

REF: "Aldrich", "the CRC", "the Merck", and/or "Lange's"
The Organic Chem Lab Survival Manual, 7th ed., J. Zubrick, Wiley, Hoboken, NJ
Introduction to Organic Chemistry, 3^d ed., Brown & Poon, Wiley, Hoboken, NJ

EQUIPMENT: equipment in student lab drawers
 Mel-Temp apparatus & m.p. tubes
 Thermowell heating mantle & controller
 Buchner funnel & filter flask

MATERIALS: SUBSTANCE..... (approx.) AMOUNT / GROUP

*mixture of organic compounds:.....2 g
 calcium chloride, anhydrous 10 g
 solvent (diethyl ether, dichloromethane, or hexane)..... 100 mL
 hydrochloric acid solution, concentrated 10 mL
 sodium hydroxide solution, aqueous, 10%..... 100 mL

*Your unknown mixture of organic compounds will contain one compound from group A, one from B, and one from C:

group A	group B	group C
benzoic acid	<i>p</i> -chloroaniline	<i>p</i> -dichlorobenzene
4-chlorobenzoic acid	<i>m</i> -nitroaniline	hexamethyl benzene
4-methylbenzoic acid	<i>p</i> -toluidine	naphthalene

INTRODUCTION

After synthesizing an organic compound, the desired product must be separated from the by-products, excess reactants, impurities, and other undesired substances that may be in the reaction mixture. Similarly, substances in nature are always mixed with other substances. Extraction is the most common technique used to separate a desired organic product from a reaction mixture or to isolate an organic substance from its natural source.

SAFETY & WASTE

Review Zubrick, chapter 1. If you have any questions about lab safety, ask your instructor before proceeding with any experiment.

Whenever ANYone in the lab is doing ANY experimental procedure, you must be wearing your safety goggles.

Assume that all of the solvents and compounds used in this experiment are toxic. Do not dispose of any of them in the sink or trash. See PROCEDURE, step 6 on the next page.

PROCEDURE

DO NOT CONDUCT, SET UP, PREPARE FOR, or EVEN THINK ABOUT DOING ANY "NEW" EXPERIMENTAL PROCESS OR USING ANY UNFAMILIAR EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING THE APPROPRIATE SECTION IN YOUR LAB MANUAL ("Zubrick").

1. Start with about 2 grams of unknown mixture.
2. Separate your mixture into three pure compounds via extraction. (ref. Zumdahl ch. 10 & 15)
3. Recover and purify your solvent via simple distillation. (ref. Zumdahl ch. 20)
4. Determine the mass % composition of your unknown mixture by compound.
5. Identify the 3 unknown compounds in your mixture.
6. Dispose of the products of this experiment:
 - a. solid unknowns into 3 waste beakers labeled "A", "B", and "C"
 - b. your solvent into a waste beaker in the fume hood
 - c. neutralize any leftover strong acid or base solutions with sodium bicarbonate and dispose of them down the drain

7. HINTS

- a. You will need to use ALL of the equipment and materials listed on page 1.
- b. In your (Brown & Poon) textbook, sections 10.5, 10.6, and 14.5 may be helpful.

8. ON OR BEFORE MAY 11th AT 6pm SHARP, turn in a report that contains:

a. & b., below, must be in the form of a neat, legible, summary page:

- a. a list of the compounds in your unknown mixture
- b. the % composition of your original mixture by compound
- c. data, experimental evidence, and calculations to support your conclusions
- d. any other notes or supporting documentation

GRADING SCHEME

- a) determining correct compound in mixture 2 points each
- b) determining % composition of original mixture to $\pm 10\%$ 2 point
- c) conclusions logically follow from experimental data..... 4 points
- d) appropriate experimental procedures have been used..... 8 points