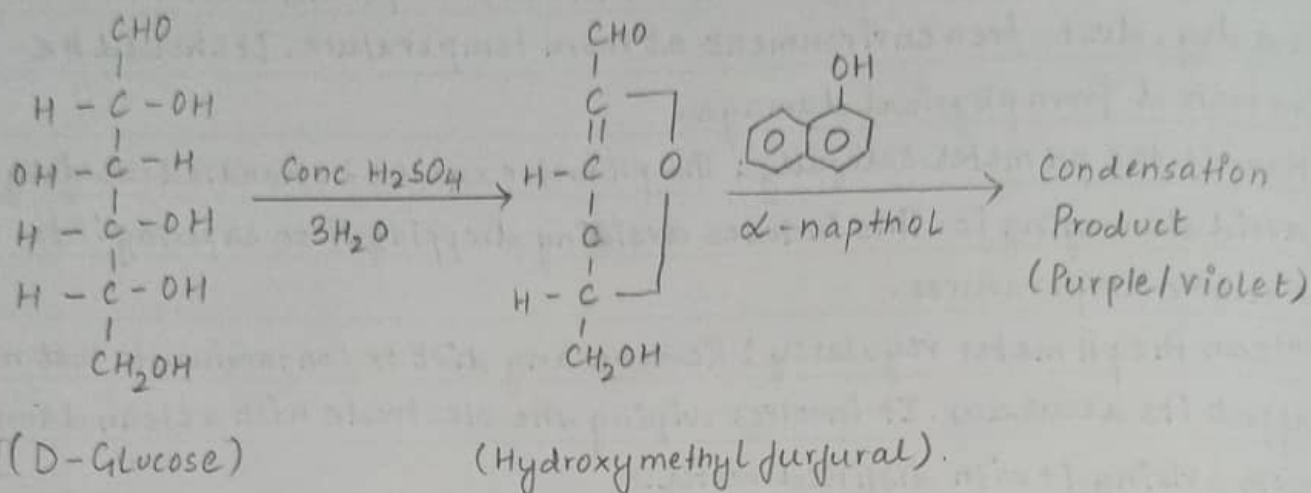


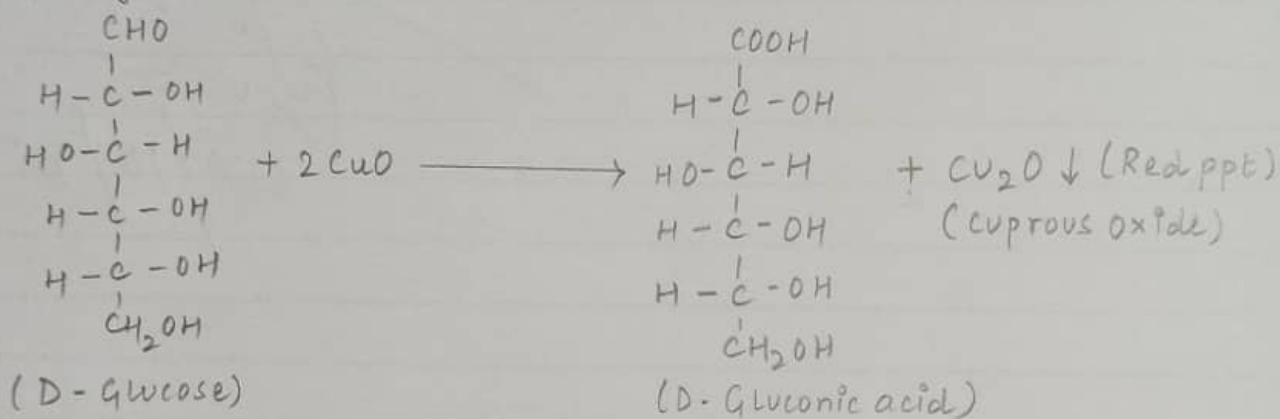
1. MOLISH TEST



2. Fehling's Test

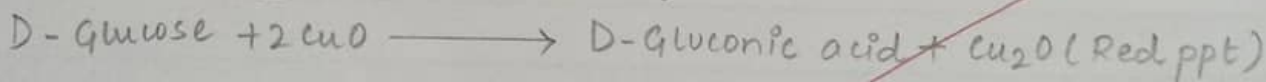
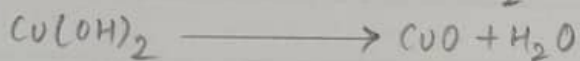
Fehling's A : Blue coloured aq. solⁿ of CuSO_4

Fehling's B : aq. solⁿ of potassium sodium tartarate



3. Benedict's Test

Reagent : 173g of Sodium nitrate, 100 anhydrides, Na_2CO_3 in 600 ml hot water to 800 ml with H_2O .





