Tishk International University
Faculty of Applied Science
Nutrition & Dietetics Department

Principles of Food Science

Practical

Tests of ***Carbohydrates, Fats,*** and ***Proteins*** in Given Food Stuffs

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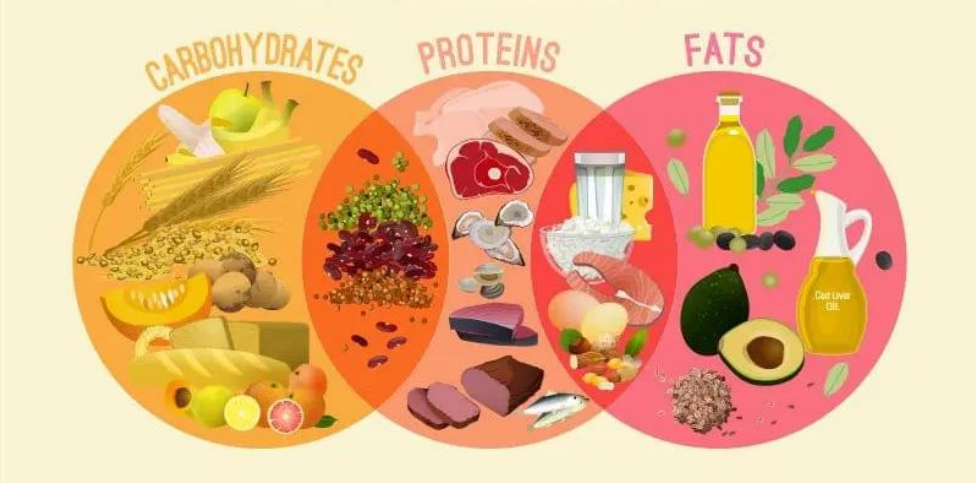
Objectives

- Description of Macromolecules
- Aim
- Test names
- Observation Table

- ✓ Carbohydrates provide energy to cells in the body.
- ✓ Protein is the major functional and structural component of all body cells.
- ✓ Fats and oils are the highest energy sources that contain fatty acids essential for health and are not produced by the human body.

Aim:

- To detect the presence of carbohydrates, fats, and proteins in the given foodstuffs.



1. Test for Carbohydrates

*** Starch Test (Iodine Test)**

Reagent: Iodine solution (iodine in potassium iodide).

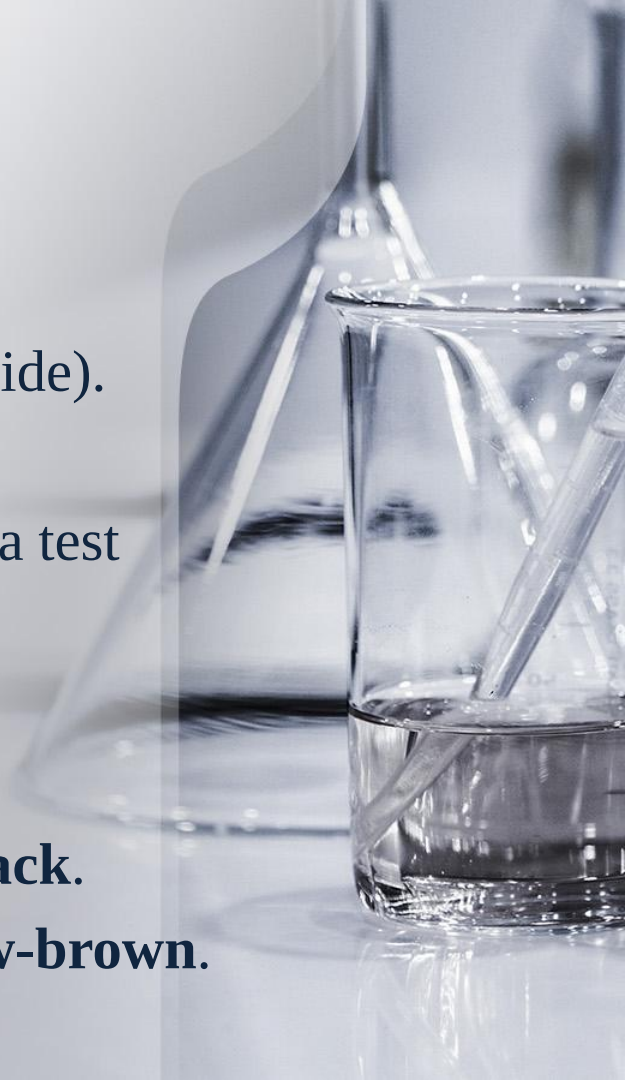
Procedure:

- Take a small amount of the food sample in a test tube.
- Add a few drops of iodine solution.

