To Study Some Simple Tests Of Oils & Fats

Requirements

Chloroform, ethyl alcohol, $KHSO_4$ crystals, furfural solution, Huble's solution, desi ghee, vegetable ghee and refined oil.

Procedure

1. Solubility Test

This test is based on the fact that oils and fats are soluble in organic solvents like chloroform, alcohol, etc., but are insoluble in water. Shake a small amount of given sample with 5 ml each of water, alcohol and chloroform in three test-tubes and observe the solubility and draw inferences
as follows:

Test-tube	*Solvent*	*Observations*	*Inference*
1.	Water	(*i*) Sample is *immiscible.*	Oil or fat present.
		(*ii*) Sample is *miscible.*	Oil or fat absent.
2.	Alcohol	(*i*) Sample forms lower layer, which *dissolves on heating.*	Oil or fat present.
		(*ii*) Sample *does not dissolve* even on heating.	Oil or fat absent.
3.	Chloroform	(*i*) Sample is *miscible.*	Oil or fat present.
		(*ii*) Sample is *immiscible.*	Oil or fat absent.

2. Transluscent Spot Test

Press a little of the substance in the folds of the filter paper. On unfolding the filter paper, the appearance of transluscent or greasy spot on the filter paper indicates the presence of fat or oil. The spot grows larger on heating and drying the filter paper.

3. Acrolein Test

Heat a little of the sample with some crystals of $KHSO_4$ in a test-tube. A pungent irritating odour of acrolein confirms the presence of fat or oil.

$$\text{Oil or fat} \xrightarrow{\Delta} \text{Glycerol} + \text{Fatty acid}$$

$$\underset{\text{Glycerol}}{\begin{matrix}CH_2OH\\ |\\ CHOH\\ |\\ CH_2OH\end{matrix}} \xrightarrow[\Delta]{KHSO_4} \underset{\text{Acrolein}}{\begin{matrix}CH_2\\ \|\\ CH\\ |\\ CHO\end{matrix}} + 2H_2O$$

4. Baudouin Test

This test is applied to distinguish between desi ghee and vanaspati ghee.
Vanaspati ghee contains 5% seasame oil. Pure desi ghee does not contain seasame oil. Shake 5 ml of melted ghee with 5 ml of cone. HCl and 2-3 drops of 2% furfural solution in alcohol. Keep it aside for 5-10 minutes. Rose red colour appears if seasame oil is present.
This test can be applied to find out whether the given sample of desi ghee contains vanaspati ghee or not.

5. Huble's Test

This test is applied to know degree of unsaturation in the given sample of oil or fat.
Take two test tubes, label them as I and II. Put in each test tube 3 ml of chloroform. Add 3-4 drops of cotton seed oil in test tube no. I and linseed oil in test-tube II. Shake and add 3 drops of Huble's reagent in each test tube and observe the fading of violet colour in test tubes. The violet colour of iodine fades away in test tube II, while, violet colour in test-tube I does not fade away. This indicates that linseed oil is more unsaturated than cotton seed oil.
Preparation of Huble's Solution
Mix equal volumes of 5 to 7% H_gCl_2 in alcohol with 5% solution of iodine in 96% alcohol.

Proteins

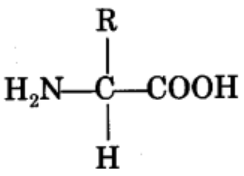
Proteins are high molecular mass, long chain polymers composed of a-amino acids. Proteins are perhaps the most complex organic materials produced in nature. The name protein is derived from Greek and proteins meaning of first importance. Proteins are constituents of cells and hence are present in all living bodies. They contain the elements carbon, hydrogen, nitrogen, oxygen and sometimes phosphorus and sulphur.

Plants build up their proteins from carbon dioxide, water and minerals (ammonium salts and nitrates) in the presence of sun light. Animals derive proteins from plants. The plant proteins are hydrolysed in the presence of enzymes to amino acids in the animals body.

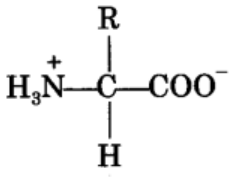
These amino acids are absorbed by blood and are transported to various parts of the body. From these amino acids, the animals proteins are synthesized.

Amino acids are molecules that have both an amino (NH_2) and a carboxylic (COOH) group. The amino acids in proteins are called a-amino adds because they have the amino group attached to the a-earbon atom. a-Amino adds exists as zwitter ions and

are crystalline solids.

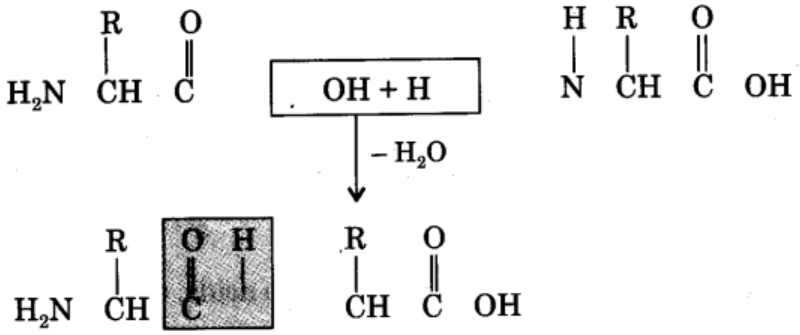


α-Amino acids



Zwitter ion

The amino acids contain an acidic group and a basic group. They undergo condensation as shown below:



Peptide linkage

The —C(=O)—NH—linkage that joins the two amino acid units is called **peptide linkage.** The product formed by the combination of two α-amino acid molecules is called **dipeptide** and with three α-amino acid molecules is called **tripeptide**. A polypeptide contains large number of α-amino acid molecules. *A polypeptide having molecular mass greater than 10000 is called protein.*