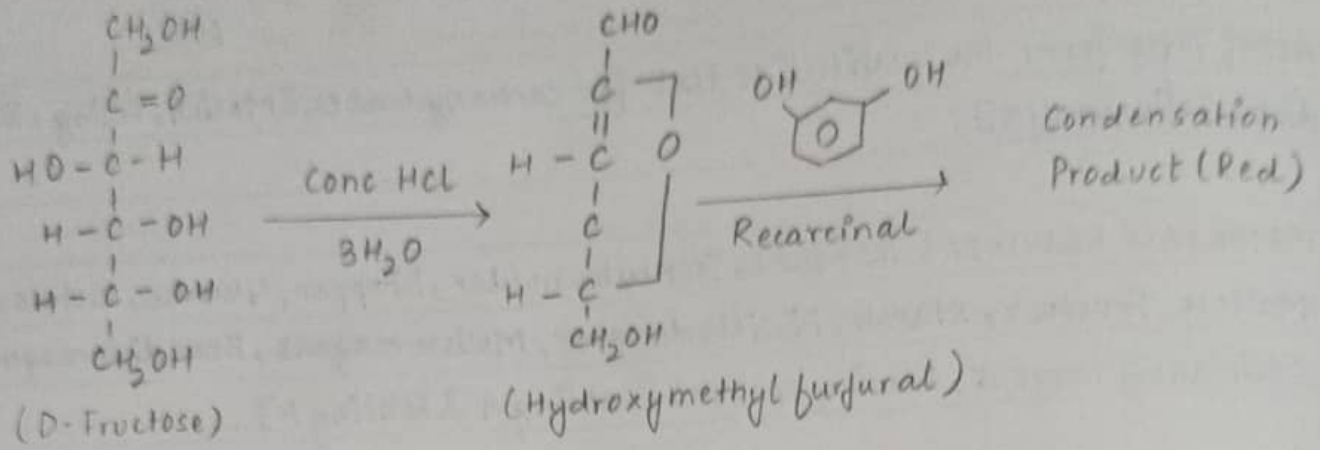
AIM: To perform the qualitative test for carbohydrates. [Molish, Fehling, Benedict, Seliwanoff's].

MATERIALS REQUIRED: Test tube, Test tube holder, Dropper, Glucose, lactose, Maltose, Fructose, Starch, Distilled water, Molish reagent, Benedict reagent, Seliwanoff reagent, Fehling reagent [Fehling A & Fehling B].

THEORY: Carbohydrates are the most abundant organic molecules in nature. They can be defined as poly hydroxy aldehydes or ketones. They are hydrates of carbon. Following are general qualitative test of Carbohydrates:-

- (1) **Molish's test:** This general test for carbohydrates. This is given by almost all carbohydrates. In this test, concentrated H_2SO_4 hydrates the glycosidic bonds that gets dehydrates in the presence of acid to form furfural which reacts with α -naphthol to form purple/violet colour product. (ring at junction).
- (2) **Fehling's test:** This test is given by reducing sugars. To the aqueous solution of carbohydrates Fehling's solution [A+B] is added & heated in water bath. The formation of red ppt. confirm presence of reducing sugars.
- (3) **Benedict's Test:** This test is given by reducing sugars in alkaline medium, Sodium carbonate converts glucose to enediol & this enediol reduces cupric to cuprous forming cuprous hydroxide. This solution is kept in the sodium citrate & on boiling, red ppt of cuprous oxide is formed.
- (4) **Seliwanoff's Test:** Seliwanoff's Test is a chemical test which distinguishes b/w the aldose & ketose sugars. It gives (+ve) test for ketose sugar. Ketose sugars dehydrates faster than aldose in presence of conc. HCl & forms furfural which gives cherry red colour with resorcinol.

