



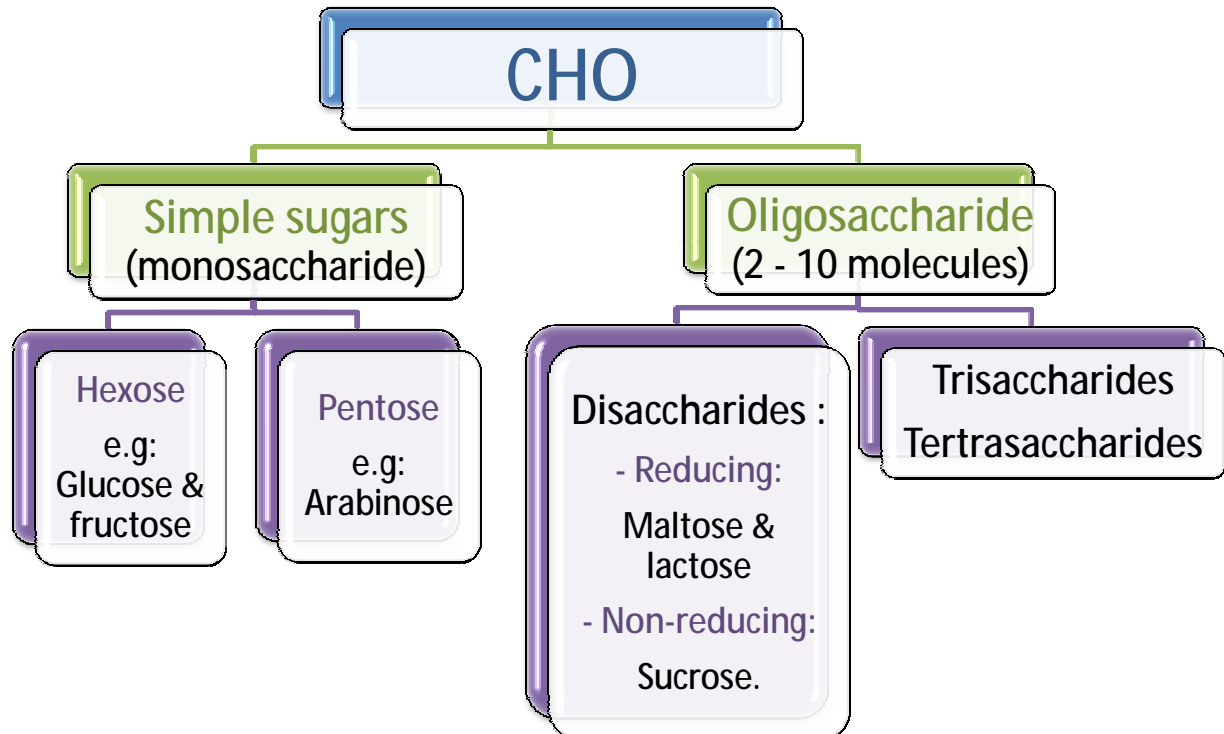
# Carbohydrates

Lab No. 1

## Carbohydrates (CHO):

Carbohydrates are hydrates of carbon; they consist of carbon, hydrogen & oxygen, usually abbreviated as CHO.

### Classification:



## Chemical qualitative tests :

### A- General tests:

#### 1- Molisch's test:

Molisch's test is positive with all CHO

##### Procedure:

- 1- Prepare a solution of the sample, add it to a test tube
- 2- Add 4 drops of 15% alc.  $\alpha$  naphthol, shake the test tube
- 3- Use a holder, add conc.  $\text{H}_2\text{SO}_4$  drop by drop on the wall

**Positive result:** Purple ring is formed between the two layers.

#### 2- Reduction of Fehling solution:

All of the monosaccharides and the reducing disaccharides can reduce fehling solution, and thus will give positive results.

##### Procedure:

- 1- Prepare a solution of the sample, add it to a test tube
- 2- In another test tube, prepare fehling solution by mixing equal volumes of fehling A and fehling B.
- 3- Add few milliliters of fehling solution to the sample solution.
- 4- Heat it on W.B. for **15 – 60 seconds**

**Positive result:** change in color (green, yellow or red)

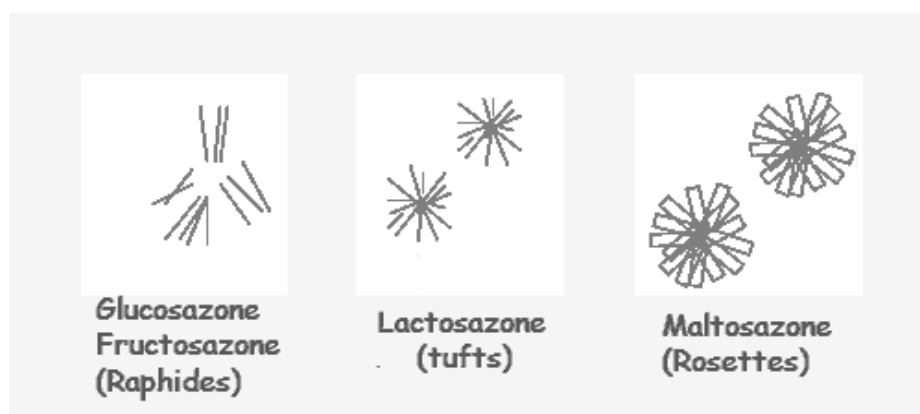
### 3-Osazone test:

Positive with all of the monosaccharides and the reducing disaccharides

#### Procedure:

- 1- Add 1 tsp of sample + 3 tsp of phenyl hydrazine HCl + 4 tsp of Na acetate
- 2- Add 5 ml water
- 3- Boil in W.B. for 45 min
- 4- White ppt. is formed

Notice the formed ppt. / crystals under microscope



### 4- Reduction of Barfoed's solution:

Barfoed's solution gives positive results with monosaccharides (**within 5 minutes**).

#### Procedure:

- 1- Prepare a solution of the sample, add it to a test tube, add few milliliters of Barfoed's solution.
- 2- Heat it on W.B. for 5 **minutes**

**Positive result:** Reddish ppt.

**P.S.:** Disaccharides also react with Barfoed's solution, but the reaction takes longer time (> 10 min.)

## Chemical qualitative tests:

### B- Specific tests:

#### - Cobalt nitrate test for sucrose:

In a test tube, add solution of **sucrose** + cobalt nitrate + excess dil. NaOH → Violet color.

#### - Rapid furfural (resorcinol) test for fructose:

In a test tube, add a solution of **fructose** + few ml of dil. HCL+ ↑ resorcinol crystals, carefully, heat the test tube on the direct flame for 2 -3 min. → Red color.

#### - Specific tests for glucose:

1-In a test tube add a solution of glucose + NaOH solution, boil on W.B. → Yellow color, which changed to brown.

2- In a test tube add a solution of glucose + 0.5 ml conc. ammonia + 2 ml lead subacetate, carefully, heat the test tube on the direct flame → faint pink → orange.

## Scheme for identification of Carbohydrates

