

# Lab 15B: Preparation of Esters

Name:

Date:

Block:

| For Students:  | For Teacher:  |
|----------------|---|
| Lab performed: | Pre-lab completion: <input type="checkbox"/> Yes <input type="checkbox"/> No  |
| Lab due:       | Lab Submitted: <input type="checkbox"/> On Time <input type="checkbox"/> Late |

## Introduction & Objectives

### Objectives:

- 1.
- 2.

### Answer the following questions:

1. What two organic compounds react together to form an ester?
2. Name the ester formed from the reaction of **ethyl alcohol** and **butanoic acid**
3. What two things will you do to speed up this reaction?
4. What are 3 safety concerns for this lab? For each safety concern, describe a way that you will stay safe during this lab

## Procedure & Observations

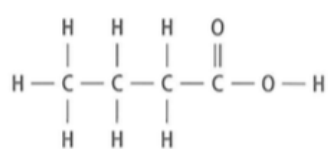
**Table I**

| <b>Test Tube</b> | <b>Carboxylic Acid</b>                          | <b>Alcohol</b> | <b>Name of Ester Formed</b> | <b>Odour</b> |
|------------------|---|----------------|-----------------------------|--------------|
| <b>1</b>         | 1 mL ethanoic acid<br>(acetic acid)             | 1 mL ethanol   |                             |              |
| <b>2</b>         | 1 mL butanoic acid                              | 1 mL methanol  |                             |              |
| <b>3</b>         | 1g<br>2-hydroxybenzoic acid<br>(salicylic acid) | 1 mL methanol  |                             |              |
| <b>4</b>         | 1 mL butanoic acid                              | 1 mL ethanol   |                             |              |

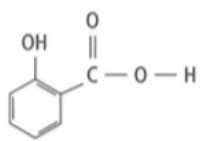
## Analysis of Results

Answer the following

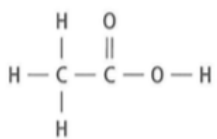
1. Using structural formulas, write the **equations** for the reactions that occurred in each of the test tubes. Include and **name all reactants and products**. Use the reactant structures below to help you



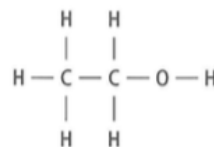
Butanoic Acid  
C<sub>3</sub>H<sub>7</sub>COOH



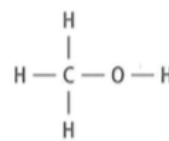
Salicylic Acid (2-hydroxybenzoic acid)  
HO<sub>2</sub>C<sub>6</sub>H<sub>4</sub>COOH



Acetic Acid (Ethanoic Acid)  
CH<sub>3</sub>COOH



Ethanol  
C<sub>2</sub>H<sub>5</sub>OH



Methanol  
CH<sub>3</sub>OH

Test Tube 1

+

→

+

Ethanoic Acid

Ethanol

Water

Test Tube 2

+

→

+

Test Tube 3

+

→

+

Test Tube 4

+

→

+

2. What is the name of the ester formed from each of the following combinations?
  - a. Ethanol and hexanoic acid
  
  - b. Methanol and pentanoic acid
  
3. What combination of alcohol and acid will form the following esters?
  - a. Methyl butanoate
  
  - b. Hexyl octanoate
  
4. What are three possible sources of error in this lab? If you list human error, please explain what you will do to reduce/eliminate the error in the next lab

## Conclusion

*State the results of Objectives 1 and 2*

1.

2.