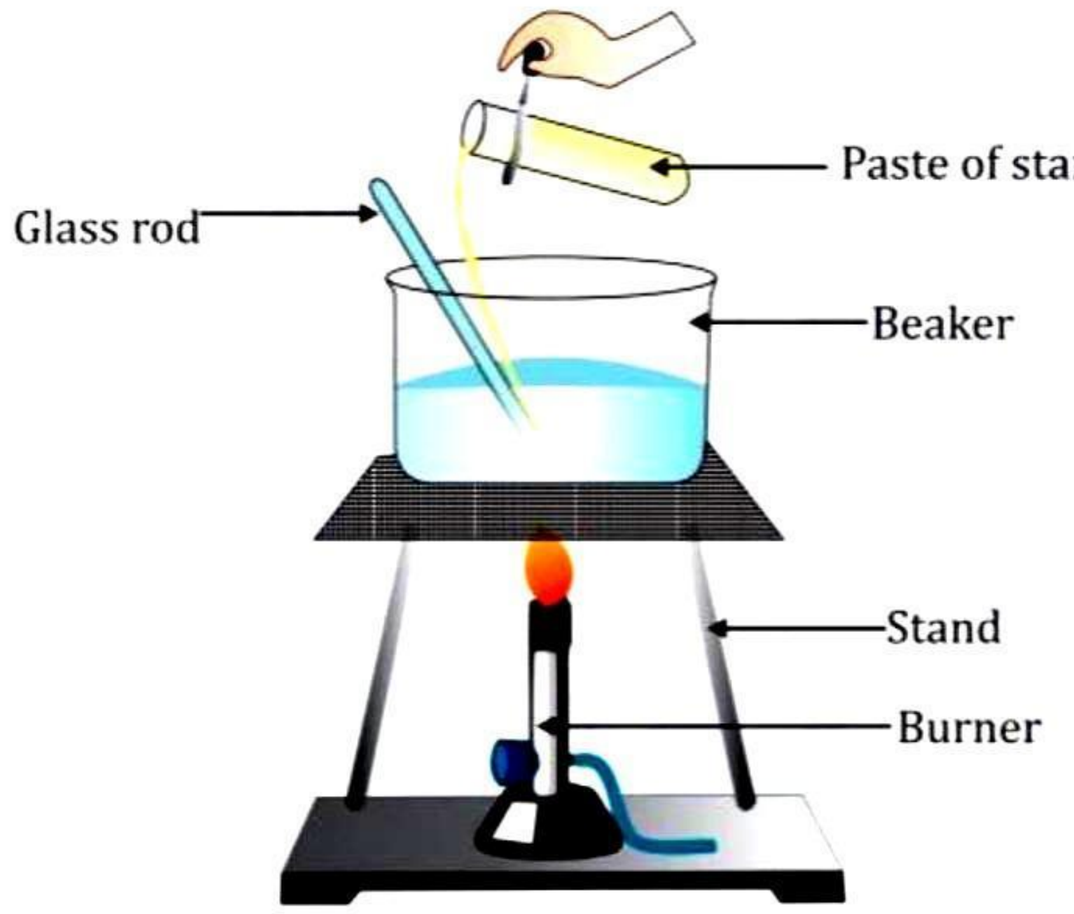
Experiment

Aim

To prepare a Colloidal Solution (sol.) of Starch

Theory

Starch forms a lyophilic sol when water is used as the dispersion medium. The formation of sol is accelerated by heating. The starch sol can be prepared by heating starch and water at about 100°C. It is quite stable and is not affected by the presence of any electrolytic impurity.



Preparation of starch sol.

Fig. 1.

Material Required

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

Procedure

1. Take 1 g of starch in a mortar and add a few ml of distilled water.
2. Grind the starch to make a thin paste and transfer this paste to a 50 ml beaker.
3. Take about 125 ml of distilled water in a 250 ml beaker and heat the beaker so that the water starts boiling.
4. Pour the paste slowly stirring into boiling water in the beaker (Fig. 1.).
5. Allow it to further boil for about 2-3 minutes and then allow the beaker to cool.
6. Filter the contents of the beaker through a filter paper, fixed in a funnel.
7. Label the filtrate 'Starch Sol'.

Result

A starch colloidal solution has been prepared.

Precautions

1. The apparatus used for preparing sol should be properly cleaned.
2. Distilled water should be used for preparing sols in water.
3. Starch should be converted into a fine paste before adding it to boiling water.
4. Starch paste should be added in a thin stream to boiling water.
5. Constant stirring of the contents is necessary during the preparation of the sol.

VIVA VOCE

Q 1. Can you explain the significance of preparing a colloidal solution of starch in chemistry?

Ans. The preparation of a colloidal solution of starch allows us to study the colloidal behavior of macromolecules, understand their interactions with solvents, and explore their applications in various fields such as food science, pharmaceuticals, and materials science.

Q 2. What specific properties of starch make it suitable for preparing a colloidal solution?

Ans. Starch, being a polymer of glucose, has large molecular weight and size, making it suitable for forming colloidal suspensions. Additionally, its hydrophilic nature allows it to disperse in water, forming colloidal solutions.

Q 3. How do you expect the appearance of the colloidal solution of starch to differ from that of a true solution or a suspension?

Ans. The colloidal solution of starch is expected to appear translucent or opaque due to the scattering of light by the dispersed starch particles. In contrast, a true solution would be transparent, while a suspension would show visible settling of particles over time.

Q 4. What method did you use to prepare the colloidal solution of starch?

Ans. The colloidal solution of starch can be prepared by grinding starch into fine particles and dispersing them in water with continuous stirring or by heating starch in excess water to form a gel-like dispersion.

Q 5. Can you explain the concept of Brownian motion and its relevance to colloidal solutions?

Ans. Brownian motion refers to the random movement of colloidal particles in a fluid medium due to collisions with solvent molecules. It is significant in colloidal solutions as it helps maintain the stability of the dispersion by preventing particle sedimentation.

Q 6. How would you test the colloidal nature of the solution you have prepared?

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

Q 7. What precautions did you take during the preparation of the colloidal solution to ensure its stability and uniformity?

Ans. Precautions such as using distilled water, ensuring proper grinding of starch particles, avoiding contamination, and maintaining constant agitation during the preparation process were taken to ensure the stability and uniformity of the colloidal solution.