

NEATH PORT TALBOT COLLEGE COLEG CASTELL NEDD PORT TALBOT

School of Maths & Science Science Practical

Food Tests

◆ Aim

To carry out a number of tests to identify the main classes of biological molecules.

◆ Introduction

A series of simple biochemical tests can be used to identify carbohydrates, proteins and lipids.

◆ Safety



Control Measures

- The wearing of safety glasses and a laboratory coat at all times will be sufficient to take account of most hazards and significant risks.
- Avoid skin contact with chemicals.
- Keep stoppers on bottles as much as possible.
- Keep flammable liquids away from flames.
- All waste is to be placed in the labelled container immediately after use.
- You are reminded of the need for good laboratory practice in order to maintain a safe working environment.

Hazards



Highly Flammable

Ethanol



Harmful

Ethanol

Irritant

Hydrochloric acid
Sodium Hydroxide

◆ Procedures

BIOCHEMICAL TESTS FOR CARBOHYDRATES

A. Test for reducing sugar

Method

1. Bring the water in the water bath (i.e. beaker of water heated by Bunsen burner) up to boiling point and turn down the source of heat.
2. Take 2cm³ of the solution to be tested (e.g. glucose) and add 2cm³ of Benedict's reagent. Mix the reagents thoroughly.
3. Place the test tube in the water bath and leave for 5 minutes, shaking occasionally.

Results

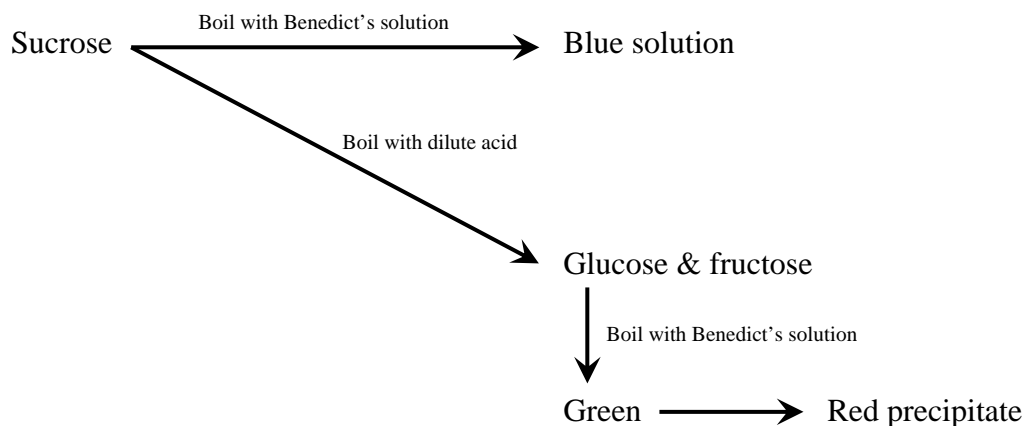
If a reducing sugar is present, a precipitate will be formed. The test is partially quantitative; the more reducing sugar, the greater the amount and the darker the colour of the precipitate.

| <u>Amount of reducing sugar</u> | <u>Colour of solution or precipitate</u> |
|---------------------------------------|--|
| No reducing sugar | Blue solution |
| Increasing quantity of reducing sugar | Green Yellow Brown Red |

B. Test for non-reducing sugar

Information

There is no specific test for a non-reducing sugar. It can, however, be hydrolysed by boiling with dilute hydrochloric acid, into its constituent monosaccharides. These will then reduce Benedict's reagent in the normal way. A non-reducing sugar is thus identified by a negative reaction to Benedict's reagent **before** hydrolysis and a positive result **after** hydrolysis.



Method

1. Carry out the reducing sugar test.
2. Add 1cm³ of dilute hydrochloric acid to a **fresh** sample of 2cm³ of the solution to be tested e.g. sucrose, mix the solution and **boil for 2-3 minutes**.
3. Add sodium hydrogen carbonate **slowly** until the solution is neutral or slightly alkaline. Use pH paper to test for this. (N.B. if the NaHCO₃ is not added slowly, effervescence may be so brisk that some liquid will splash out of the tube.)
4. Carry out the reducing test again.

Results

A negative result (blue solution) after the first reducing sugar test, followed by a positive result (precipitate) after the second reducing sugar test, is an indication of a non-reducing sugar.

C. Test for starch

(This test must be carried out at room temperature. Do **not** boil the solution.)

Method

1. Place two drops of the solution to be tested in a depression in a spotting tile.
2. Add a drop of iodine/potassium iodide solution (iodine reagent).

Results

If starch is present, the yellow orange iodine reagent becomes a blue-black colour.

BIOCHEMICAL TESTS FOR PROTEINS AND LIPIDS

A. Test for proteins: the biuret test

(This test should be carried out at room temperature.)

Method

1. To 2cm³ of the solution being tested e.g. albumin, add 2cm³ of 0.4 mol / dm³ sodium hydroxide solution and shake the tube to mix the contents.
2. Add 0.2 mol / dm³ copper sulphate solution **a drop at a time**, shaking the tube continuously. Do not exceed 10 drops.
3. Repeat procedures 1 and 2 using water as a control instead of the test solution.

Results

The presence of a protein is indicated by a purple/mauve colouration. The control remains clear, or very slightly blue. (Positive results are sometimes obtained with non-protein material.)

B. Tests for lipids: Emulsion test

Method

1. Place 2cm³ of the oil in a test tube and add 5cm³ of ethanol.
2. Shake the tube thoroughly until all the oil is dissolved.
3. Add 5cm³ of water and shake gently.
4. As a control, repeat procedures 1 - 3 using water instead of oil.

Results

A milky suspension indicates the presence of a lipid.