4. Seliwanoff's Test



MOLISH'S TEST

PROCEDURE:→ MOLISH'S TEST

EXPERIMENT	OBSERVATION	INFERENCE
Take 2ml of test solution. Add 2-3 drops of Molish's Reagent (5% naphthol in ethanol) & then Mix. pipette 1ml conc. H_2SO_4 along the sides of the test tube wall slowly until 2 different layers are formed.	a violet/purple covering is seen b/w the junction of two liquids.	This prove the presence of carbohydrates of the given solution.

• OBSERVATION TABLE:-

	SAMPLE	OBSERVATION	INFERENCE
1.	Controller	No specific observation seen.	Carbohydrate absent.
2.	Glucose	violet/purple ring at junction.	Carbohydrate present.
3.	Sucrose	Formation of violet/purple ring.	Carbohydrate present.
4.	Lactose	Formation of violet/purple ring.	Carbohydrate present.
5.	Maltose	Formation of violet/purple ring.	Carbohydrate present.
6.	Fructose	Formation of violet/purple ring.	Carbohydrate present.
7.	starch.	Formation of violet/purple ring.	Carbohydrate present.

→ FEHLING'S TEST

	EXPERIMENT	OBSERVATION	INFERENCE
•	Add 1ml of Fehling's reagent (equal Vol. of Fehling A & Fehling B) to 1ml of sample.	Formation of Red ppt. (cuprous oxide).	Presence of reducing sugar confirmed.
•	place in hot water bath		



FEHLING'S TEST



BENEDICT'S TEST



• OBSERVATION TABLE :-

	SAMPLE	OBSERVATION	INFERENCE
1.	Controlled sol ⁿ .	No Red ppt is formed.	No Reducing sugar.
2.	Glucose	A Red ppt is formed.	Reducing Sugar confirmed.
3.	Sucrose	No Formation of Red ppt.	No Reducing sugar.
4.	Lactose	A Red ppt is formed.	Reducing Sugar confirmed.
5.	Maltose	A Red ppt is formed.	Reducing sugar confirmed.
6.	Fructose	No formation of red ppt.	No Reducing sugar.
7.	Starch	No formation of red ppt.	No Reducing Sugar.

→ BENEDICT'S TEST

EXPERIMENT	OBSERVATION	INFERENCE
Add 2ml of Benedict's reagent to 1ml Sample & place them in hot water bath.	Formation of Red ppt. [Cuprous Oxide]	Presence of Reducing Sugar.

• OBSERVATION TABLE :-

		OBSERVATION	INFERENCE
1.	Controlled sol ⁿ	No Red ppt formation.	Reducing sugar absent.
2.	Glucose	Red ppt formation.	Reducing sugar present.
3.	Sucrose	No red ppt formed.	Reducing sugar absent.
4.	Lactose	Red ppt formation.	Reducing sugar present.
5.	Maltose	Red ppt formation.	Reducing sugar present.
6.	Fructose	No Red ppt formed.	Reducing sugar absent.
7.	Starch	No Red ppt formed.	Reducing sugar absent.



SELIWANOFF'S TEST

→ SELIWANOFF'S TEST

EXPERIMENT	OBSERVATION	INFERENCE
Add 2ml of Seliwanoff reagent [0.05% of Resorcinol in 3M HCl] in 1ml of test solution place them in water bath.	Appearance of cherry red solution.	Presence of Ketose sugar.

• OBSERVATION TABLE :-

	SAMPLE	OBSERVATION	INFERENCE
1.	Controlled Sol ⁿ .	No red ppt is formed	Ketose Sugar absent.
2.	Glucose	No red ppt is formed	Ketose Sugar absent.
3.	Sucrose	Red ppt is formed	Ketose Sugar present.
4.	Lactose	No red ppt is formed	Ketose Sugar absent.
5.	Maltose	No red ppt is formed	Ketose Sugar absent.
6.	Fructose	Red ppt is formed	Ketose Sugar present.
7.	Starch	No red ppt is formed	Ketose Sugar absent

PRECAUTIONS :-

1. Wash the apparatus before use.
2. Always add conc. solution slowly.
3. Avoid mouth pipetting & air bubbles.
4. Always perform controlled solution step to check whether the reagent is working properly.