Preparation of Starch Solution

Introduction

This procedure contains two recipes for preparing starch solution—the traditional method and the spray starch method. With the traditional method, soluble starch is added to boiling water. The spray starch method simply requires spraying spray starch into a container of water.

Materials

Traditional Method

Soluble starch, 1 g
Water, distilled or deionized, 100 mL
Balance
Beaker, 250-mL
Graduated cylinder, 100-mL
Hot plate
Stirring rod

Spray Starch Method

Spray starch (the type used for ironing)
Water, 100 mL
Beaker, 250-mL
Graduated cylinder, 100-mL
Stirring rod

Safety Precautions

This activity requires the use of hazardous components and/or has the potential for hazardous reactions. Avoid spraying starch onto the floor as this may cause the floor to become slippery. Avoid spraying starch in the direction of anyone's face or eyes. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron. Please review current Material Safety Data Sheets for additional safety, handling, and disposal information.

Procedure

Traditional Method for preparing 100 mL of a 1% starch solution.

1. Place 100 mL of distilled or deionized water in a 250-mL beaker and bring to boiling on a hot plate.
2. Make a smooth paste with 1 g of soluble starch and a small volume (several milliliters or so) of distilled or deionized water.
3. Once the water is boiling, carefully remove the beaker containing the boiling water from the hot plate. Pour the starch paste into the boiling water and stir until all of the starch is dissolved. The resulting solution may be somewhat cloudy.
4. Allow the starch solution to cool to room temperature before use. *Note:* This is especially important if the starch solution is to be used in a kinetics experiment where temperature is a factor.

Spray Starch Method for preparing 100 mL of a starch solution.

1. Pour 100 mL of distilled or deionized water into a 250-mL beaker.
2. Generously spray the spray starch into the water. Spray until the solution appears slightly blue in color (at least 10 seconds).
3. Stir the solution to mix and allow the foam to settle. This may take up to 10 minutes.

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures governing the disposal of laboratory waste. Discard any unused starch solution down the drain with an excess of water according to Flinn Suggested Disposal Method #26b. If starch solution has been used as an indicator for detecting the presence of iodine, dispose of that solution according to the proper disposal method determined according to the composition of the resulting solution.

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Tips

- Starch solutions, prepared by either method, have a poor shelf life and will deteriorate quickly. Therefore, a fresh starch solution should be prepared on the day of the lab.
- Starch solutions are often used as indicators for detecting the presence of iodine. Generally, a 1% starch solution will produce a nice, deep-blue color in the presence of iodine. The more concentrated the starch solution, the deeper blue in color is the resulting solution. If the starch solution is too dilute (which may occur when a starch solution is prepared by the spray starch method), a color change will still be observed in the presence of iodine; however, the color produced is more of a brown color. If this brown color is observed, simply spray more spray starch into the starch solution to make it more concentrated so that the familiar deep-blue color is observed.

Discussion

Starch solution is commonly used as an indicator for detecting the presence of iodine. When starch and iodine are present together, they form a deep-blue starch–iodine complex. The deep-blue color of the complex is due to the pentaiodide anion, I_5^-. Though unstable as a free anion, the pentaiodide anion becomes stable as part of the starch complex.

Acknowledgment

We would like to thank George Gross (retired), Union High School, Union, New Jersey for providing us with the procedure for preparing starch solution using spray starch.

Reference

Teitelbaum, R. C.; Ruby, S. L.; Marks, T. J. *J. Am. Chem. Soc.* **1980,** *102*, 3322.

Materials for *Preparation of Starch Solution* are available from Flinn Scientific, Inc.

Catalog No.	Description
S0123	Starch, Soluble for Iodometry, 500 g
S0302	Spray Starch
W0007	Water, Deionized
W0001	Water, Distilled

Consult the Flinn Scientific website for current prices.