Experiment

Aim

To prepare a Colloidal Solution of Egg Albumin.

Theory

Egg albumin which is obtained from eggs forms lyophilic sol with cold water. The sol is quite stable and is not affected by the presence of traces of impurities.

Material Required

Beakers (250 ml and 50 ml), glass rod, funnel, filter paper, pestle and mortar, tripod stand, wire gauze, burner, Egg and distilled water.

Procedure

1. Break the outer shell of the egg by striking it with a glass rod and collect its colourless liquid along with the yellow yolk. Decant the colourless liquid into another beaker. This colourless liquid is known as egg albumin.
2. Prepare 100 ml of 5% solution of sodium chloride in a 250 ml beaker.
3. To this solution add egg albumin in small portions with constant stirring. This process should take 15-20 minutes.
4. Filter the contents of the beaker through a filter paper, fixed in a funnel, and collect the filtrate.
5. Label this filtrate as 'egg-albumin sol'.

Result

An Egg albumin colloidal solution has been prepared.

Precautions

1. The apparatus used for preparing the sol. should be clean.
2. Distilled water should be used for preparing the solution.
3. Egg albumin sol is prepared at room temperature because in a hot solution the precipitation of egg albumin takes place.
4. The yellow yolk should be separated from the egg albumin before using the latter in the experiment. The addition of egg albumin should be done very slowly and with constant stirring to disperse the colloidal particles well in the solution.

VIVA VOCE

Q 1. What is the significance of preparing a colloidal solution of egg albumin in chemistry?

Ans. The preparation of a colloidal solution of egg albumin allows us to study the properties and behavior of proteins in colloidal form, which have numerous applications in industries such as

food, pharmaceuticals, and cosmetics.

Q 2. How does the colloidal nature of egg albumin differ from its behavior in a true solution or a suspension?

Ans. In a colloidal solution, egg albumin forms dispersed particles that are intermediate in size between true solutions and suspensions, exhibiting the Tyndall effect and Brownian motion. In contrast, in a true solution, egg albumin molecules are uniformly dissolved, while in a suspension, they settle out over time.

Q 3. Describe the method you used to prepare the colloidal solution of egg albumin.

Ans. The colloidal solution of egg albumin can be prepared by adding egg albumin to water and then stirring vigorously or by adding a dilute solution of egg albumin drop by drop to water with continuous stirring.

Q 4. Why is it necessary to stir the solution vigorously during the preparation of the colloidal solution of egg albumin?

Ans. Vigorous stirring helps in breaking down large aggregates of egg albumin molecules into smaller particles, ensuring a more uniform dispersion and enhancing the stability of the colloidal solution.

Q 5. Can you explain the role of the dispersing medium (water) in the formation of a colloidal solution of egg albumin?

Ans. The water acts as a dispersing medium by surrounding and solvating the egg albumin molecules, preventing their aggregation and facilitating their suspension in the solution.

Q 6. What precautions did you take to prevent denaturation or coagulation of egg albumin during the preparation process?

Ans. Precautions such as using distilled water, avoiding excessive heat, and maintaining pH within a suitable range were taken to prevent denaturation or coagulation of egg albumin.

Q 7. How would you confirm the colloidal nature of the solution you have prepared?

Ans. The colloidal nature of the solution can be confirmed by observing the Tyndall effect, which is the scattering of light by colloidal particles, or by examining the solution under a microscope to observe Brownian motion.

Q 8. What factors affect the stability of the colloidal solution of egg albumin?

Ans. Factors such as pH, temperature, presence of electrolytes, and agitation can affect the stability of the colloidal solution by influencing the balance between attractive and repulsive forces among the particles.

Q 9. How could you modify the experimental procedure to produce a more concentrated colloidal solution of egg albumin?

Ans. To produce a more concentrated colloidal solution, one could use a higher concentration of egg albumin solution or reduce the volume of water used for dispersion while maintaining the same amount of egg albumin.

Q 10. What are some potential applications of colloidal solutions of egg albumin in various industries?

Ans. Colloidal solutions of egg albumin have applications as emulsifiers, stabilizers, and thickening agents in food processing, pharmaceutical formulations, and cosmetics due to their ability to form stable colloidal dispersions.