REQUIRED PRACTICAL 4
FOOD TESTS

Using qualitative reagents to test for the presence of carbohydrates, lipids and proteins in food samples. These can be used to identify the food groups of a pre-prepared sample of foods.


Protein


Lipids


Sugars (glucose) or starch

Qualitative Tests → Test for presence of key biological molecules

Benedict's Test

Test for glucose (sugars)

Method:

1) Set up a Bunsen burnerwater bath.
2) Put some of the food sample into a test tube.
3) Add a few drops of Benedict's solution to the test tube.
4) Put the test tube in the water bath and heat at a temperature higher than 80°c for 5 minutes.
5) Note down any colour change in your table of results.

Equipment


Pre-prepared food samples


Traditional water bath (water and Bunsen burner)


Benedict's solution


Pipettes


Thermometer


Test tube for each food item

- Positive result - Green - Brick red
- Negative result - Light blue (no change)

Iodine Test


Test for starch

Method -

1) Put some of the food sample into a test tube.
2) Add a few drops of iodine solution.
3) Note any colour change in your results table.

Equipment

- Positive result - Blue-black
- Negative result - Orange-brown (no change)

Preparing samples

This increases the surface area of food samples

1. Break up the food using a pestle and mortar
2. Transfer to a test tube and add distilled water.
3. Stir the mixture with a glass rod.
4. Filter the mixture with a funnel and filter paper.

Recording data

Name of food tested	Colour with Benedict's solution	Colour with iodine solution	Cloudy layer with ethanol?	Colour with Biuret solution
Olive oil	Blue	Orange	✓	Blue
Caster sugar	Red	Orange	✗	Blue
Biscuit	Yellow	Orange	✓	Blue
Tofu	Blue	Orange	✗	Purple
Potato	Blue	Blue-black	✗	Blue

Concluding statement (e.g. Biscuit)

"The biscuit contained sugar and lipid because it tested positive in both Benedict's test for sugar (blue -> yellow) and the emulsion test for lipids (an emulsion was created). It did not contain starch because it tested negative in the iodine test (no change in colour). Also, it did not contain protein because the results for the Biuret test were negative (solution stayed blue)."

Hazards


Copper (II) sulfate is an eye irritant

Biuret test

Always wear goggles


Wash skin which gets into contact

Contains sodium hydroxide which is corrosive

Emulsion test

Ethanol is highly flammable

Keep away from Bunsen in Benedict's test /turn off Bunsen burner

Benedict's Test

The flame can result in burns

Always wear goggles, avoid lose clothing

Iodine test

Iodine is an eye irritant

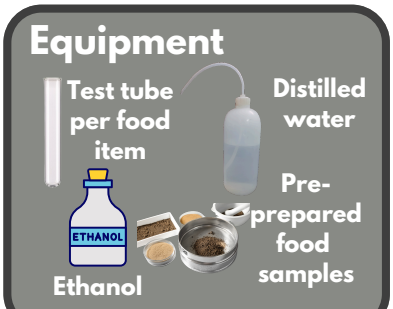
Emulsion Test


Test for lipids

Method:

1) Put some of the food sample into a test tube.
2) Add a few drops of ethanol.
3) Add a equal volume of distilled water.
4) Shake the solution gently.
5) Note down any colour change in your results table.

Equipment



- Positive result - Cloudy emulsion
- Negative result - Colourless (no change)

Biuret Test


Test for proteins

Method:

1) Put some of the food sample into a test tube.
2) Add 1cm³ of Biuret solution A and 1cm³ of Biuret solution B to the test tube.
3) Shake the tube gently.
4) Note down any colour change in results table.

Equipment

- Positive result - Lilac-purple
- Negative result - Blue (no change)

Exam Style Questions - Enzymes

1) Describe how you would test a sample of food to show it contains lipids. Give the reason for any safety precautions you would take. (4 marks)

2) The table below shows information about tests that identify three different types of biological molecule. Complete the table to show the names of the types of molecules that are tested, reagents used and results obtained. (5 marks)

Molecule tested	Reagents	Positive result	Negative result
Lipid	i. _____ _____ ii. _____ _____	iii. _____ _____	Clear liquid
Protein	Biuret solution	iv. _____ _____	Blue
Starch	Benedict's solution	Green - Brick red solution	v. _____ _____

3) Describe the test that is used to indicate the presence of starch. State the observation that would be made if starch was present. (2 marks)

Description of test - _____

Observation if starch is present - _____

4) The table below shows the results of qualitative tests on a unknown food sample A. Explain what conclusions can be made from the information in the table. (2 marks)

	Colour with Benedict's solution	Colour with iodine solution	Cloudy layer with ethanol?	Colour with Biuret solution
Food sample A	Light Blue	Orange	Yes	Blue

5) Describe the test you would use to find out if protein is present in food. (2 marks)

Exam Style Questions - Food Tests (Answers)

1) Describe how you would test a sample of food to show it contains lipids.
Give the reason for any safety precautions you would take. (4 marks)

Level 2 (3-4 marks): Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

- **Must contain reference to ethanol, a positive result (cloudy emulsion) and a reason for a safety precaution**

Level 1: (1-2 marks): Facts, events or processes are identified and simply stated but their relevance is not clear.

Indicative content:

- **Grinding up the food**
- **Add distilled water and ethanol reagent (allow C6H5OH) to food (sample)**
- **Lipids cause a cloudy emulsion to appear**
- **Wear goggles to protect eyes**
- **Clean up spills immediately**
- **Ethanol is highly flammable**
- **Avoid wearing baggy clothing**

2) The table below shows information about tests that identify three different types of biological molecule.
Complete the table to show the names of the types of molecules that are tested, reagents used and results obtained. (5 marks)

One mark for each correct name:

Molecule tested	Reagents	Positive result	Negative result
Lipid	i. Ethanol ii. Water	iii. Cloudy emulsion	Clear liquid
Protein	Biuret reagent	iv. Lilac/purple solution	Blue solution
Starch	Benedict's reagent	Green - Brick red solution	v. Blue solution

3) Describe the test that is used to indicate the presence of starch. State the observation that would be made if starch was present. (2 marks)

Description of test -
One mark - Add/use iodine (solution)
Observation if starch is present -
One mark - (Orange to) blue-black

4) The table below shows the results of qualitative tests on a unknown food sample A.
Using the information in the table, state what conclusions can be made from the information in the table. (3 marks)

	Colour with Benedict's solution	Colour with iodine solution	Cloudy layer with ethanol?	Colour with Biuret solution
Food sample A	Light blue	Orange	Yes	Blue

One mark for each of the following, up to a maximum of two marks:

- **The food sample contains lipids and proteins.**
- **The qualitative tests for lipids and proteins were positive.**
- **The food sample does not contain sugar or starch.**
- **The quantitative tests for sugars and starch were negative.**

5) Describe the test you would use to find out if protein is present in food. (2 marks)
Mark one - Add Biuret reagent to food sample (allow sodium/potassium hydroxide solution + cooper sulfate)
Mark two - Lilac/purple colour shows protein is present