SNS COLLEGE OF TECHNOLOGY

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Coimbatore – 35

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DEPARTMENT OF FOOD TECHNOLOGY

19FTO302-FOOD NUTRITION

III – YEAR VI SEMESTER

UNIT-III CARBOHYDRATES

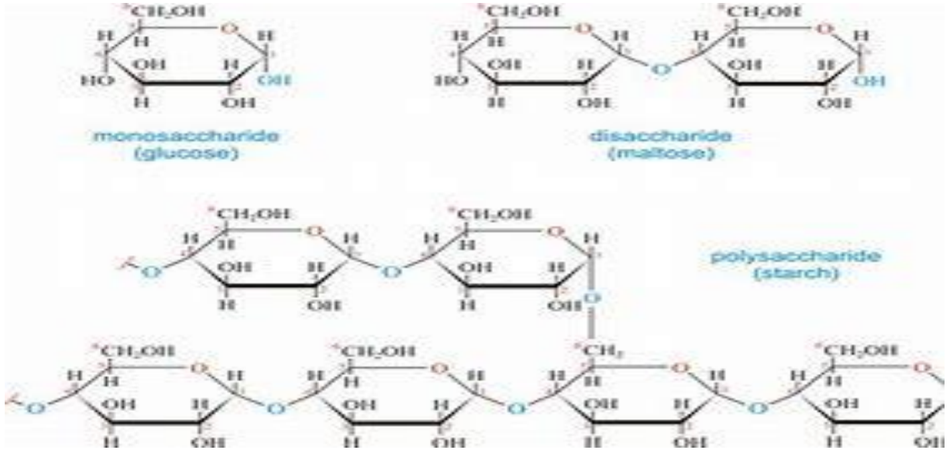
Carbohydrates

• Carbohydrates are macronutrients and are one of the three main ways by which our body obtains its energy.

•They are called carbohydrates as they comprise ***carbon***, ***hydrogen*** and ***oxygen*** at their chemical level.

•Carbohydrates are essential nutrients which include sugars, fibers and starches.

- They are found in grains, vegetables, fruits and in milk and other dairy products.
- They are the basic food groups which play an important role in a healthy life.
- The general formula of this class of organic compounds is $\mathbf{C_n(H_2O)_n}$.



Sources of Carbohydrates

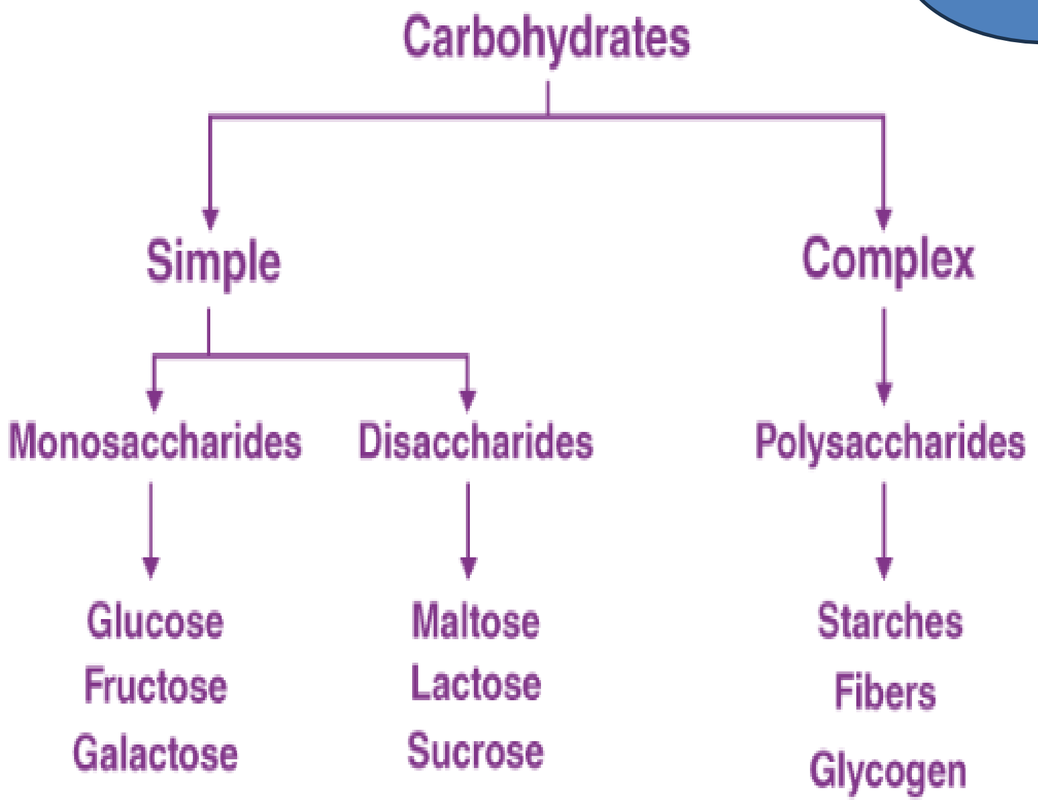
- Simple sugars are found in the form of fructose in many fruits.
- Galactose is present in all dairy products.
- Lactose is abundantly found in milk and other dairy products.
- Maltose is present in cereal, beer, potatoes, processed cheese, pasta, etc.
- Sucrose is naturally obtained from sugar and honey containing small amounts of vitamins and minerals.

