Laboratory protocol for carbohydrates

Science, Chemistry

For polysaccharide extract a. Repeat procedure A. 2a – A. 2d with 10 mL of the polysaccharide extract from Expt. 6 but use 10 drops conc. HCl. B. General Tests for Carbohydrates Test the ff. carbohydrate solutions: 1% glucose, fructose, maltose, sucrose, lactose, agar-agar, gum arabic, glycogen, cotton, starch, polysaccharide solution from clams, and all hydrolysates from

Part A - Molisch Test

- Add 2 drops Molisch reagent to 1 mL sugar solution. Mix thoroughly.
- Incline the tube and gently pour 3 mL conc H2SO4 down the side of the tube.
- Note the color at the interface of the 2 layers.

Benedicts's Test

Add 1 ml of the solution to be tested to 5 ml of Benedict's solution, and shake each tube. Place the tube in a boiling water bath and heat for 3 minutes. Remove the tubes from the heat and allow them to cool. Note precipitation, if there is any, and the color of the precipitate formed.

Barfoed's Test

- Add 1 ml of the solution to be tested to 3 ml of freshly prepared Barfoed's reagent.
- Place test tubes into a boiling water bath and heat for 3 minutes.
- Remove the tubes from the bath and allow to cool.

Do not heat the tubes longer than 3 minutes, as a positive test can be obtained with disaccharides if they are heated long enough.

Lasker and Enkelwitz Test

- Add 1 ml of the solution to be tested to 5 ml of Benedict's solution in a test tube and mix well.
- Heat the test tube in a 55 oC water bath for 20 minutes.
- Note changes after 10 mins and up to 20 mins.

Orcinol Test

- Add 1 ml of the solution to be tested to 3 ml of Orcinol reagent.
- Gently heat the tube to boiling. Allow the tube to cool.
- Note color of the solution or if there is any precipitate formed.

Mucic Acid Test

- Add 10 drops conc HNO3 to 3 ml of the solution to be tested and mix well.
- Heat on a boiling water bath until the volume of the solution is reduced to about 1 ml.
- Remove the mixture from the water bath and let it cool in an ice bath.
- Note the formation of crystals, if any.

Caution: Perform the reaction under a fume hood.

Iodine Test for Starch and Glycogen

Add 2 drops of Lugol's iodine solution to 10 drops of solution to be tested in a spot plate. Note color changes.

Post-Lab Questions:

1. Correlate the results of the iodine test on the polysaccharides with their structures.

2. Correlate the results of the tests on cotton with the structure of cellulose.
3. Give the balanced chemical equation, the positive result and the product/s responsible for the positive result of each color reaction test.
4. Conclude on the type of carbohydrate in your polysaccharide extract based on the results of its color reactions.