

Nutrients

To maintain life organisms perform some basic function is called nutrition. Nutrition is one of the basic function of life in which intake of food, digestion, absorption, assimilation and egestion of undigested foods are included.

Nutrient : Nutrient are the substance by which an organism get energy or it is used for biosynthesis of its body.

For example carbohydrate and fat are the source of energy. Whereas proteins and minerals are the nutrient used for biosynthesis.

Carbohydrate : Carbohydrates are organic compounds in which the ratio of Carbon, Hydrogen and Oxygen is 1 : 2 : 1. Carbohydrate in the form of sugar and starch are major intake in animals and human. 50 to 75% energy is obtained by oxidation of carbohydrate. Carbohydrate containing aldehyde group is called aldose and with ketone group is called ketose. Carbohydrates are derivatives of polyhydroxy alcohols.

Classification of carbohydrate : Carbohydrates are classified into three major group.

(a) Monosaccharides : These are the simple sugar made up of single polyhydroxy or ketone unit. Most common monosaccharides found in nature is glucose containing six carbon atom. Triose, tetrose, pentoses, heptoses are the type of monosaccharides.

(b) Oligosaccharides : When 2 - 10 monosaccharides join together they form oligosaccharides. They are usually crystalline in nature and sweet in taste. Maltose, sucrose, lactose are disaccharides made up of two monosaccharides.

(c) Polysaccharides : These are the compound of sugar which are formed due to joining large number of monosaccharide. They are insoluble and tasteless. Some examples of polysaccharides are starch, glycogen, cellulose, chitin etc.

Function of carbohydrate

1. Carbohydrate works as fuel. During the process of respiration, glucose break into CO_2 & H_2O with the release of

energy. One gram of glucose gives 4.2 kilo calories energy.

2. Nucleic acids are polymers of nucleosides and nucleotides and contain pentose sugar.

3. Lactose of milk is formed from glucose and galactose.

4. Glucose is used for the formation of fat and amino acid.

5. Carbon skeleton of monosaccharides is used in the formation of fatty acid, chitin, cellulose etc.

Source of Carbohydrate : Wheat, rice, maize, sweet potato, potato and other plant and animals are the sources of carbohydrate.

2. Protein : Protein word was first used by J. Berzelius. It is a complex organic compound made up of 20 types of amino acids. Approximately 15% of the human body is made up of protein. Nitrogen is present in protein in addition to C, H & O.

Twenty two types of protein are necessary for human body out of which 12 are synthesized by body itself and remaining 10 are obtained by food are called essential amino acid.

Types of proteins :

On the basis of chemical composition

It is divided into three types.

(1) Simple Protein : It consists of only amino acid.
Example : Albumin, Globulin, Histones etc.

(2) Conjugate Protein : Having some other chemical compounds in addition to amino acid.
Example : Chromoprotein, Glycoprotein etc.

(3) Derived Protein : It is derived from the partial digestion of natural proteins or its hydrolysis.
Example : Peptone, Peptide, Proteinase etc.

Function of Protein :

(i) It takes part in the formation of cells, protoplasm and tissues.

(ii) These are important for physical growth. Physical growth hampers by its deficiency. Lack of proteins causes

Kwashiorkor and Marasmus diseases in children.

(iii) In case of necessity these provide energy to the body.

(iv) These control the development of genetic characters.

(v) These are helpful in conduction also.

Kwashiorkor : In this disease hands and legs of children get slimmed and the stomach comes out.

Marasmus : In this disease muscles of children are loosened.

3. Fats : Fat is an ester of glycerol and fatty acid.

In these carbon, hydrogen and oxygen are present in different quantities, but proportionally less oxygen than carbohydrate.

Normally fat remains as solid at 20°C temperature, but if it is in liquid form at this temperature, this is called oil.

Fatty acids are of two types – Saturated and unsaturated. Unsaturated fatty acids are found in fish oil and vegetable oil. Only coconut oil and palm oil are the examples of saturated oil.

9.3 kilo calorie energy is liberated from 1 gram fat.

Normally an adult person should get 20-30% of energy from fat.

Main functions of fat :

(i) It provides energy to the body.

(ii) It remains under the skin and prevents the loss of heat from the body.

(iii) It makes the food material tasty.

(iv) It protects different parts of the body from injury.

Due to the lack of fat skin gets dried, weight of the body decreases and the development of the body checked.

Due to the excessiveness of fat the body gets fatty, heart disease takes place and blood pressure increases.

4. Vitamins : Vitamin was invented by Sir F. G. Hopkins. The term vitamin was coined by Funk.

Vitamins are organic compound required in minute quantities. No calorie is obtained from it, but it is very important in regulating chemical reactions in metabolism of the body.

On the basis of solubility, vitamins are of two types :

(i) Vitamin soluble in water : Vitamin-B and Vitamin-C.

(ii) Vitamin soluble in fat : Vitamin-A, Vitamin-D, Vitamin-E and Vitamin -K

1. Cobalt is found in Vitamin-B12.

2. Synthesis of vitamins cannot be done by the cells and is fulfilled by the vitamin foods.

3. However, synthesis of Vitamin-D and K takes place in our body.

4. Synthesis of Vitamin-D takes place by the ultra violet rays present in the sunlight through cholesterol (Irgesterol) of skin.

5. Vitamin-K is synthesized in our colon by the bacteria and from there it is absorbed.

6. Minerals : Mineral is a homogenous inorganic material needed for body. These control the metabolism of body.

7. Water : Human gets it by drinking. Water is the important component of our body. 65-75% weight of the body is water.

Main function of water :

1. Water controls the temperature of our body by sweating and vaporizing.

2. It is the important way of excretion of the excretory substances from the body.

3. Maximum organic chemical reactions in the body perform through hydrolysis.

Balance Diet : That nutrition, in which all the important nutrients for organism are available in sufficient quantity, is called Balance Diet. Balance nutrition is obtained from Balance Diet, which is given in the chart below :