



Department: Microbiology
 Course Code: CMM 102

Assignment

- 1) H_3COOH - Methanoic acid
 $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ - Pentanoic acid
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ - Butanoic acid
 $\text{HO}_2\text{C}-\text{CH}_2-\text{H}$ - Ethanoic acid
 $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ - Hexanoic acid
 $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ - Hex-4-enoic acid

2) Physical appearance - All simple aliphatic carboxylic acids up to 6 carbon atoms at room temperature. Most other carboxylic acids are solid at room temperature although cyclohexane carboxylic acid (cyclohexanoic acid) also remains liquid at room temperature and freezes to a solid below the room temperature.

Boiling points
 Boiling points increase with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

Solubility
 Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water. This is due to their ability to form hydrogen bonds with water molecules.

3) From Ethanol

Ethanoic acid is obtained commercially by the liquid phase air oxidation of 5% solution of ethanol in ethanoic acid using manganese(II) ethanoate catalytic. Ethanol itself is obtained from ethylene.



From petroleum

Liquid phase air oxidation of C₅ to C₆ alkane derivatives from petroleum at high temperature and pressure will give C₅ to C₆ carboxylic acids with methane, propane and butane as by products.

C₅ to C₆ in high temperature pressure C₅ to C₆ carboxylic acids

1) Oxidation of primary alcohols and aldehydes

Oxidation of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents (e.g. K₂Cr₂O₇ or KMnO₄) in acidic solution.

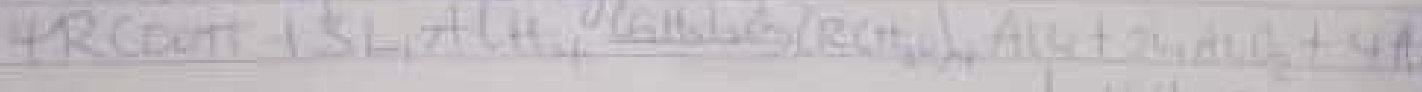


2) Carbonation of Grignard reagent

Aliphatic carboxylic acids are obtained by adding carbon dioxide to the Grignard reagent and then hydrolyzed with dilute acid.



3) Reduction of Carboxylic acid



(3)

5) Decarboxylation of Carboxylic acid



6) Esterification

