THEORY/INTRODUCTION

Chromatography is one of the most useful means of separating mixtures of compounds for purification and/or identification purposes. Compounds separate in chromatography because of the differences in their partitioning between two phases. The two phases are the mobile phase (a liquid or gas) and the stationary phase (usually a solid, but sometimes a liquid). Compounds which spend most of their time in the mobile phase will travel more quickly than compounds which spend more time in the stationary phase, thus creating a separation.

The amount of time a compound spends in a phase corresponds to its attraction to that phase. In the case of the mobile phase, the attraction between the compound and the molecules of that phase is more commonly known as solubility. The adage, “like dissolves like” refers to the solubility of polar compounds in polar liquids and non-polar compounds in non-polar solvents. The size and structure of a molecule determine it’s polarity.

Paper chromatography will be used to separate FDA approved food dyes. Since the dyes differ in structure (and therefore polarity), they will travel up the paper (stationary phase) at different rates. A very polar mobile phase (0.1% NaCl in water) will be used.

PROCEDURE

1. Place 7mL of mobile phase into a 250mL beaker. Cover the beaker with a plastic Petri dish and set aside.

2. Obtain a piece of chromatography paper and determine which side is the rough side (by touch). Using a pencil, draw a line 1cm from the bottom on the rough side. Beginning 1.5cm from the end, make marks along the origin line at 1cm intervals. Label the marks with the codes of the knowns and unknowns (Figure 1).
3. Spot the solutions onto the chromatography paper at each of the 1cm intervals, using a clean toothpick for each solution.

4. Roll the spotted chromatography paper into a cylinder with the spots on the outside. Staple the ends of the paper together. **Make sure the edges do not overlap!**

5. Carefully place the cylinder into the beaker, making sure the spots are at the bottom of the cylinder. Replace the covers. The paper should not touch the walls of the beaker. The entire bottom of the cylinder should rest on the bottom of the beaker. Make sure that the spots are above the surface of the liquid.

6. When the solvent has moved to within 1.5cm of the top of the paper, remove the cylinder. Carefully unroll the cylinder and place it on a paper towel to dry.

7. After the chromatogram is dry, compare the distance traveled of the unknown dyes with the known dyes and identify.

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<tr>
<th>CODE</th>
<th>DYES PRESENT</th>
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**DISCUSSION/THINGS TO THINK ABOUT**

1. Which dye traveled the farthest up the paper? Why?

2. Which compound traveled the least? Why?