that the major nutrients of our food are carbohydrates, fats & proteins. It is important to note here that the foods which we consume are not used by our body cells in their original form. This is because of the fact that most of the ingredients of our body are complex molecules which are insoluble in water, & and hence cannot be absorbed by the blood as such.

The main function of the digestion process is to convert the food that we eat in the such a form which can be easily absorbed & assimilated by our body. This point will become clearer from example. Our food contains mainly carbohydrates, fats & proteins, which are all complex organic compounds insoluble in water and hence cannot be absorbed by the blood directly & assimilated by ours. During the digestion process, carbohydrates, fats and proteins undergo mechanical and chemical treatment due to which they are spilt into simpler water.

Vitamins

Vitamins are the complex organic compounds found in some foods which are necessary for the well-being of the entire body. Vitamins are necessary for normal growth, good health, good vision, proper digestion, healthy teeth, gums, and bones, and for life to be maintained. Vitamins act as catalysts in certain chemical reaction of metabolism in our body, which laid to normal growth and good health. Vitamins do not provide energy to our body, so in this respect they differ from carbohydrates and fats which provide energy. Though vitamins are needed by our body in minute quantities but their presence is essential in our diet.

When vitamins were discovered their chemical composition were not known immediately, so, initially, the vitamins were represented by letters like A,B,C,D, etc. More than 15 vitamins are known at present and each one of these is needed for a specific purpose is the body. Some of the important vitamins are; vitamin A, Vitamin B, complex, vitamin C, vitamin D, Vitamin E, and Vitamin K. Most of vitamins cannot be made by body, so they have to supply through various foods which contain them. Only two vitamins called vitamin D and vitamin K can be made in our body. All the vitamins are prepared in plants. Al most all the food items contain more than one vitamin in varying amounts. These days, however, all the vitamins are also being produced synthetically. It should be noted that unlike carbohydrates, fats, and proteins, the amount of minerals and vitamins needed in our diet is not large, but we must have them in the diet is not large, but we must have them in the died since the body does not make these substances.

CLASSIFICATION OF VITAMINS;-

Some of vitamins are soluble in water whereas others are soluble only in fats or oils, so, on the basis of their solubility, all the vitamins can be divided into two classes or two groups; water soluble vitamins and fat-soluble vitamins.

1. Water soluble vitamins are; - vitamin B-complex and Vitamins C

2. Fat soluble vitamins are; - Vitamin-A, Vitamin-D, Vitamin-K Vitamin-E Called pernicious anemia. The various source of this vitamin are: meat, liver milk & eggs etc.

VITAMIN - C

THE chemical name of vitamin c is ascorbic acids. It is a water-soluble vitamin. Vitamin C is necessary for keeping teeth, gums & joints healthy. It is also increasing the resistance of our body to infection & help fight diseases. The various source of vitamin c is amla, lime, orange & tomatoes.

VITAMIN - D

The chemical name of vitamin D is calciferol. Vitamin D is a fat-soluble vitamin. Vitamin d is necessary for the normal growth of bones & teeth because it increase the absorption of calcium & phosphorus into the body. The various sources of vitamin D are: milk, fish, egg & butter. Vitamin D are also produced in our body when the skin is exposed to sunlight.

VITAMIN - E

The chemical name of Vitamin E is tocopherol. The chemical name of Vitamin E is tocopherol. It is fat soluble vitamin. Vitamin E is necessary for moral reproduction, normal functioning of muscles and protection of liver. The various sources of vitamin E are: green leafy vegetables, milk, butter, tomatoes and wheat germ oil.

VITAMIN-K(PHYLLOQUININE)

Vitamin K is a fat-soluble vitamin which is known as phylloquinone. Vitamin K is necessary for the normal clotting of blood and preventing hemorrhage. The various sources of vitamin K are: green leafy vegetables like spinach, cabbage, tomatoes and soybean.

The metals, nonmetals & their salts are called minerals because they are mined form the soil, ground and the earth. Our body needs minerals for its proper functioning,

normal growth and good health. Minerals are needed to build bones, teeth, formation of red blood corpuscles, and coagulation of blood, functioning of muscles, never & thyroid gland etc. Several minerals are needed to enzymes to do their work. Some of the important minerals needed by our body are: iron, iodine, calcium, phosphorus, sodium potassium., Zinc, copper magnesium chlorine fluorine and Sulphur. the deficiency of minerals in the body causes many diseases. Minerals, however, do not supply any energy to our body. They are essential for the metabolic activities of the contraction for certain tissues our body can use minerals in the compound from and not as pure elements. For example, we cannot left sodium metal or chlorine gas in their element from as such; because they are toxic (poisonous) and can even kill a person. But their compound called sodium chloride is a mineral salt which is harmless and, in fact, essential for our body. We get most of the minerals form plant sources. This is because plants take the various minerals form the soil through their roots and supply them to man and animals through the food chain. So, even the minerals which we get from some animals are, in fact, derived from the plants which the animals eats.

