Ministry of Higher education and Scientific Research

Al- Mustaqbal University

College of Science

M.S.C. SAJA JAWAD ABAID

SAJA.JAWAD.ABAID@UOMUS.EDU.IQ

LECTURE (5)

(QUALITATIVE ANALYSIS OF CARBOHYDRATE – LACTOSE)

Qualitative Analysis of Carbohydrate – Lactose

Introduction

Lactose is a disaccharide composed of glucose and galactose, primarily found in milk and dairy products. It is a reducing sugar due to its free anomeric carbon, making it detectable through various qualitative tests.

Objectives of Lactose Analysis

1. Identify the presence of lactose in a given sample.
2. Understand the chemical properties of lactose.
3. Differentiate lactose from other carbohydrates using specific qualitative tests.

Qualitative Tests for Lactose

1. Molisch's Test (General Carbohydrate Test)

Principle: Detects carbohydrates based on dehydration by sulfuric acid, forming a purple-colored compound.

Procedure:

-Add Molisch's reagent (α-naphthol) to the lactose solution.

-Gently pour concentrated H_2SO_4 along the test tube wall.

-A purple ring at the interface indicates the presence of carbohydrates.

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2. Benedict's Test (Reducing Sugar Test)

Principle: Reducing sugars reduce Cu^{2+} ions to Cu^{+}, forming a colored precipitate.

Procedure:

-Add Benedict's reagent to the lactose solution and heat.

-A color change from blue to green, yellow, orange, or brick red confirms a reducing sugar.

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3. Barfoed's Test (Distinguishing Mono- and Disaccharides)

Principle: Monosaccharides reduce cupric acetate faster than disaccharides.

Procedure:

-Add Barfoed's reagent to the lactose solution and heat for 2-3 minutes.

-A delayed red precipitate indicates lactose (as it is a disaccharide).

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4. Seliwanoff's Test (Ketose vs. Aldose Sugar Test)

Principle: Ketoses react faster with resorcinol in acid, forming a red color.

Procedure:

-Add Seliwanoff's reagent (resorcinol + HCl) to the lactose solution.

-Heat the mixture.

-A delayed red color or no reaction indicates lactose (an aldose sugar).

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5. Osazone Test (Lactose Crystal Formation)

Principle: Phenylhydrazine reacts with lactose to form yellow crystalline structures.

Procedure:

-Mix lactose with phenylhydrazine and heat.

-The formation of characteristic "powder puff" or "hedgehog" crystals confirms lactose presence.

THE END

THANK YOU AND GOOD LUCK

حتّى لا تشعر بالحُزن تناسى كُلَّ ما من شأنه
المساس بطمأنينتك كالتفكير بالمستقبل،
صراعاتك ،هزائمك، وتلك الذكريات المسمومة!