Ministry of Higher education and Scientific Research

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LECTURE (6)

(QUALITATIVE ANALYSIS OF CARBOHYDRATE –SUCROSE)

Qualitative Analysis of Carbohydrate – Sucrose

Sucrose is a **disaccharide** composed of glucose and fructose. It is a **non-reducing sugar** and does not give a positive test with Benedict's or Fehling's solution. Below are the qualitative tests used to analyze sucrose:

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1. Solubility Test

- **Procedure**: Dissolve a small amount of sucrose in water.
- **Observation**: Sucrose is highly soluble in water, forming a clear solution.
- **Inference**: Confirms the presence of a carbohydrate.

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2. Molisch's Test (General Test for Carbohydrates)

- **Reagents**: α-naphthol and concentrated sulfuric acid (H_2SO_4).
- **Procedure**: Add 2 drops of α-naphthol solution to sucrose solution, then carefully add concentrated sulfuric acid along the sides of the test tube.
- **Observation**: A purple or violet ring appears at the junction.
- **Inference**: Confirms the presence of carbohydrates.

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3. Benedict's Test (Test for Reducing Sugars)

- **Reagents**: Benedict's reagent (copper(II) sulfate, sodium carbonate, and sodium citrate).
- **Procedure**: Add Benedict's reagent to the sucrose solution and heat in a water bath.
- **Observation**: No color change (remains blue).
- **Inference**: Sucrose is a **non-reducing sugar** and does not react with Benedict's reagent unless hydrolyzed.

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4. Fehling's Test (Test for Reducing Sugars)

- **Reagents**: Fehling's A (copper sulfate) and Fehling's B (sodium potassium tartrate).
- **Procedure**: Mix Fehling's A and B, add sucrose solution, and heat.
- **Observation**: No red precipitate forms.
- **Inference**: Confirms that sucrose is a **non-reducing sugar**.

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5. Barfoed's Test (Test for Monosaccharides)

- **Reagents**: Barfoed's reagent (copper acetate in acetic acid).
- **Procedure**: Add Barfoed's reagent to the sucrose solution and heat in a water bath.

- **Observation**: No red precipitate forms within 2–3 minutes.
- **Inference**: Confirms sucrose is **not a monosaccharide** but a disaccharide.

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6. Hydrolysis Test (Sucrose → Glucose + Fructose)

- **Procedure**: Boil sucrose solution with dilute hydrochloric acid (HCl) and then neutralize with sodium hydroxide (NaOH). Perform Benedict's or Fehling's test on the hydrolyzed solution.
- **Observation**: A brick-red precipitate forms after hydrolysis.
- **Inference**: Hydrolysis breaks sucrose into glucose and fructose, which are reducing sugars.

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7. Seliwanoff's Test (Test for Ketoses – Fructose Detection)

- **Reagents**: Resorcinol and concentrated HCl.
- **Procedure**: Heat sucrose solution with Seliwanoff's reagent.
- **Observation**: A red color appears (due to fructose after hydrolysis).
- **Inference**: Confirms the presence of fructose in sucrose.