Functions of Carbohydrates

- The main function of carbohydrates is to provide energy and food to the body and to the nervous system.
- Carbohydrates are known as one of the basic components of food, including sugars, starch, and fibre which are abundantly found in grains, fruits and milk products.
- It is also involved in fat metabolism and prevents ketosis.
- Inhibits the breakdown of proteins for energy as they are the primary source of energy.

Classification of Carbohydrates

Types



Simple Carbohydrates

- Simple Sugars.
- Soft drinks, candy, cookies and other sweet snacks contain simple carbohydrates. These foods are often made with white sugar, a form of processed sugar.
- Fruit, milk and vegetables contain natural sugars. Honey is a natural sugar as well.
- Simple carbohydrates are easier to handle because they are less (or simpler) complex.

Complex Carbohydrates

- Complex carbohydrates are often single units (monosaccharides), which are bound together.
- The oligosaccharides contain two to ten simple units of sugar.
- Polysaccharides contain hundreds and thousands of monosaccharides which are related. Complex carbohydrates have fairly long-lasting energy.

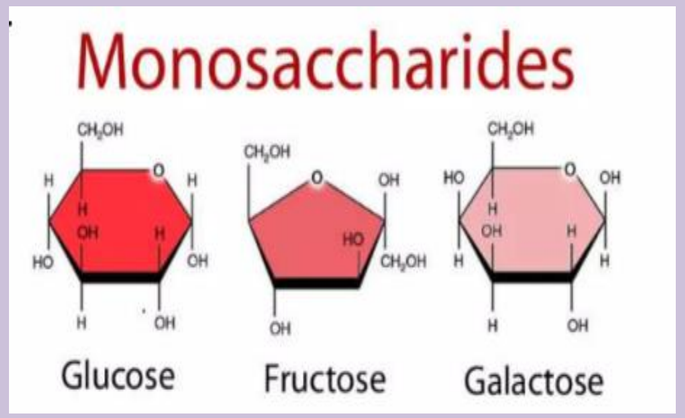
The different types of carbohydrates can be classified on the basis of their behaviour in hydrolysis. They are mainly classified into three groups:

- ***Monosaccharides***
- ***Disaccharides***
- ***Polysaccharides***

Monosaccharides

Monosaccharides - [Greek monos = single; sacchar = sugar]

- or simple sugars consist of one sugar unit that cannot be further broken down into simpler sugars.
- Examples of monosaccharides in foods are
- glucose,
- fructose and
- galactose.



