

Construction of Variegated Disaccharide “J” Tubes

Special Technical Experiment for Advanced Chemistry Students

Purpose: To observe the effect of torsion on the visible configuration of certain groups of macromolecules.

Apparatus: 400 mL beaker
Bunsen burner
Graduated cylinder
Paraffin coated paper
stirring rod
ring stand set-up
thermometer

Materials: Sucrose ($C_{12}H_{22}O_{11}$)
Potassium hydrogen tartrate ($CHC_4H_4O_6$)
Mentha peperita extract
Hydrogenated vegetable oil
Plant starch ($C_6H_{10}O_5$)
Edible pigments

Procedure:

1. Add 145 g sucrose, 35 g starch, 40 mL water, and .5 g potassium hydrogen tartrate to a 400 mL beaker. Thoroughly mix with a stirring rod.
2. When a uniform mixture is achieved, subject the mixture to intense heat from the nearest source of C_3H_8 . When the mixture begins to boil, lower the flame. During the operation (approximately 20 minutes) avoid stirring because any external agitation will be detrimental to the desired effect.
3. The quantity of heat is proportional to the viscosity of the product. This is an important factor in determining the end point of the reaction. When the thermometer reaches 132 degrees Celsius, sufficient heat has been added. Remove the burner.
4. Add plant extract (approximately 2 mLs) and stir. Pour one-half of the mixture onto the paraffin-coated paper which has been lubricated with hydrogenated vegetable oil. Then melt, by friction, some of the lubricant in your palms. The paraffin-coated paper should be placed on top of paper towels to prevent the paraffin from melting onto the table top. To the portion of the mixture remaining in the beaker, add 1 mL of red pigment. Now pour the colored mixture onto another piece of lubricated paraffin paper.
5. When the mixture has cooled to a tolerable heat, initiate torsion on both portions to counter their tensile strength. Continue to stretch with both hands until the desired tensile strength is reached. Divide each color into four 8 inch segments. When ready, combine one non-pigmented segment with a pigmented segment. Do so with torsion. Place the distortions on a clean section of paraffin-coated paper and shape them into “J” conformations. Permit the final product to remain undisturbed until the molecules become adapted to this position.

Analysis: Perform a critical taste test comparing your product with a commercially synthesized product.

Happy Holidays!

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