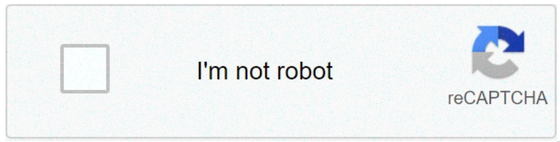

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How to prepare seliwanoff reagent

Seliwanoff’s test is a biochemical test devised by the Russian chemist Theodore Seliwanoff in 1887. The main objective of the test is to distinguish Aldoses from ketose sugars. If the sugar contains a ketone group, it is a ketose while if it contains an aldehyde group, it is an Aldose. Principle The test relies on the principle that on treatment with acid, ketoses are more rapidly dehydrated than Aldoses. The acid hydrolysis of polysaccharide and oligosaccharide ketoses yields simpler sugars followed by furfural. The dehydrated ketose then reacts with two equivalents of resorcinol in a series of condensation reactions to produce a molecule with a deep cherry red color. When Seliwanoff reagent is added to a solution containing ketoses, a red color is formed rapidly indicating a positive test. When added to a solution containing Aldoses, a slower forming light pink is observed instead. Seliwanoff’s Reagent Test solution: 5% Glucose, 5% Sucrose, 5% FructoseSeliwanoff’s reagent (0.5% resorcinol in 3N HCl)Water bathPipettesDry test tubes Procedure Take 1ml of sample in test tube and take 1ml of distilled water in another tube as control.Add 3ml of Seliwanoff’s reagent in both test tubeKeep the test tubes in water bath for between 1-2 minutes.Look for the development of red color. Note: If the reaction is allowed for longer time, Aldoses also produce positive results. Seliwanoff’s Test Result Interpretation Positive Seliwanoff’s Test: If the color changes to red, then your result is positive and keto sugar (Fructose and Sucrose) is present inside the solution.Negative Seliwanoff’s Test: If no red color appears or if a faint pink color appears, you’re your result is negative and Aldose sugar (Glucose) is present in the solution. Seliwanoff's test used to distinguish sugars that included ketose or aldose. Aldose sugars have an aldehyde group, while ketose have a ketone group. So if heated, ketose is faster dehydrated than aldose. HCl in the seliwanoff’s reagent will dehydrate sugar into furfural which will react with resorcinol to form a cherry red solution. With this test, ketose sugars such as fructose will result in cherry red color, while the aldose sugars like glucose will give a negative result with no red color appearing in the solution. However, if the heating is not in accordance with the procedure (over 5 minutes), aldose sugar will sometimes produce a pink color. While the sucrose (a combination of fructose and glucose) will produce a cherry red color because of the fructose in it. seliwanoff's test reaction Seliwanoff's test reaction The reaction occurs: HCl dehydrate sugar ketosa forming furfural. Furfural reacts with resorcinol (seliwanoff’s reagent) forming the cherry red color of solution. Material and reagents: Seliwanoff’s reagent (Dissolve 34 ml of HCl in 68 ml of distilled water, add 0.15 g resorcinol) Material to be tested Work steps: Enter 5 ml of seliwanoff's reagent into a test tube. Add 1 ml of material to be tested. Heat in boiling water (water bath) for 5 minutes. Observe the color change appears. Note: This test was discovered by Russian chemist named Theodore Seliwanoff in 1887. This test is popularly used in the test carbohydrate qualitatively, to determine the type of sugar that were tested include ketose or aldose. When showing cherry red color solution, it means sugar that be tested is / contains ketose sugars. April 24, 2018 Gaurab Karki Tests, tests for carbohydrates 0 Seliwanoff’s test is used to distinguish aldoses from ketoses. On treatment with conc. Acid, ketoses are dehydrated more rapidly to give furfural derivatives and on condensation with resorcinol give cherry red complex. The test will be answered by fructose, sucrose and other keto containing carbohydrates. Reagents: test solution: 5 % Glucose, 5 % Sucrose, 5 % Fructose. Seliwanoff’s reagent (0.5% resorcinol in 3N HCl) Water bath Pipettes Dry test tubes Procedures Take 1ml of sample in test tube and take 1ml of distilled water in another tube as control. Add 3ml of Seliwanoff’s reagents in both test tube Keep the test tubes in water bath for 1-2 minutes. Look for the development of red color. **If the reaction is allowed for longer time, aldoses also produce positive results. Result Interpretation of Seliwanoff’s test: Positive seliwanoff’s test: Fructose and sucrose Negative seliwanoff’s test: glucose, distilled water 2. Bial’s Test: Principle, reagents, Procedure and result Principle of Bial’s test: Bial’s test is useful in distinguishing pentoses sugar from hexoses sugars. Pentosses (such as ribose sugar) form furfural in acidic medium which condense with orcinol in presence of ferric ion to give blue green colored complex which is soluble in butyl alcohol. Reagents: test reagent: 5 % Glucose, 5 % Ribose, 5 % Fructose Bial’s reagent Water bath Dry test tubes Pipettes Procedures of Bial’s test: Take 2ml of Bial’s reagent in test tube. Add 4-5 drops of test solution to this reagent. Keep in water bath for 30 seconds. Look for the development of bluish green color. Result interpretation for Bial’s test: Positive Bial’s test: formation of blue color (eg. Ribose sugar) Negative Bial’s test: formation of any other color indicates negative test. Hexose sugar (glucose, fructose) generally gives green, red or brown color product. 