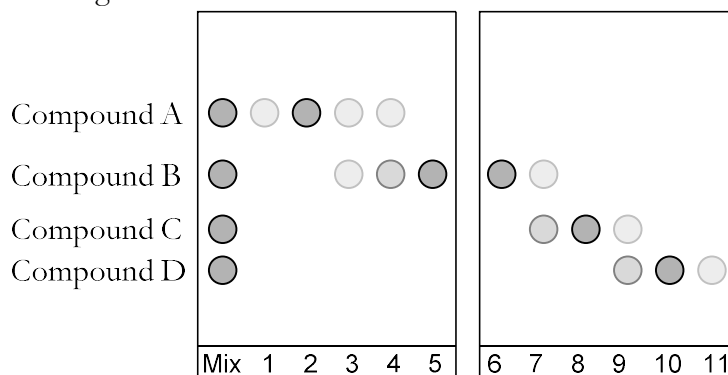


# Experiment 31

## Large-Scale Column Chromatography: Separation of Paprika Pigments

### Study Questions

- 1) A chemist found that a mixture of four components (Compounds A–D) could be separated on a silica gel TLC plate using 10% diethyl ether in hexanes as the eluting solvent (see “original mixture” far left plate in the figure below). The mixture was then chromatographed on a silica gel column eluted with this same solvent mixture and 11 fractions of 15 mL each were collected. Thin-layer chromatographic analysis of the various fractions (1-11) under the conditions stated above gave the results shown in the figure below:



- a. According to these results which fractions should be combined to give pure samples of A, B, C, and D? **Answer:** Combine 1 & 2 for A; 5 & 6 for B; 8 for C; and 10 & 11 for D.
- b. Which fractions contain more than one component? Indicate for these ‘mixed’ fraction numbers what components of the original mixture are present. **Answer:** 3 & 4 contain both A and B; 7 contains both B and C; 9 contains both C and D.
- 2) Rank these compounds by predicted  $R_f$  values: capsanthin,  $\beta$ -carotene, and cryptoxanthin (assume there are no ester groups added to any of these compounds). Explain your rankings. **Answer:**  $\beta$ -carotene (zero OH groups) will be fastest, cryptoxanthin (one OH group) will be intermediate, and capsanthin (two OH groups) will be slowest.