

B.Sc Second year Zoology (Subsidiary)

Paper-2

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CARBOHYDRATES

Carbohydrates, or saccharides, are biomolecules. The four major classes of biomolecules are carbohydrates, proteins, nucleotides, and lipids. Carbohydrates are the most abundant of the four.

Also known as “carbs,” carbohydrates have several roles in living organisms, including energy transportation. They are also structural components of plants and insects.

Carbohydrate derivatives are involved in reproduction, the immune system, the development of disease, and blood clotting.

Fast facts on carbohydrates

- “Saccharide” is another word for “carbohydrate.”
- Foods high in carbohydrates include bread, pasta, beans, potatoes, rice, and cereals.
- One gram of carbohydrate contains approximately 4 kilocalories
- High glycemic index (GI) carbohydrates quickly enter the bloodstream as glucose

- Switching to a low-GI diet improves the chance of a healthy weight and lifestyle

What are carbohydrates?

...Sources of carbohydrate include whole grains, fruit, and vegetables.

Carbohydrates, also known as saccharides or carbs, are sugars or starches. They are a major food source and a key form of energy for most organisms.

They consist of carbon, hydrogen, and oxygen atoms.

Two basic compounds make up carbohydrates:

Aldehydes: These are double-bonded carbon and oxygen atoms, plus a hydrogen atom.

Ketones: These are double-bonded carbon and oxygen atoms, plus two additional carbon atoms.

Carbs can combine together to form polymers, or chains.

These polymers can function as:

- long-term food storage molecules
- protective membranes for organisms and cells
- the main structural support for plants

Most organic matter on earth is [made up of](#) carbohydrates. They are involved in many aspects of life.

Types

There are various types of carbohydrate. They include monosaccharides, disaccharides, and polysaccharides.

Monosaccharides

This is the smallest possible sugar unit. Examples include glucose, galactose, or fructose. Glucose is a major source of energy for a cell. “Blood sugar” means “glucose in the blood.”

In human [nutrition](#), these include:

- galactose, most readily available in milk and dairy products
- fructose, mostly in vegetables and fruit

Disaccharides

Disaccharides are two monosaccharide molecules bonded together, for example, lactose, maltose, and sucrose.

Bonding one glucose molecule with a galactose molecule produces lactose. Lactose is commonly found in milk.

Bonding one glucose molecule with a fructose molecule, produces a sucrose molecule.

Sucrose is found in table sugar. It is often results from photosynthesis, when sunlight absorbed by chlorophyll reacts with other compounds in plants.

Polysaccharides

Different polysaccharides act as food stores in plants and animals. They also play a structural role in the plant cell wall and the tough outer skeleton of insects.

Polysaccharides are a chain of two or more monosaccharides.

The chain may be:

- branched, so that the molecule looks like a tree with branches and twigs
- unbranched, where the molecule is a straight line

Polysaccharide molecule chains may consist of hundreds or thousands of monosaccharides.

Glycogen is a polysaccharide that humans and animals store in the liver and muscles.

Starches are glucose polymers that are made up of amylose and amylopectin. Rich sources [include](#) potatoes, rice, and wheat. Starches are not water soluble. Humans and animals digest them using amylase enzymes.

Cellulose is one of the main structural constituents of plants. Wood, paper, and cotton are mostly made of cellulose.

Simple and complex carbs

You may have heard about [simple and complex](#) carbohydrates.

Monosaccharides and disaccharides are simple carbohydrates, and polysaccharides are complex.

Simple carbohydrates are sugars. They consist of just one or two molecules. They provide a rapid source of energy, but the consumer soon feels hungry again. Examples include white bread, sugars, and candies.

Complex carbohydrates consist of long chains of sugar molecules. Wholegrains and foods that still have their fiber in are complex carbs. They tend to fill you up for longer, and they are considered more healthful, as they contain more [vitamins](#), minerals, and fiber. Examples include fruits, vegetables, pulses, and wholemeal pasta.