Observation:

If starch is present, the solution turns **blue-black**.

If starch is absent, the solution remains **yellow-brown**.

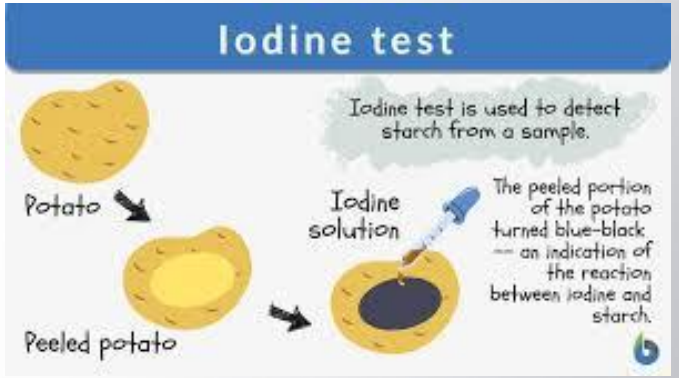


Brown / Yellow

Blue / Purple

Negative Test (starch absent)

Positive Test (starch present)



2. Test for Proteins

***Ninhydrin Test for Proteins (Amino Acids Test)**

The Ninhydrin Test is used to detect free amino acids and proteins that contain free amine ($-NH_2$) groups.

Reagents:

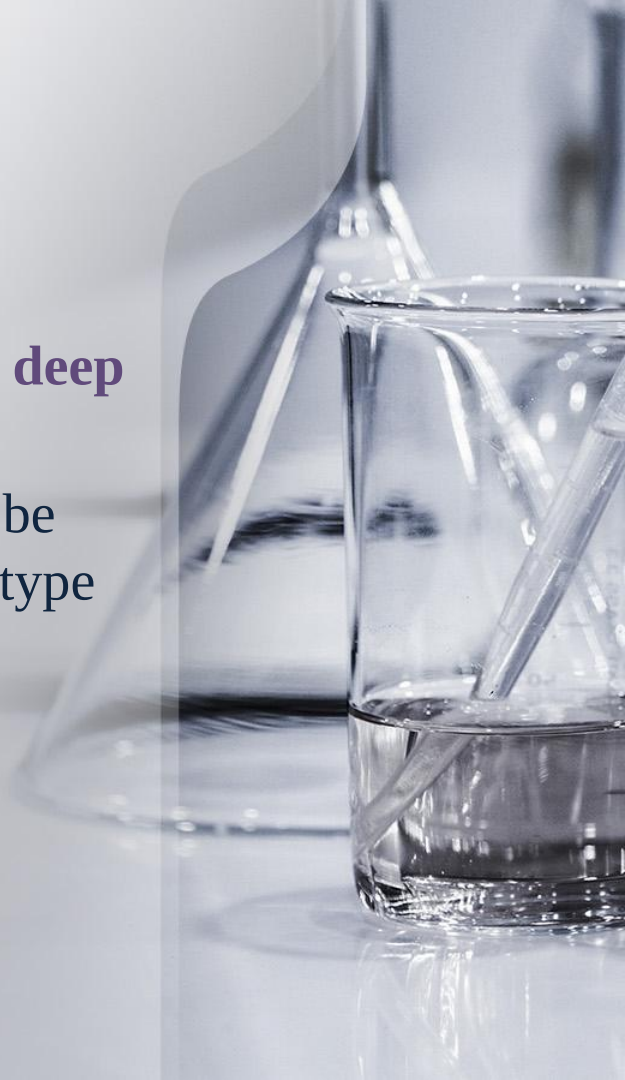
Ninhydrin solution (a chemical that reacts with free amino acids).

Procedure:

- Take a small amount of the food sample or solution containing proteins/amino acids.
- Add a few drops of ninhydrin solution.
- Heat the mixture in a water bath at about 90°C for 2–5 minutes.

Observation:

- If free amino acids are present, the solution turns **deep blue or purple** (Ruhemann's purple).
- If peptides or proteins are present, the color may be yellow, brown, or faint purple, depending on the type of protein.
- No color change means **absence** of amino acids/proteins.



