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mbbs

19/mhs/1152

Chem 102

- ① Based On the number of hydroxyl group they possess
- Monohydric alcohols have 1 hydroxyl group eg  $\text{CH}_3\text{CH}_2\text{OH}$
  - Dihydric alcohols have 2 hydroxyl group eg  $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$
  - Trihydric alcohols have 3 hydroxyl groups eg  $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2$   
 $\text{CH}_2$   
 $\text{OH}$
  - Polyhydric alcohols have more than 3 hydroxyl group eg  
 $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$
- ② Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group
- If the carbon atom has 2/3 hydrogen atom it is a Primary alcohol ( $1^\circ$ ) -  $\text{CH}_3\text{OH}$
  - If the carbon atom has one ( $1$ ) hydrogen atom, it is a Secondary alcohol ( $2^\circ$ ) -  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
  - If the carbon atom has no hydrogen atom, it is a tertiary alcohol ( $3^\circ$ ) -  $(\text{CH}_3)_3\text{C}-\text{OH}$

## 2) Solubility of alcohols in water and organic solvent

### In water:

Alcohols are soluble in water. This is due to the hydroxyl group in the alcohol which is able to form hydrogen bonds with water molecules. Alcohols with smaller hydrocarbon chain are very soluble. As the length of the hydrocarbon chain increases, the solubility in water decreases.

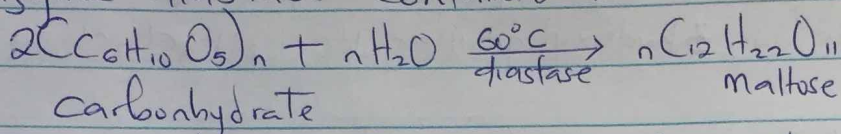
### In Organic Solvent

All monohydric alcohols are soluble in organic solvents

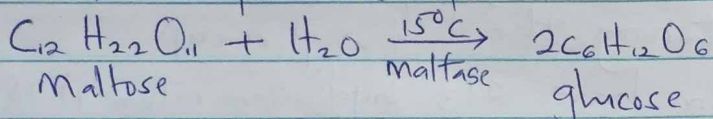
As water is polar it attracts OH group. Carbon chain on the other hand as nonpolar is repelled. Solubility in alcohols is therefore determined by the stronger of the two forces

### ③ Steps in the industrial manufacturing of ethanol

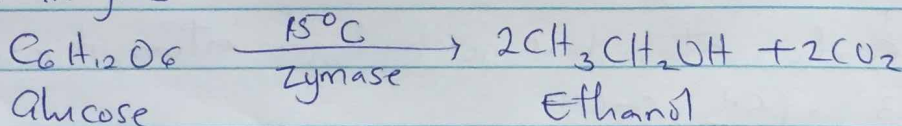
- The starch material (yam, rice) is warmed with malt to 60°C for a while, then it is converted to maltose with enzyme diastase contained in the malt.



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



- The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also in yeast



### 4) Reaction between 2 methyl propanal and butyl magnesium chloride