3. Iodine Test: Principle, reagents, Procedure and Result Principle of Iodine test for carbohydrate: Starch when reacted with I2 forms absorbed compound that gives blue color. On heating or on addition of alkali like NaOH or KIH, color disappears. This reaction is only physically association where I2 traps in the coiled structure of polysaccharide. On heating or on addition of alkali; the coiled structure becomes linear and the I2 molecules are released and the color disappears. The test will be answered by fructose, sucrose and other keto containing carbohydrates. Reagents 5 % Glucose, 5 % Sucrose, 5 % Fructose, 5 % Starch Iodine solution Water bath Dry test tubes Pipettes Procedure for Iodine test for carbohydrate Take 2ml of sample in test tube and take 2ml of distilled water in another tube as control. Add 5 drops of iodine solution to all the tubes. Look for the development of blue color. Heat the solution, the blue color will disappear and on cooling the color reappears. Result interpretation of Iodine test: Positive iodine test: dark blue color (starch) Negative iodine test: glucose, fructose and sucrose 1. Qualitative tests forcarbohydrates
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2. I. Fragmentation With Strong Acid
SELIWANOFF TEST
II. Reduction of Metallic Ions By Sugars
BENEDICT’S TEST
3. 4. SeliwanofftestIntroductionprocedureresults && discussionapplications
Fragmentation with strong acid
5. introduction
“Many carbohydrates can be identified using condensation reagents, which react with the carbohydrates to produce highly colored products.
Often the carbohydrate is initially dehydrated into smaller saccharide units, using a dehydrating acid.
The smaller the units or molecules, formed will produce a more highly colored complex with the condensation reagent, as in Molisch's, Bial's and Seliwanoff's tests.”
6. introduction
A biochemical test to identify the presence of ketonicsugars in solution. 7. F. F. Seliwanoff 8. A few drops of the reagent, consisting of resorcinol crystals dissolved in equal amounts of water and hydrochloric acid, are heated with the test solution and the formation of a red precipitate indicates a positive result.proceDure
To 3 ml of Seliwanoff's reagent, Add 0.5 ml of the test solution heat the mixture in a boiling water bath for 10-15 minutes.
2. Observe the production of a red color or a
brownish-red precipitate and the rate of its
appearance.
9. proceDure
CONDITIONS TO BE OBSERVED IN PERFORMING THE TEST:
A. The concentration of HCl must not be more than 12 %
B. The reaction must be observed after not more
than 20-30 seconds of boiling
C. Glucose must not be present in amounts exceeding 2%
10. results &&Discussion
Proposed resulT :
A ketone hexose, also called a ketohexose, will form a deep red color when reacted with Seliwanoff's reagent.
An aldehyde hexose, also called a aldohexose, will show a light pink color that takes a longer time to develop when reacted with Seliwanoff's reagent.
Ketose --> dehydration product --> cherry-red product (within 2 minutes)
11. results &&Discussion
12. results &&Discussion
13. results &&Discussion
Used to distinguish between aldehyde and ketone hexosesSeliwanoff's test uses:
12% hydrochloric acid as the dehydrating acid
5% resorcinol as the condensation reagent
14. results &&Discussion
The acid hydrolysis of polysaccharides and oligosaccharides yields simpler sugars. 15. The dehydrated ketose then reacts with the resorcinol to produce a deep cherry red color. 16. Aldoses may react slightly to produce a faint pink color. 17. Fructose and sucrose are two common sugars which give a positive test. 18. Sucrose gives a positive test as it is a disaccharide consisting of fructose and glucose. results &&Discussion
The test reagent dehydrates ketohexoses
to form 5-hydroxymethylfurfural.
19. results &&Discussion
Aldohexose reacts more slowly
to give 5-hydroxylmethylfurfural
20. results &&Discussion
(Aldohexoses)
Once 5-hydroxylmethylfurfural is produced, it reacts with resorcinol to give a dark red condensation product.
Sucrose hydrolyzes to give fructose, which eventually reacts to produce a dark red color.
21. Benedict’s testIntroductionprocedureresults && discussionapplications
reduction of metallic ions by sugars
22. introduction
“Reducing sugars are oxidized by copper (II) ions in two other saccharide test solutions: Benedict's reagent, a mildly basic solution and Barfoed's reagent, a mildly acidic solution. The presence of red copper (I) oxide precipitate indicates that the saccharide has reduced the copper (II) ions.”
