

Date-20/02/2023

B.Sc-II, Zoal (Sub)

Carbohydrate. (2nd PDF)

(2) OLIGOSACCHARIDE CARBOHYDRATES:— These carbohydrates are made by condensation of 2-10 sugar molecules. On the basis of no. of sugar molecules these carbohydrates are further divided into following groups:—

(A) DISACCHARIDE CARBOHYDRATES:— These carbohydrates are made by condensation of two similar or dissimilar sugars and by emission of one water molecule. The general formula of disaccharide carbohydrates is $C_6H_{12}O_6 + C_6H_{12}O_6 - H_2O = C_{12}H_{22}O_{11}$. The two sugar molecules are connected with fourth carbon of one sugar then such type of linkage is called 1-4-linkage, similarly 1-6 linkage and some other linkage are also found in disaccharide carbohydrates. Some important disaccharide carbohydrates are as follows:—

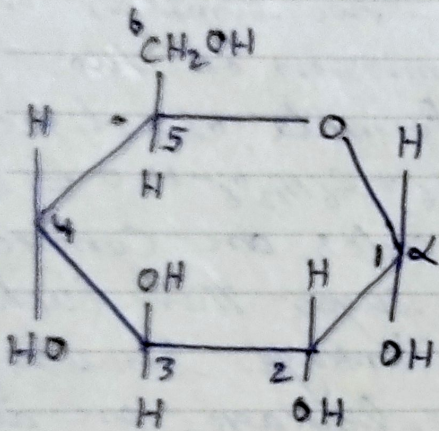
(1) SUCROSE (CANE SUGAR):— it is found in sugarcane and made by condensation of one glucose and one fructose molecules.

(2) MALTOSE (MALT SUGAR):— it is found in malted grains of barley and made by condensation of two glucose molecules.

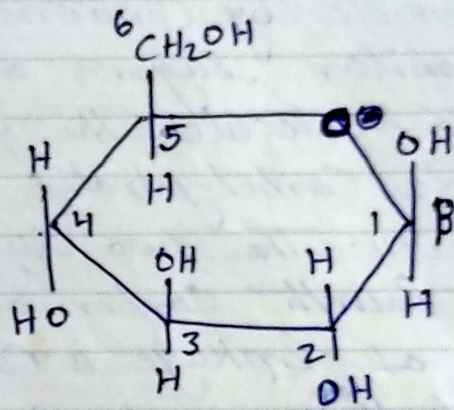
(3) LACTOSE (MILK SUGAR):— it is found in milk and made by condensation of one glucose and one galactose molecules.

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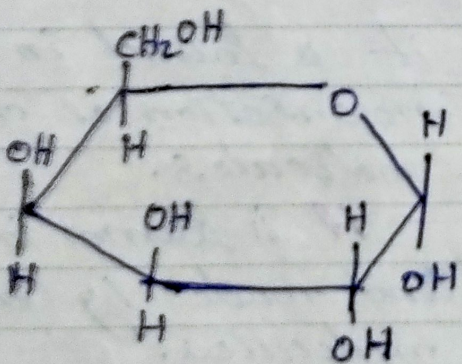
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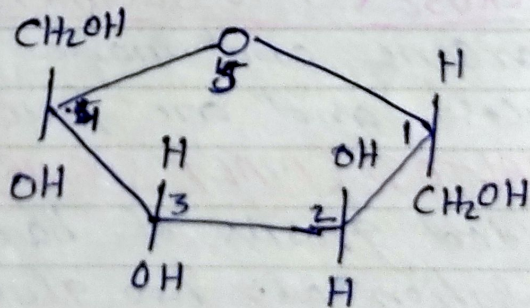
α D = Glucose



β D = Glucose



D = Galactose



D = Fructose

(B) TRISACCHARIDE CARBOHYDRATES: — In these Carbo-
-hydrates 3 Sugars are present e.g. — Raffinose: —
it is found in Cotton seed and made by Condens-
-ation of one glucose, one galactose and one
fructose molecules. The formula of raffinose
is $3(C_6H_{12}O_6) - 2H_2O = C_{18}H_{32}O_{18}$

(C) TETRASACCHARIDE CARBOHYDRATE: — In these Carbo-
-hydrates 4 Sugars are present e.g. Stachyose: — it
is made by Condensation of one glucose, two galactose
and one fructose molecules. The formula of stachy-
-ose is $4(C_6H_{12}O_6) - 3H_2O = C_{24}H_{42}O_{21}$

(3) POLYSACCHARIDE CARBOHYDRATES: — These Carbohydrates
are made by Condensation of more than 10 sugar
molecules hence these are the most complex
Carbohydrates. on the basis of types of sugar
molecules it further divided into two groups.

(i) HOMOSACCHARIDE: — made by similar sugars.

(ii) HETEROSACCHARIDE: — made by dissimilar
sugars.

Some important polysaccharide Carbo-
-hydrates are as follows: —

(1) STARCH: — it is a complex Carbohydrate which
is found in plants and absent in animals.
it is treated with iodine solution. then it
converts into deep bluish colour.

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it may be of both homopolysaccharide and heteropolysaccharide types. The structure of starch is found in the form of chain of sugar rings. If the chain is straight or unbranched then it is called amylose. If chain is branched then it is called amylopectin. In the structure of starch 80-85% amylopectin and 15-20% amylose are present. Amylose is made by 1-4 linkage but amylopectin is made by 1-6 linkage. Both chains are made by L-D-glucose.

(B) GLYCOGEN:— Glycogen is also an important complex carbohydrate which is found in the form of reserve food materials in the liver and muscles of animals. The structure of glycogen is similar to amylopectin but each branch is smaller and more branched than amylopectin. In each branch about 12 glucose molecules. The solubility of polysaccharides depends on the number of branches of chain.

(8)

If more branches are present then Carbohydrates are more soluble. For example glycogen is more soluble than amylopectin and amylopectin is more soluble than amylose.

(C) CELLULOSE: — Cellulose is also an important complex carbohydrate which is found in cell wall of plant cells. It is made by chain of about 1600-2700 β -D glucose which are connected together with the help of 1-4 linkage. The chain of glucose are arranged in ~~parallel~~ parallel manner hence it is fibrous in nature our body have no any enzyme to digest cellulose hence in our body. it acts as roughage.

(D) CHITIN: — Chitin is also an important carbohydrate which is found in shell of Crustaceans and exoskeleton of insects.

FUNCTION: — (1) About 90% of our food is made by carbohydrates which provides energy to us hence it is also called energy yielding substances. one gram carbohydrate provide 4.7 KJ energy.

(2) In our blood Carbohydrate is present in the form of blood sugar. □□

- (3) In our liver and muscles carbohydrates is stored in the form of glycogen which acts as reserve food.
- (4) Ribose is necessary for formation of genetic materials like DNA and RNA in our body.
- (5) The extra carbohydrate of our body get stored in the form of adipose tissue.
- (6) Some carbohydrates are necessary for formation of mucilaginous substances and mucopolysaccharides in our body.
- (7) Carbohydrate acts as respiratory substrate in living organism.

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