**Fischer Esterification**

**Introduction**

The main purpose/goal for this lab is to synthesize an ester from a carboxylic acid and an alcohol. This reaction has a daily use of creating odor concentrates and flavorings.

**Mechanism for unknown 3**

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**Theoretical Yield**

It’s a 1:1 ratio reaction.

🡪 0.002mol\*162.19(g/mol) methyl trans-cinnamate= 0.3244g of product.

**Physical Data and Hazards**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Compound** | **Molar mass (g/mol)** | **Melting Point (degrees C)** | **Boiling Point (degrees C)** | **Density (g/cm3)** | **Solubility (g/L)** | **Hazards** |
| ***Trans-cinnamic acid*** | 148.16 | 133 | 300 | 1.25 | 0.50 | Irritant |
| ***Methyl trans-cinnamate*** | 162.19 | 34-38 | 261-262 | 1.09 | - | Toxic |
| ***Methanol*** | 32.04 | -97.60 | 64.70 | 0.79 | Miscible | Toxic, flammable |
| ***Methylene Chloride*** | 84.93 | -96.70 | 39.60 | 1.33 | 13 | Toxic, flammable |
| ***Sulfuric acid*** | 98.08 | 10 | 337 | 1.84 | Miscible | Corrosive |

*Possible unknowns are given on pg.186 of the Experiments Book with MP and Structure.*

*Sources: Handbook for Organic Chemistry,* ***CRC Handbook of Chemistry and Physics*** *(especially Section C: "Physical Constants of Organic Compounds" ), available at the information desk in the Science Library (in Norlin) and in the Organic Chemistry Stockroom.*

***Wastes***

*Organic Wastes: Final products should be rinsed with minimal amount of acetone.*

*Aqueous Waste: Sodium Carbonate and brine washes*

*Solid Chemical Waste: Filter papers and drying agents*

***Safety Precautions***

*Sulfuric acid is very corrosive; methanol is toxic and highly flammable.*

**Procedure**

1. Weigh 2mmol of the assigned unknown.
   1. Place it in a 25ml round bottom flask
   2. Add boiling chips
   3. Add 10 ml of anhydrous methanol
   4. Add 1ml of concentrated sulfuric acid
2. Set the round bottom flask with the reflux condenser
3. Add stir bar.
4. Heat to reaction to reflux
   1. Let it react for 20 minutes
   2. Cool it down to room temperature
5. Add 30ml of 10% sodium carbonate into a 125ml of Erlenmeyer flask along with a stir bar.
   1. Make sure to rinse the stir bar
6. While the reaction is still being stirred, add the contents in the round bottom flask to the Erlenmeyer flask slowly.
7. Add 30ml of dichloromethane to the solution
8. Stir it for a few minutes
9. Place the compound into the separatory funnel.
10. Collect the organic layer
11. Extract the aqueous layer with an addition of 10ml of dichloromethane.
12. Combine the two organic layers.
13. Washing it once with 15ml of saturated NaCl solution
14. Dry it with anhydrous sodium sulfate.
15. Decant the solution into an already weighed side arm flask
16. Remove the solvent under low pressure
17. Weigh the product.