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M/ENAO6/015

Mechanical engineering

CTIM 100

## 1 Classification of alcohols

2 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 containing the hydroxyl group are two or more, it is a primary alcohol ( $1^\circ$ ), if it is one hydrogen atom, it is a secondary alcohol ( $2^\circ$ ), if there is no hydrogen atom, it is a tertiary hydrocarbon ( $3^\circ$ ) e.g  $C_2H_5OH$  ( $1^\circ$ ) - ethanol.

3 Based on the number of hydroxyl groups they possess:

Monohydric alcohols have one hydroxyl group present in the alcohol structure, dihydric alcohols group (glycol) have two hydroxyl groups present; trihydric alcohols or triols have three hydroxyl groups, polyhydric alcohols (polyols) have more than three hydroxyl groups. e.g  $HOC_2H_4COH$  (Dihydric alcohol) - ethane-1,2-diol

## Solubility of alcohols

In water:

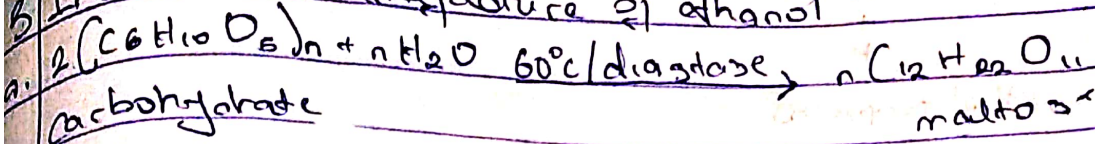
Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

3 Organic solvents:

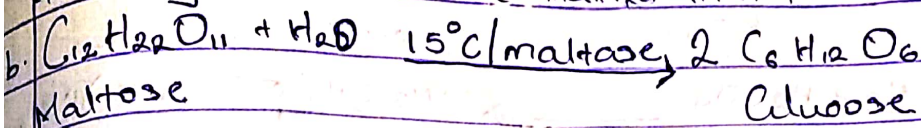
All monohydric alcohols are soluble in organic solvents. The solubility

of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

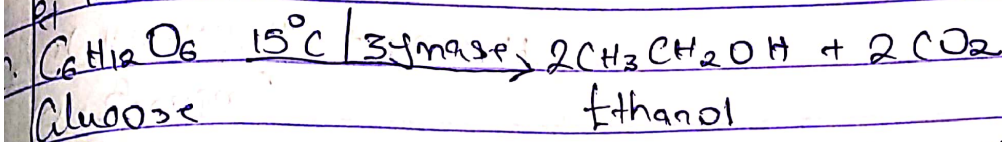
### B Industrial manufacture of ethanol



The starch containing materials including ~~maltose~~ molasses, potatoes, etc on warming with malt to  $60^\circ C$  for a specific amount of time is converted into maltose by the enzyme diastase contained in malt.

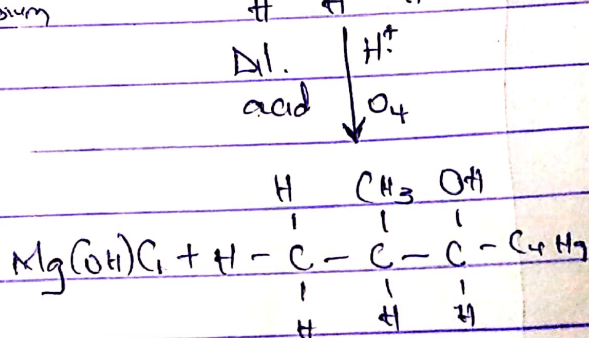
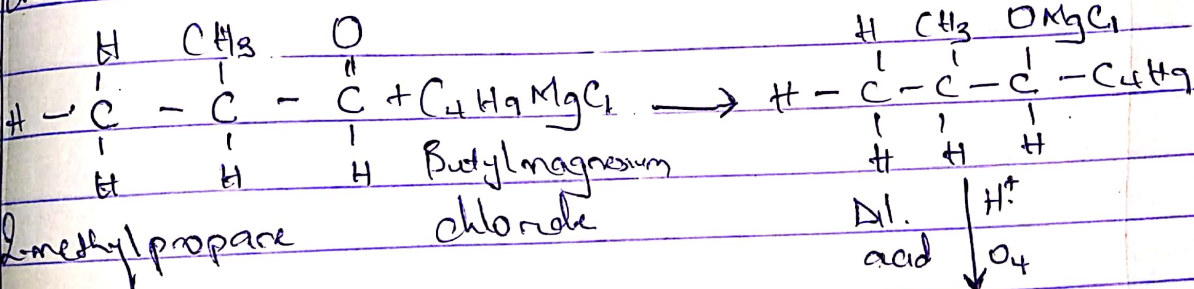


The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of  $15^\circ C$ .

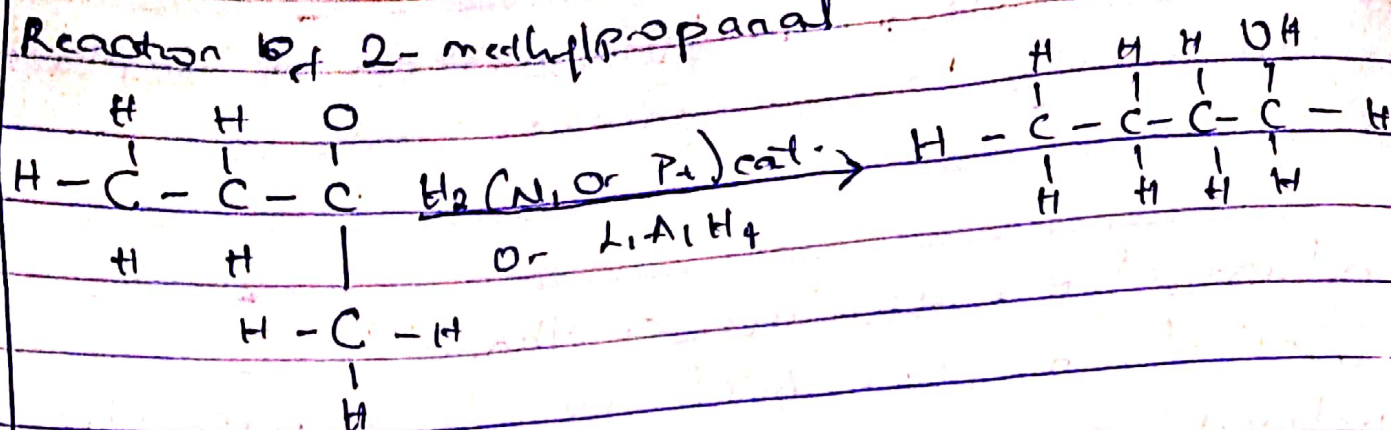


The glucose at constant temperature of  $15^\circ C$  is then converted into alcohol by the enzyme, zymase contained also in yeast.

### Reaction between 2-methylpropane and butyl magnesium chloride



### 7 Reaction of 2-methylpropanal



2-methylpropanal

### 8 Conversion of Propan-1-ol to Propan-2-ol