23. introduction
One liter of Benedict's solution contains: 173 grams sodium citrate
100 grams sodium carbonate
17.3 grams cupric sulfatepentahydrate.
Benedict's solution or Benedict's test 24. Stanley Rossiter Benedict. introduction
Benedict's reagent is used as a test for the presence of reducing sugars.
Benedict's test will detect the presence of aldehydes (except aromatic ones), and
alpha-hydroxy-ketones, including those that occur in certain ketoses.
25. proceDure
Take 3 mL of Benedict’s solution in a test tube and boil vigorously for about one minute
Add 8 drops of test solution and continue boiling for another 2 minutes.
26. results &&Discussion
Proposed resulT :
During a water bath, which is usually 4–10 minutes, the solution should progress in the colors of blue (with no glucose present), green, yellow, orange, red, and then brick red or brown (with high glucose present).
27. results &&Discussion
Proposed resulT :
28. results &&Discussion
29. results &&Discussion
30. results &&Discussion
Shows positive test for:
Reducing sugars
 Reactions:
Reducing sugars are oxidized by the copper ion in solution to form a carboxylic acid and a reddish precipitate of copper (i) oxide. 31. ketose fructose is strictly not a reducing sugar and gives a POSITIVE TEST. results &&Discussion
A colour change would signify the presence of glucose. 32. The common disaccharides lactose and maltose are directly detected by benedict's reagent, because each contains a glucose with a free reducing aldehyde moiety, after isomerization. 33. Ketose fructose is an alpha-hydroxy-ketone, and gives a positive test because it is converted to the ldoses glucose and mannose by the base in the reagent. results &&Discussion
Sucrose contains two sugars (fructose and glucose) joined by their glycosidic bond in such a way as to prevent the glucose isomerizing to aldehyde, or the fructose to alpha-hydroxy-ketone form. 34. Sucrose is thus a non-reducing sugar which does not react with benedict's reagent. results &&Discussion
Sucrose indirectly produces a positive result with Benedict's reagent if heated with dilute hydrochloric acid prior to the test, although after this treatment it is no longer sucrose. 35. The acidic conditions and heat break the glycosidic bond in sucrose through hydrolysis. The products of sucrose decomposition are glucose and fructose, both of which can be detected by benedict's reagent, as described above. results &&Discussion
36. results &&Discussion
Benedict's test uses a mixture of copper (II) sulfate, sodium citrate, and sodium carbonate in a mildly basic solution.
If the saccharide is a reducing sugar, it will reduce the copper (II) ions to copper (I) oxide, a red precipitate.
37. results &&Discussion
Alkaline solutions of copper are reduced by sugars having a free aldehyde or ketone group. the citrate will form soluble complex ions with Cu++, preventing the precipitation of CuCO3 in alkaline solutions.
38. applications
1) Diabetes Urine Test - Benedict's Test
 This is a very simple and effective method of ascertaining the presence or the amount of glucose in the urine and can be done by the diabetic himself.

Perform the test two hours after a meal.
In the initial stages of the disease, a diabetic does not lose sugar in his urine, when on empty stomach.
Hence if the benedict's test is performed in the fasting state, it is possible to miss the diagnosis of the disease.
Even if sugar is detected in the urine by benedict's test, the diagnosis of diabetes should be confirmed by blood-analysis.
39. applications
Apparatus:
Benedict's solution
Dropper, Test-tube, Test-tube holder.
Procedure:
1. Take 5 ml (one teaspoon) of Benedict's solution in the test-tube.
2. Holding the test-tube with the holder, heat it over a spirit lamp till the Benedict's Solution boils without overflowing.
3. Drop 8 to 10 drops of urine into the boiling Benedict's solution.
4. After again boiling the mixture, let it cool down.
5. While cooling, the mixture changes colour.
6. The colour of the mixture serves as a guide to the amount of sugar in the urine : blue-sugar absent; green-0.5% sugar; yellow-1% sugar; orange-1.5% sugar; brick red-2 % or more sugar.
40. applications
2)Benedict's test on Beer.
Beer contains mainly water and some but apart from these substances a large number of other biomolecules. These molecules [including derivatives of ethanol and higher alcohols like 2-methylbutanol] are there because they are synthesized during the beer production process or are being produced during storage. 41. Staling of beer, resulting in a bad taste is due to the deterioration of some of the components naturally present in beer. These reactions are initiated by light and catalyzed by e.G. Riboflavin, one of these components in beer. 42. Ultimately the beer contains degradation products like aldehydes, ketones, [furfural, acetone, trans-2-butenal and trans-2-nonenal] oxidized lipids, and so on. 43. The reason that beer gives a positive a positive reaction in the benedict test is that the beer contains these compound that react with the reagent. These compound may be remaining sugar and the other components like aldehydes and ketones. references

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