

1. CLASSIFICATION OF ALCOHOLS

- 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 (1°). If it is one hydrogen atom, it is called secondary alcohol (2°) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (3°).

Example- $\text{CH}_3\text{CH}_2\text{OH}$ ethanol (1°)

- This is based on the number of hydroxyl groups they possess. Monohydric alcohol structure. Dihydric alcohols are also called Glycols which 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- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ propanol (Monohydric alcohol)

2. SOLUBILITY OF WATER

Lower alcohols with up to three carbon atoms in their molecules are soluble in water because, 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 some alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

3. THREE STEPS IN THE MANUFACTURE OF ETHANOL

Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalyst, enzymes found in yeast break down carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include masses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



Carbohydrate 60°C /diastase Maltose

The maltose is broken down into glucose on addition of yeast which contains the enzymes maltase and at a temperature 15°C



Maltose 15°C /maltase glucose

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase

contained also in yeast



Glucose 15°C /Zymase ethanol

4.



6. REDUCTION OF 2-METHYLPROPANONE



2-methylpropanone secondary alcohol

$\text{LiAlH}_4/(\text{C}_2\text{H}_5)_2\text{O}$ as reducing agent

7. REDUCTION OF 2-METHYLPROPANAL



2-methylpropanal primary alcohol

$\text{LiAlH}_4/(\text{C}_2\text{H}_5)_2\text{O}$ as reducing agent

8. CONVERSION OF PROPAN-1-OL TO PROPAN-2-OL



Propan-1-ol $-\text{H}_2\text{O}$



Propan-2-ol