Oligosaccharides

These are compound sugars that yield 2 to 10 molecules of the same or different monosaccharides on hydrolysis. Accordingly, an oligosaccharide yielding 2 molecules of monosaccharide on hydrolysis is designated as a disaccharide, and the one yielding 3 molecules of monosaccharide as a trisaccharide and so on.

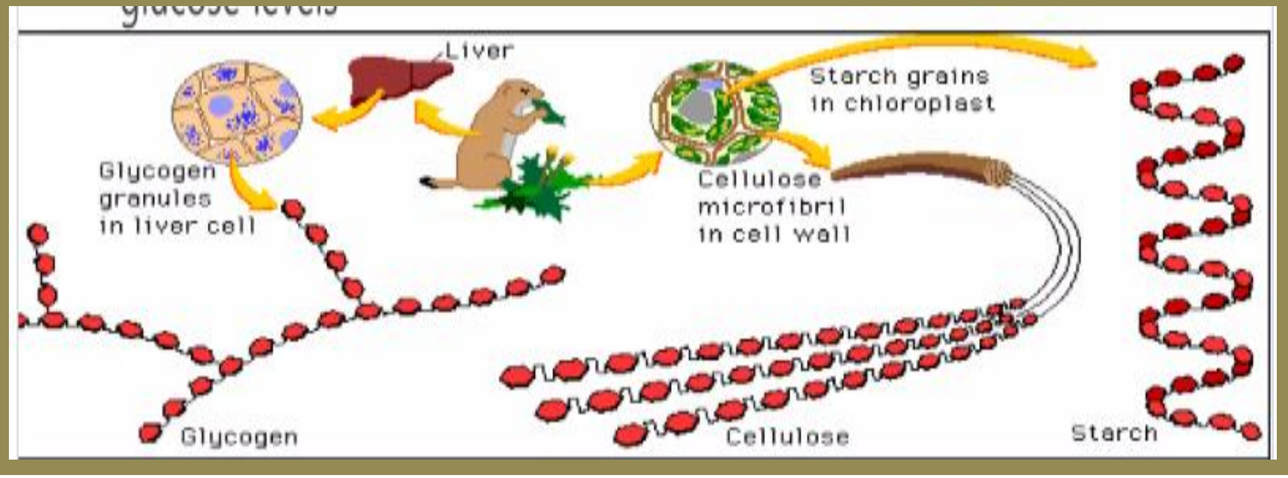
$$\text{Maltose} + H_2O \xrightarrow{H^+ \text{ or maltase}} \text{glucose} + \text{glucose}$$

$$\text{Lactose} + H_2O \xrightarrow{H^+ \text{ or lactase}} \text{glucose} + \text{galactose}$$

$$\text{Sucrose} + H_2O \xrightarrow{H^+ \text{ or sucrase}} \text{glucose} + \text{fructose}$$

Polysaccharides

- Containing 10 or more monosaccharide units attached together
- Examples :1. Starch- digestible 2. Glycogen- digestible 3. Fibre- indigestible
- Long chains of glucose units form these polysaccharides
- Cellulose gives structure to plants, fibre to our diet
- Glycogen is an energy storage sugar produced by animals
- Liver cells synthesize glycogen after a meal to maintain blood glucose levels



Sources of Carbohydrates :

Dairy Milk yogurt, and ice cream Fruit Whole fruit and fruit juice Grains Bread, rice, crackers, and cereal. Legumes Beans and other plant-based proteins Starchy Vegetables Potatoes and corn.

RDA of carbohydrates

- The Dietary Guidelines for Americans recommends that carbohydrates make up 45 to 65 % of your total daily calories.
- So, if you get 2,000 calories a day, between 900 and 1, 300 calories should be from carbohydrates. That translates to between 225 and 325 grams of carbohydrates a day.

THANK YOU