

Topic: Carbohydrates; Structure

B.Sc. Botany Hons. III

Paper: VI Group: A

Dr. Sanjeev Kumar Vidyarthi

Department of Botany

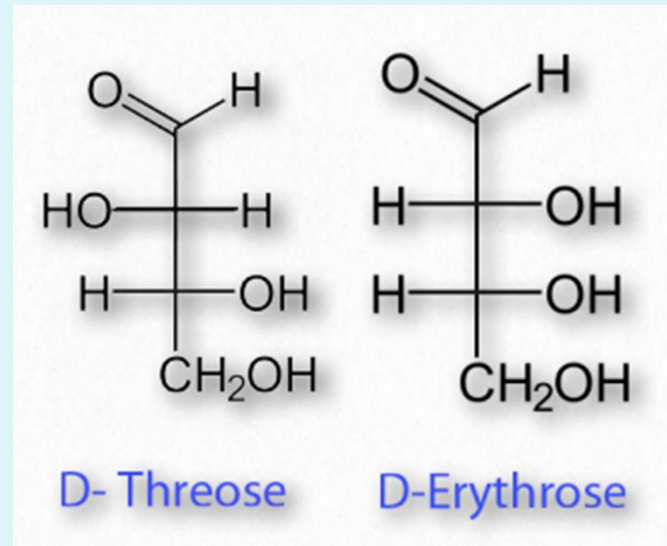
Dr. L.K.V.D. College, Tajpur, Samastipur

L.N. Mithila University, Darbhanga

Monosaccharides

- The most common monosaccharides include glucose, fructose, galactose, ribose, and mannose.
- Of these sugars, all but one (fructose) exists as an aldehyde.
- Fructose and other less well known sugars are ketones.
- By convention, the letters 'ose' at the end of a biochemical name flags a molecule as a sugar.
- Thus, there are glucose, galactose, sucrose, and many other '-oses'. Other descriptive nomenclature involves use of a prefix that tells how many carbons the sugar contains.
- For example, glucose, which contains six carbons, is described as a hexose.
- The following list shows the prefixes for numbers of carbons in a sugar:

- Tri- = 3
- Tetr- = 4
- Pent- = 5
- Hex- = 6
- Hept- = 7
- Oct- = 8



Other prefixes identify whether the sugar contains an aldehyde group (aldo-) or a ketone (keto-) group. Prefixes may be combined. Glucose, which is a 6-carbon sugar with an aldehyde group, can be described as an aldohexose.

The list that follows gives the common sugars and their descriptors.

- Ribose = aldo-pentose
- Glucose = aldo-hexose

- Galactose = aldo-hexose
- Mannose = aldo-hexose
- Fructose = keto-hexose

Diastereomers

Sugars may have multiple asymmetric carbons and thus differ from each other in the configuration of hydroxyl groups on asymmetric carbons. Two sugars having the same chemical form (aldoses, for example) and the same number of carbons, but that differ only in the stereochemical orientations of their carbons are referred to as diastereomer. For example, glucose, galactose, and mannose all have the formula of $C_6H_{12}O_6$, but are chemically distinct from each other in the orientation of hydroxyl groups around the carbons within them.