

# **CARBOHYDRATE CONTAINING DRUG- HONEY**



## CARBOHYDRATES

- ❖ Carbohydrates are a group of compounds composed of carbon, hydrogen and oxygen in which hydrogen and oxygen elements are in the same proportion as in water.
- ❖ Carbohydrates are defined as polyhydroxy aldehydes or polyhydroxy ketone or compound on hydrolysis produce either of them.



- ❖ Carbohydrates are among the first products or primary products to arise as a result of photosynthesis.
- ❖ They supply energy, provide important food reserve as starch in plants and as glycogen in animals and responsible for the structural and skeletal cellulose and other rigid cellular framework.
- ❖ They are the precursors of biosynthesis of proteins, fats and secondary metabolites. They are abundant in plants than 

## Classification

Carbohydrates are classified into

- a) **Sugars or saccharides:** Saccharides may be mono, di, tri and tetra saccharides.
  - b) **Polysaccharides:** Polysaccharides on hydrolysis gives an indefinite number of monosaccharides.
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1. **Monosaccharides:** These sugars contain from 3-9 carbon atoms.
    - a. Trioses: They contain 3 carbon atoms. e.g. glyceraldehyde
    - b. Tetroses: They contain 4 carbon atoms. e.g. erythrose
    - c. Pentoses: They contain 5 carbon atoms. e.g. ribose, arabinose.
    - d. Hexoses: They contain 6 carbon atoms. They can be grouped into aldoses (has an aldehyde group) and ketoses (has a ketone group) e.g. aldoses – glucose, mannose and ketoses – fructose and sorbose.
    - e. Heptoses: They contain 7 carbon atoms. e.g. sedoheptulose.



**Disaccharides:** These on hydrolysis yield 2 molecules of monosaccharides. e.g.



**Trisaccharides:** These on hydrolysis yield 3 molecules of monosaccharides.



**Tetrasaccharides:** These on hydrolysis yield 4 molecules of monosaccharides.



## Polysaccharides

- ❖ These on hydrolysis yield an indefinite molecule of monosaccharides.
- ❖ The hydrolysis of polysaccharides takes place in the presence of enzymes or reagents, the final products is hexoses or pentoses or their derivatives.
- ❖ Oligosaccharides contains 2-10 units of saccharides.
- ❖ Also, in addition polysaccharides include polysaccharide complexes, such as sulphate esters (Mucilages), uronic acid (Polyuronides-gums), amino sugars (glucosamine).



## Properties

1. Low molecular weight carbohydrates are crystalline, water soluble and sweet in taste.  
e.g. sucrose, glucose and fructose.
2. The high molecular weight carbohydrates (polysaccharides) are amorphous, water insoluble and tasteless. e.g. starch, cellulose, gum, pectin, inulin etc.

## Chemical test

1. **Molisch's test:** To the carbohydrate solution in a test tube, 2 drops of  $\alpha$ -naphthol solution is added followed by Con.  $H_2SO_4$  along the side of the test tube, violet ring develops at the junction of two liquids.



**2. Fehling's test:** To the carbohydrate solution in a test tube, equal volume of Fehling's solution A and B is added, heated in a boiling water bath. Formation of brownish red precipitate indicates the presence of reducing sugar (For non-reducing sugar, the test is performed after acid hydrolysis).

**3. Benedict's test:** To the carbohydrate solution in a test tube, Benedict's reagent is added, heated in a boiling water bath, formation of orange or red precipitate indicates the presence of reducing sugar.

**4. Iodine test:** To the carbohydrate solution, 2 drops of iodine solution added, formation of blue-black colour indicates the presence of polysaccharides.



# Honey



**Synonyms:** Madhu, Honey purified, Mel

**B.S:** Sugar secretion deposited in honey comb by the bees, *Apis mellifera*

**Family:** Apidae

**Order:** Hymenoptera

**G.S:** Africa, Australia, New Zealand, California and India.



## **Collection**



- In the spring the bees gather pollen and nectar (a watery soln. containing 25% sucrose and 75% water) through his hollow tube of mouth (probosis) and deposits in honey-sac located in abdomen.
- The enzyme invertase present in saliva of the bee convert nectar into invert sugar which is partly utilized by the bee and the remaining is deposited into honey comb.
- Honey comb is smoked to remove the bees and honey is obtained by applying the pressure to it or allowing it to drain naturally.
- The honey is heated to  $80^{\circ}\text{C}$  and allowed to stand.
- The impurities floating are skimmed off and the liquid diluted with water to produce honey of 1.35 density.
- It should be cooled rapidly or else it darkens in colour on keeping.



## Description:

**Colour** – Pale yellow-yellowish brown

**Odour** – Characteristic, pleasant

**Taste** – Sweet and faintly acid

**Solubility**: Soluble in water and insoluble in alcohol.

It is a thick syrupy liquid, translucent when fresh and on keeping it becomes opaque and granular due to the crystallization of glucose.



**Chemical Constituents:** Glucose (35%), fructose (45%), sucrose (2%), maltose, gum, traces of succinic acid, acetic acid, dextrin, formic acid , colouring matter, enzymes- invertase, diastase, inulase and traces of vitamins, proteins.

Honey, a saturated solution of sugar, on keeping starts crystallizing called as granulated honey and can be minimized by heating the honey.

**Chemical test:** Honey is adulterant with artificial invert sugar which contains furfural, detected by Fiehe's test. It gives instant red colour with resorcinol in hydrochloric acid.

It gives positive result for reducing sugar. With Fehling solution A and B gives red colour after heating in a water bath.



## Uses:



- Demulcent and sweetening agent
- Common ingredients in several cough mixture, cough drops and vehicle for ayurvedic formulations.
- Inhibits the growth of oral bacteria , coats the throat and reduces throat irritation
- Effective in the treatment of gastric or peptic stomach ulcers and in burns.
- Effective in the treatment of various wounds and infections because of its antimicrobial (antibacterial, antiviral and antifungal) properties.
- Antioxidant.
- Contains a variety of sugars and minerals and has been shown to be low in calories and useful as a sweetener for diabetics, people with heart disease or those who are overweight.
- It is used for creating appetite, strengthening the stomach and as a meat preservative.





*Thank You*

