

Date: 8th october,
2012

[Science](#), [Chemistry](#)



DATE: 8th October, 2012 SYLLABUS TOPIC: Food Tests — Semi Quantitative

Test AIM: To determine the concentration of glucose present in an unknown sample, using a semi quantitative glucose test APPARATUS AND MATERIALS:

4% stock solution of glucose, water, 6 test tubes, ruler, water bath, solution of unknown concentration (Sample A), Benedict's reagent METHOD: 1.

Solutions of different concentration were made from the stock solution and placed in test tubes. 2. All test tubes were labeled appropriately, according to table below, and Benedict's test was carried out on the various dilutions for 5 minutes. 3. The colours of the solution were observed and heights of precipitate formed were recorded. The test tubes were placed in a rack and put aside to be used as a colour standard for comparison. 4. Benedict's test

was carried out on sample A. 5. Solution formed was compared to solutions of known concentrations to find the concentration range in which sample A fell. RESULTS AND OBSERVATIONS: Test Tube | Concentration / % | Volume

of stock / cm³ | Volume of water / cm³ | Height of precipitate / mm | Colour Change | 1 | 4 | 5 | 0 | 10 | Blue to Red | 2 | 1.5 | 7.5 | 12.5 | 7 | Blue to Dark Orange | 3 | 1 | 2.5 | 7.5 | 5 | Blue to Orange | 4 | 0.5 | 2.5 | 17.5 | 4 | Blue to Light Orange | 5 | 0.25 | 2.5 | 37.5 | 3 | Blue to Yellow | Sample A |

Unknown | Unknown | Unknown | 9 | Blue to Red | TABLE SHOWING

CONCENTRATIONS OF SOLUTIONS AND HEIGHT OF PRECIPITATE **A

multiplication of X2 was used for solutions 3 **A multiplication of X4 was

used for solution 2 and 4 **A multiplication of X8 was used for solution 5

CALCULATIONS: Solution 2 Initial Volume (V1) x Initial Concentration (C2) = Final Volume (V2) x Final Concentration (C2) 4 V = 5 x 1.5 4 V = 7.5 V = 1.

875 cm³ Volume of water = 5 -1.875 = 3.125 Using a multiplication factor

of X4: Volume of stock solution = $1.875 \times 4 = 7.5 \text{ cm}^3$ Volume of water = $3.125 \times 4 = 12.5 \text{ cm}^3$ Solution 3 Initial Volume (V_1) x Initial Concentration (C_1)

= Final Volume (V_2) x Final Concentration (C_2) $4 \text{ V} = 5 \times 1.4 \text{ V} = 5 \text{ V} = 1.25 \text{ cm}^3$ Volume of water = $5 - 1.25 = 3.75$ Using a multiplication factor of X4:

Volume of stock solution = $1.25 \times 2 = 2.5 \text{ cm}^3$ Volume of water = $3.75 \times 2 = 7.5 \text{ cm}^3$ DISCUSSION: There was a colour change for each Benedict's test

performed, which means that the concentration of sugar does not affect whether the Benedict's test works, but the difference in colour intensity and precipitate height for each test tube shows that concentration does affect the results. From the results, one can see the more concentrated the solution the greater the precipitate and the more intense the colour of the solution.

Comparing the height of the precipitates of the solutions of known concentrations as well as their colours, the concentration of Sample A was obtained. The height of the precipitate formed by Sample A (9mm) was a little less than the precipitate of solution 1 (10mm) and they were nearly identical in colour, therefore one can estimate the concentration of Sample A as between 1.5% - 4%

In a semi-quantitative test, the ratio of the substances in a mixture can be found, but not the amount of any of the substances. In a quantitative test the exact amount of each substance can be obtained. The advantage in semi-quantitative testing is that it is easier and quicker to do as it is simple. The advantage of quantitative testing is it is more in depth than semi-quantitative testing and by knowing the exact amount of substances in a mixture you can calculate the ratio. This test can be improved by removing the precipitate from the solution, drying and weighing it and then comparing the masses. This gives a more accurate

measurement to compare. The masses recorded can be plotted on a graph against the concentration of glucose and the concentration of glucose in any substance can be found by drawing a line from the mass to the gradient and then to the corresponding concentration. PRECAUTIONS: 1. Test tubes were heated in a water bath and not directly with a Bunsen burner. 2. Solutions were left alone for a period of time to allow precipitates to settle properly. 3. Test tubes were labeled to ensure correct observations were made.

LIMITATIONS: 1. As it was a semi-quantitative test the exact concentration of solution could not be obtained. SOURCES OF ERROR: 1. There may have been small errors in the measuring of solutions. CONCLUSION: The concentrations of sugar in solutions affect the amount of precipitate formed and the colour change when the Benedict's test is carried out. Sample A has a concentration of 1.5% - 4%.