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DEPT: MEDICINE AND SURGERY

MATRIC NO: 19/MHSO1/028

COURSE: CHM102

1. **Classification of Alcohol**

This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol {10}, if it is one hydrogen atom, it is called a secondary alcohol {20} and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol {30}. Example CH3OH Methanol {10}.

ii) 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 and they have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than three hydroxyl groups. Example CH3CH2CH2OH Propanol(Monohydric alcohol).

1. **Solubility of alcohols in water, 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. **Steps in the Industrial manufacture of ethanol**
2. Extraction of Starch: The crushed potato is steamed at 1400C to 1500C under pressure to prepare starch solution known as MASH. Before hydrolysis, starch first undergoes germination at 100c to 130c for few days. This germinated starch is called malt.
3. Hydrolysis of Starch: Starch is hydrolyzed to maltose by an enzyme known as diastase.

2(C6H10O5) + nH20 n(C12H22011)

Starch maltose

1. Fermentation: Finally yeast is added to maltose. Yeast secretes two enzymes:
2. Maltase: converts maltose into glucose.
3. Zymase: converts glucose into ethanol.

C12H22O11 + H2O 2C6H12O6

C6H12O6 C2H50H + 2CO2

Ethanol

1. **Reaction between 2 methyl propanal and butyl magnesium chloride**

CH3-CH-CH=O + CH3CH2CH2CH2MgCl

| Butyl magnesium chloride

CH3

2 Methyl propanal

CH3CH2CH2CH2

| OH-H+

CH3—CH—CH + O MgCl-----------

|

CH3

CH2CH2CH2CH3

|

CH3—CH—CH –OH + Mg {OH} Cl

|

CH3

2 methyl heptan-3-ol

**7)** **Reduction reaction of 2methylpropanal**

C4H8O + 2H----- CH3CHCH2OH

CH3 {2-methylpropan-1-ol}

**8)** **Conversion of propan-1-ol to propan-2-ol**

CH3CH2CH2OH + H2SO4------------ CH3CH2CH2OH2OSO3H

-H2O

CH3CH2CH2OSO3H

-H2SO4

CH3CHCH3 CH3CH=CH2

OH

{Propan-2-ol}