Negative
Ninhydrin Test

Amino acid
Absent

Positive
Ninhydrin Test

Amino acid Present

Purple-colored
complex present

Proline present

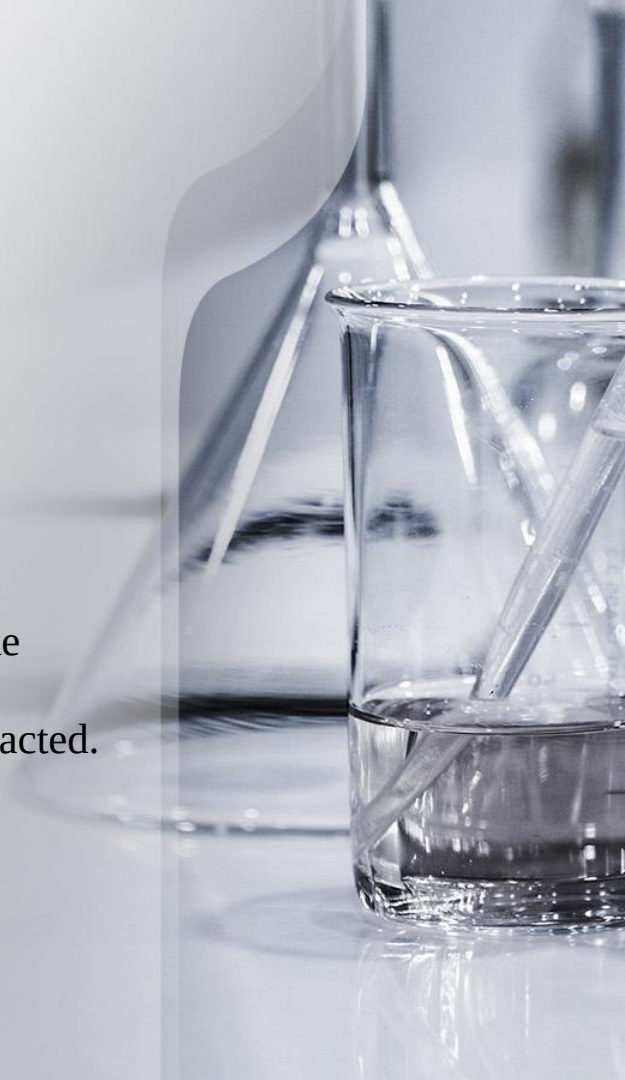
3. Test for Fats (Lipids)

***Emulsion Test (Ethanol Test):**
Reagents: Ethamol and H2O.

Procedure:

Solid Sample:

1. **Crush** the food sample and place it in a dry test tube.
2. **Add ethanol** to about 2 ml above the level of the sample and shake thoroughly.
3. Allow the solid to **settle** (about 3 min) to allow the lipid to be extracted.
4. **Decant** the ethanol into another test tube.
5. Add 2 ml of **deionized water** to the second test tube
6. Make observations.

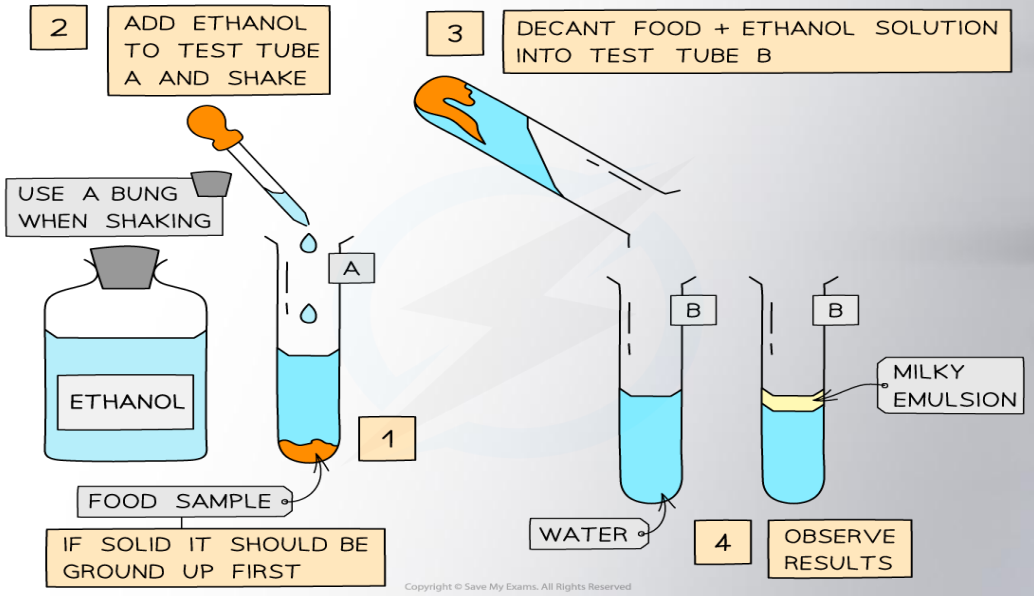


Liquid Sample:

1. Add a **few drops** of the liquid food sample to a dry test tube.
2. Add 2 ml **ethanol** and shake it thoroughly
3. Add 2 ml of **deionized water**.
4. Make **observations**.

Observation

A **milky-white emulsion** indicates the presence of fats.
No emulsion means **absence of fats**.



Sample	Carbohydrates	Proteins	Oils and Fats