BENEDICT'S TEST

Qualitative or quantitative test for reducing sugars

Background

Benedict's solution reacts with reducing sugars on heating and reduces the Cu(II) ion to Cu(I) producing a precipitate of red copper oxide. The resulting colour change depends on the type and concentration of sugar, so this test can be used semi-quantitatively to indicate approximate concentrations.

An alternative version of Benedicts reagent for quantitative testing (QBS) contains potassium thyocyanate and does not form red copper oxide. Instead the presence of reducing sugar is measured by the loss of the blue colour of copper sulphate and a white precipitate is formed which will settle out or can be removed by filtration before measuring the colour of the filrate.

Using a colorimeter you can obtain accurate, fully quantitative determinations of concentration down to 0.001M, (180µg of glucose/cm^3). This is about 5 times lower than the concentrations detectable with test strips.

Lower concentrations can be detected rather more easily and in smaller volumes using DNSA reagent.

SAFETY

WEAR EYE PROTECTION
TAKE CARE WITH BOILING WATER

Benedicts reagent	**Quantitative Benedicts reagent**
Solution 1 Sodium citrate 86.5g Sodium carbonate (anhydrous) 50g Dissolve in 400mls H_2O Solution 2 Copper sulphate.$5H_2O$ 8.7g Dissolve in 50mls H_2O. Add 2 to 1 with rapid stirring then dilute to 500mls Positive result on boiling with reducing sugars *The stock solution does not require a hazard warning label.*	Solution 1 Sodium citrate 100g Sodium carbonate (anhydrous) 32.5g Potassium thiocyanate 62.5g Dissolve in 400mls H_2O Solution 2 Copper sulphate.$5H_2O$ 9g Dissolve in 50mls H2O. Add 2 to 1 with rapid stirring Add 0.13g potassium hexacyanoferrate (II) then dilute to 500mls For colourimetric use dilute 35mls of this solution to 100mls with water. *The stock solution does not require a hazard warning label.*

Methods

Qualitative

- Add about $5cm^3$ of the reagent to a small amount of sample in a test tube.
- Stand the test tube in boiling water for a few minutes.
- A colour change through green to yellow, brown and finally to red indicates the presence of reducing sugar.

Quantitative

- Add $2cm^3$ of QBS to $4cm^3$ of sample in a test tube.
- Stand the test tube in boiling water for 5 minutes
- Allow the tubes to stand until the precipitate settles, or filter to remove the precipitate.
- Measure the absorbance using red light

More details and sample results can be viewed on the Mystrica website, www.mystrica.com