



# ***General Chemistry***



University Of Fallujah  
College Of Medicine

**Lecture : *Barfoed and Bial Tests***

**Stage :** First stage 2st

**Lecturer :** Ayad A. Mnajid

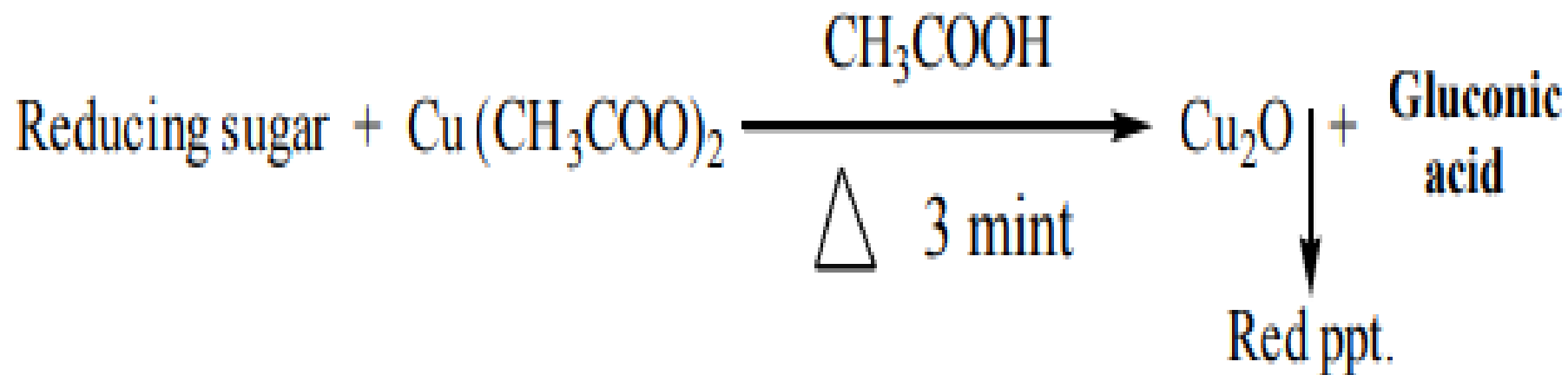
**Department:** General Chemistry

**Date:** / 4 / 2026

- **Tests for identification of Carbohydrates:**

- 1- **Molisch** Test specific for carbohydrates.
- 2- **Benedict's** Test: presence of reducing sugars.
- 3- **Barfoed's** Test: test used for detecting the presence of monosaccharides.
- 4- **Bial's** Test: used to detect pentose [5C] monosaccharides.
- 5- **Seliwanoff's** Test : used to distinguish between aldoses and ketoses.

- Barfoed's test : is a chemical test used to differentiate between **monosaccharides** (simple sugars) and **disaccharides** (complex sugars) based on their reducing properties. The test specifically identifies monosaccharides, which are strong reducing agents, as they can reduce cupric ions ( $\text{Cu}^{2+}$ ) to cuprous ions ( $\text{Cu}^+$ ) in an acidic medium.



- **Principle of Barfoed's Test**

- The Barfoed reagent is made up of copper acetate in a dilute solution of acetic acid. Since acidic pH is unfavorable for reduction, monosaccharides, which are strong reducing agents, react in about 1-2 min. However, the reducing disaccharides take a longer time of about 7-8 minutes, having first to get hydrolyzed in the acidic solution and then react with the reagent. Once the reaction takes place, thin red precipitate forms at the bottom of the sides of the tube. The difference in the time of appearance of precipitate thus helps distinguish reducing monosaccharides from reducing disaccharides.

- Application of the test: Useful to distinguish between monosaccharides and disaccharides.
- Barfoed's Reagent: Dissolve neutral copper acetate crystals in water. Pass through a filter paper placed in a funnel to remove the particles if present to another graduated beaker. Then add glacial acetic acid.

- Bial's Test .
- This test is used to distinguish between pentose monosaccharide and hexose monosaccharide  
Principle: Bial's test uses concentrated HCl as a dehydrating acid and orcinol - traces of ferric chloride [FeCl<sub>3</sub>] as condensation reagent. The test reagent dehydrates pentoses to form furfural. Furfural further reacts with orcinol and the iron ion present in the test reagent to produce a bluish or green product, while hexoses yield muddy-brown to grey condensation product.

- Principle of test :
- Bial's test uses concentrated HCl as a dehydrating acid and orcinol + traces of ferric chloride as condensation reagent. The test reagent dehydrates pentoses to form furfural. Furfural further reacts with orcinol and the iron ion present in the test reagent to produce a bluish or green product, while hexoses yield muddy-brown to grey condensation product.

