Organic Chemistry, Lab 5: carbon-carbon bond formation in aldol and diels-Alder Reactions

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Submission Information

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Experiment Number: *O4*
Demonstrator: *Thabo*
Date of Experiment: *02/08/2018*
Title: *Synthesis and purification, of carboxylic acid, by purification.*

Reaction Scheme

Yield Calculations.

Part A

Table 1: Limiting Reagent Calculations

Reactants Used	**Molecular Weight**$(g \cdot mol^{-1})$	**Mass**(g)	**Number of Moles(mol)**
Maleic Anhydride	98.06	$0.201g$	$\left(\frac{0.201g}{98.06g \cdot mol^{-1}}\right) = 2.05 \cdot 10^{-3}$
Cyclopentadiene	66.10	$0.786g \cdot ml^{-1} \cdot 0.20ml = 0.16g$	$\left(\frac{0.16g}{66.10g \cdot mol^{-1}}\right) = 2.4 \cdot 10^{-1}$

Limiting Reagent: *Maleic Acid*
Molecular Weight of Product: $164.16g \cdot mol^{-1}$

Mass of Product: $8.0149g - 7.864g = 0.1509g$
Theoretical Yield: $2.05 \cdot 10^{-3} mol \cdot 164.16g \cdot mol^{-1} = 0.337g$
Percentage Yield: $\frac{1.509g}{0.337g} \cdot 100\% = 44.8\%$

Part B

Table 2: Limiting Reagent Calculations

Reactants Used	**Molecular Weight**$(g \cdot mol^{-1})$	**Mass**(g)	**Number of Moles(mol)**
Benzyldehyde	106.12	$1.044g \cdot ml^{-1} \cdot 0.60ml = 0.63g$	$\left(\frac{0.63g}{106.12g \cdot mol^{-1}}\right) = 5.9 \cdot 10^{-3}$
Acetone	58.08	$0.7845g \cdot ml^{-1} \cdot 0.22ml = 0.17g$	$\left(\frac{0.17g}{58.08g \cdot mol^{-1}}\right) = 2.9 \cdot 10^{-3}$

Limiting Reagent: *Acetone*
Molecular Weight of Product: $234.29 \cdot mol^{-1}$
Mass of Product: $8.5849g - 8.0090g = 0.1509g$
Theoretical Yield: $2.9 \cdot 10^{-3} mol \cdot 234.29g \cdot mol^{-1} = 0.68g$
Percentage Yield: $\frac{0.5759g}{0.68g} \cdot 100\% = 85\%$