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**MATRIC NO- 19/MHS01/345**

**DEPT- MBBS**

**COURSE- CHEM 102**

1. Classification of Alcohols
2. This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol (1\*). If it is one hydrogen atom.

Examples are:

1. CH3OH Methanol (1\*)
2. CH3CH(OH)CH3 Propan-2-ol (2\*)
3. This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols have two hydroxyl groups present in the alcohols structure while trihydric alcohols have three hydroxyl group present in the structure of the alcohol.

Example are:

1. CH3CH2CH2OH Propanol (Monohydric alcohol)
2. Solubility of Alcohols in Water and Organic solvents

Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

1. The three steps in the industrial manufacture of ethanol

1. The starch containing materials includes molasses, rice and on warming with malt to 60C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

2(C6H10O5) n + nH2O ------------------------> nC12H22O11

Carbohydrate 60\*C/diastase maltose

1. The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15\*C

C12H22O11 + H2O --------------------------------> 2C6H12O6

Maltose 15\*C/maltase glucose

1. The glucose at constant temp of 15\*C is then converted into alcohol by the enzyme zymase contained also in yeast

C6H12O6  ----------------------> 2CH3CH2OH + 2CO2

Glucose 15\*C/Zymase Ethanol

1. The reaction between 2-methylpropanal and butyl magnesium chloride Hint: Grignard synthes:

**Grignard reagent = Butylmagnesium chloride**

**1st step:**

CH3CH3CH2 Mg Br + CH3 CH(CH3) C=O

|

H

CH3CH(CH3)

|

CH3CH2CH2CH2 – C – O – Mg Br

|

H

**2ndstep:**

CH3CH(CH3)

|

CH3CH2CH2CH2- C – O – Mg Br + H2O

|

H

| H2O

CH3CH(CH2)

|

CH3CH2CH2CH2- C – OH + Mg(OH)Br

|

H

1. The reaction between 2-methyl propanone and butyl magnesium chloride Hint: Grignard synthesis. Note: show all structures
2. The reduction reaction of 2-methylpropanone
3. The reduction reaction of 2-methylpropanal using Lithium Aliminium hydride:

OH

|

CH3CH(CH3) C=O ----------------> CH3CH(CH3)-C-H

| |

H H

2-methyl propanol 2-methyl propanol

1. Scheme for the conversion of propan-1-ol to propan-2-ol

CH3CH3CH2OH -----------------------> CH3CHCH3

|

OH

1. Dehydration of propanol to propene concentrated H2SO4

CH3CH3CH2OH -------------> CH3CH=CH2

1. Hydrolysis of propene to propan-2-ol using Markownikoffs addition

+H2O

CH3CH=CH2 ------------> CH3CHCH3

|

OH