

# Chromatography: Grape Soda

## INTRODUCTION

In an effort to identify the chemical components that causes plants to be green, Michael Tswett discovered the technique of chromatography in 1903. Chromatography ("color writing") is a means of separating the components of mixtures (i.e. chromatography is a method that only involves physical changes). In this experiment the food dyes used to create the color of "grape" soda will be separated into the basic components.

## MATERIALS

1 Grape Soda Pop  
1 C-18 "Sep- Pak" chromatographic bed (obtained from Waters Associates, Milford, MA) (1mL volume tube is OK)  
1 Graduated cylinder  
4 100 mL beakers  
4 small test tubes  
1 bottle of 5% isopropyl alcohol  
1 bottle of 20% isopropyl alcohol  
1 bottle of isopropyl alcohol  
Distilled water  
25 or 50 mL plastic syringe

## WHAT TO DO

1. Draw 10 mL of isopropyl alcohol into the plastic syringe.
2. Connect the syringe to the column.
3. Slowly force the 10 mL through the column. This will wet the separation bed.
4. Disconnect the syringe and fill the syringe with 10 mL of grape soda.
5. Inject the soda onto the top of the column.
6. Draw 10 mL of the 5% isopropyl alcohol solution into the syringe.
7. Connect the syringe to the column; flush this solution through the column. Collect the solution in a 100 mL beaker as it flows out of the column. Label the beaker (Beaker 1).
8. Disconnect the syringe from the column.
9. Draw 10 mL of the 20% isopropyl alcohol solution into the syringe. Reconnect the syringe to the column and force it through the column. Collect the solution in a 100 mL beaker as it flows out of the column. Label the beaker (Beaker 2).

## QUESTIONS

1. What color is the solution in Beaker 1?
2. What color is the solution in Beaker 2?
3. Combine the two solutions and compare the color of this solution to that of the grape soda. Note: Dilute the grape soda (10 mL grape soda combined with 10 mL distilled water) before making the comparison.

## SUMMARY

The food dyes are more soluble in isopropyl alcohol than in water. With the addition of 5% isopropyl alcohol to water, the orange dye will flush through the column. Next, when the higher proportion of isopropyl alcohol is added to the column the blue dye will flush off the column. From the separation at least two dyes are used to color the grape soda. The colors should match. All solutions may be poured down the drain when finished.

## SOURCES

"Chemistry Demonstrations: A Handbook for Teachers of Chemistry." Vol. 1, Bassam Z. Shakhshiri, 1989, University of Wisconsin Press.  
M. Bailey, The Ohio State University.