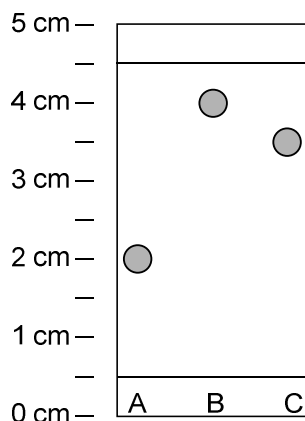


# Experiment 5

## Thin Layer Chromatography and Melting Point: Identification of Analgesics

### Study Questions

- 1) Consider the following silica gel TLC plate of compounds A, B, and C developed in hexanes:



- a. Determine the  $R_f$  values of compounds A, B, and C. **Answer:** The distance between the origin and the solvent front is 4 cm. Spot A moved 1.5 cm, so its  $R_f$  is  $1.5/4 = 0.375$ . Spot B moved 3.5 cm, so its  $R_f$  is  $3.5/4 = 0.875$ . Spot C moved 3 cm, so its  $R_f$  is  $3/4 = 0.75$ .
- b. Which compound is the most polar? **Answer:** Compound A is the most polar because it does not travel as far as the other two compounds. Remember, polar compounds stick to the adsorbent more readily, and thus do not travel as far and have a lower value for  $R_f$ .
- c. What would you expect to happen to the  $R_f$  values if you used acetone instead of hexanes as the eluting solvent? **Answer:** Acetone is a more polar solvent than is hexanes. If it were used to elute the same three compounds, each of the compounds would travel faster because the more polar eluting solvent is more proficient at eluting the compounds from the polar adsorbent. Since each compound travels faster, each compound would have a larger  $R_f$  value if acetone were used to elute than when hexanes is used to elute the TLC plate.
- d. How would the  $R_f$  values change if eluted with hexanes using an alumina TLC plate? **Answer:** Alumina is more polar than is silica (see the first paragraph under “The Adsorbent” in the TLC section). Therefore, each of the compounds would travel slower on an alumina TLC plate than on a silica TLC plate, and the  $R_f$  values for each of the compounds would be smaller.
- 2) What could happen if you used ink to draw in your base line and letters on the TLC plate? **Answer:** The ink might travel with the eluting solvent and separate into its component pigments, giving you a lot of extraneous spots.
- 3) What could happen if you spot too much of a compound on the TLC plate? **Answer:** The spot would show trailing.

## Experiment 5: Thin Layer Chromatography and Melting Point

- 4) What would happen if your solvent level is above the level of the initial spots? **Answer:** The spots would dissolve into the reservoir of eluting solvent.
  
- 5) The CRC lists the melting point for a compound as 182–183°C. You observe a melting point for this same compound isolated in your experiment as 177–181°C. What can you conclude about the compound isolated in your experiment? **Answer:** Most likely, the compound is impure, but the proper product.