Extraction – Isolation of Three Organic compounds

- An Organic Acid
- A Neutral Compound
- A Phenol - but still an acid
Extraction – A Crash Course Review on Acid/Base

The lower the pKa of a particular proton, the more acidic.

<table>
<thead>
<tr>
<th>Molecule</th>
<th>pKa of Blue Proton</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Molecule 1" /></td>
<td>4.2</td>
</tr>
<tr>
<td><img src="image2" alt="Molecule 2" /></td>
<td>3.41</td>
</tr>
<tr>
<td><img src="image3" alt="Molecule 3" /></td>
<td>9.9</td>
</tr>
<tr>
<td><img src="image4" alt="Molecule 4" /></td>
<td>16.2</td>
</tr>
</tbody>
</table>

Note – the pKa’s are affected by the groups red for reasons you will get to in 262.
Recall – acid/base equilibria will always favor the side with the **ACID** or **CONJUGATE ACID** that has the **HIGHER** pKa!

Example -

\[
\text{solubility?}_{\text{organic solvent}}
\]

\[
\text{solubility?}_{\text{water}}
\]

Most of our compounds have both polar and non-polar character.

However, the **Gruse (non-polar)** outweighs **polar**.
Extraction – The Technique(s)

Our organic solvent: \( \times \)

Fairly immiscible (insoluble) with water, actually, it is \( \frac{3.5}{1} \) (by volume) miscibility with water. Drying agent anybody?

Dissolve unknown in TBME

1. Add sat’d, aq NaHCO\(_3\)
2. Agitate
3. Let layers separate

What happens?
Which layer is which?
Extraction – The Technique(s)

Remove lower layer

Lower layer is more easily removed via Pasteur pipet.
Extraction – The Technique(s)

Add HCl

What happens?

$\text{RCO}_2\text{H}$
$\text{Na}^+$
$\text{H}_2\text{O}$
$\text{HCl}$

Precipitate $\text{RCO}_2\text{H}$
Extraction – The Technique(s)

Things to Watch out for and note:

• Confusion! Label tubes!
• Know your layers
• Effective time management
• Quantitative transfer