Important body minerals, their function and sources:

Though our body requires a large number of minerals, but the more important once are: Iron, Iodine, Calcium, Sodium, and potassium.

IRON : iron is the most important mineral required by our body. Iron is needed to prepare a protein called Hemoglobin present in blood. This hemoglobin helps us in transporting oxygen form the lungs to the body cells through the blood. Some of major sources of iron are: Liver, Kidney, bajra rai, eggs etc.

IODINE: Iodine is another important mineral needed by our body. Iodine is needed small quantities for the preparation of thyroid hormone called thyroxin. Some of the major sources of iodine are: fish sea-food, and iodized salt.

CALCIUM:-

Calcium salts are required for making bones and teeth, to help blood clotting, and for the proper working of the muscles. The major sources of calcium are: Milk, Milk products, Like Cheese, Beans, Green leafy, vegetables, whole gram meat, fish, ragi etc.

PHOSPHOROUS:-

phosphorus are also require for the formation of bones and teeth. Phosphorus is also require for the conversation of carbohydrates in energy. Phosphorus is important because it is a compound of A.T.P.,D.N.A., R.N.A. The major sources of phosphorus are: Milk, Vegetable, Bajra, Rai, nuts.

Water :

Water is an inorganic substance made up of hydrogen & oxygen. Water is not considered a food because it does not give energy like carbohydrates & fats or builds body tissues like proteins. Water is however, an essential part of a man's diet because it helps in preparing food for assimilation by the body. Water is present in the cell protoplasm, blood plasma & in the intercellular fluid in the tissues. In fact, about two – third of a man's body weight is the water in the tissues of his body. Water place an important role in a large number of process like digestion, transport & helps in regulation of body temperature.

Water is the solvent for all the salts in the body and it is the medium which all chemicals reaction take place in the body. Water is a good solvent so it dissolves the food nutrients which can then be absorbed or digested by the body. Water acts as a solvent for transporting dissolved food materials from the digestive tract to the blood. Water also dissolves the waste material of our body and hence provide a good medium for

excreting body wastes. An important role of water in our body is to regulate the body temperature the process of sweating and evaporation. when the outside temperature is high, the water oozes out through the skin in the form of sweat. when this water evaporates from our body, it takes the latent heat of vaporization from skin. By losing heat, the skin cools down a little and we feel comfortable. The survival time without water is very short. Without water, the body cells cannot function and they die.

Sources of water in our body

The amount of water needed by body depends on one's age type of work, and the climate. Our body gets a lot of water from many of the food items which we eat. For example, fruits, vegetables, meat and fish give a lot of water to our body. Most of the water needed by our body, However, comes from the plain "drinking water ", tea, coffee, milk etc. Some of the water in our body comes as a byproduct of the oxidation of glucose during the digestion of the food. In fact, 1 molecule of glucose on oxidation in the body produces 6 molecules of water.

Though roughage is not a food, it is an important part of balanced diet. Roughage neither gives us energy like carbohydrates and neither fats nor builds our body like protein do, but it is important for the normal working of the digestive system. Roughage is the fibrous material present in plants and their products like fruits and

vegetables. Roughage mainly consists of the indigestible plant carbohydrates called cellulose. The walls of the plants cell are made up of cellulose. So, when we eat fruits, vegetables and plant material, then a large quantity of cellulose in our body. But our body does not enzymes to digest the cellulose remains undigested and being a fibrous material acts as roughage and keeps the digested system in order. The various function of roughage in our body

Are given below: -

Ø Roughage help in retaining water in the body. This is because of the fibrous nature of the roughage. Being fibrous, cellulose can absorb a lot of water and help retain water in the body.

Ø Roughage adds bulk to food prevents constipation. Since roughage is bulky, it expands the intestines as it moves through them makes the passage of food earlier The roughage also stimulates the muscle contraction in the intestine walls causing movement of food. Thus, roughage keeps the food moving the intestine& hence prevents constipation.

Sources of roughage

The sources of roughage in our food are: salad; vegetables & fruit with skin high fiber contents. Cabbage is one vegetable which provide us a lot of roughage. Corn cob & half – crushed, wheat also provide roughage to our body, along with other nutrients. All these food items have cellulose content which act as roughage. These fibrous materials are good for digestion and helps in bowel movement.

Bibliography

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