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Reactions of Carbohydrates

4. Bial's Test

Objective: 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 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.

Procedure

Put 1 ml of a sample solution in a test tube.

Add 2.5 ml of Bial's reagent (a solution of orcinol, HCl and ferric chloride) to each tube.

Heat the tubes gently in hot water bath for 5 min.

A bluish or green product color indicate the presence of pentose sugar.e.g ribose

5- Seliwanoff's Test

This test is used to distinguish between aldoses (like glucose) and ketoses (like fructose).

Objective:

To distinguish between aldose and ketone sucrose.

Principle:

A dehydration reaction due to the hydroxyl groups of the sugar. Selivanoff's reagent is resorcinol in dilute hydrochloric acid. Ketoses (e.g. fructose) are more readily dehydrated by HCl than the aldoses to form hydroxymethyl furfural which then condenses with resorcinol of Seliwanoff's reagent to form a red colored complex

Procedure

Three ml of seliwanoff's reagent (a solution of resorcinol and hcl) is placed in a test tube.

5 drops of a sample solution is added .

The solution is then heated in a boiling water bath for two minutes.

The +ve result is indicated by the presence of orange to red colored solution.

6- Iodine Test

It is a specific test for polysaccharide detection.

Procedure: To 2-3 ml of starch solution add 2 drops of dilute (0.05 N) iodine solution. Observe the changes on heating and on subsequent cooling.

Observation:

Deep blue color appears which then disappears on heating and then reappears on cooling .

Principle:

Starch forms a adsorption complex with iodine to give a blue color. The blue color disappears on heating due to the breaking of the Iodine starch adsorption complex and appears on cooling due to reformation of the adsorption complex

Test	objective
Molisch test	To identify the carbohydrate from other macromolecules lipids and proteins
Benedict's test	Benedict's reagent is used as a test for the presence of reducing sugars.
Barfoed’s Test	To distinguish reducing monosaccharides
Bial’s Test	To distinguish between pentose monosaccharide and hexose monosaccharide
Seliwanoff's Test	To distinguish between aldose and ketone sugars
Iodine test	To distinguish polysaccharides


Thanks