

NAME: GOODHOPE BARIADORA HELEN
DEPT: MIBBS
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CHEM 102 ASSIGNMENT

The two major classifications of alcohol are:

1. It is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. In this classification, alcohols are grouped into three namely: primary, secondary & tertiary alcohols. Primary alcohol (1°) contains two or three hydrogen atoms which is attached to the carbon atom bearing the hydroxyl group- Secondary alcohol (2°) contains only one hydrogen atom. While, tertiary alcohol contains no hydrogen atom.

Examples:

Primary alcohol - $\text{CH}_3\text{CH}_2\text{OH}$ Ethanol (1°), CH_3OH Methanol (1°)

Secondary alcohol - $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ Propan-2-ol (2°) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ hexan-3-ol (2°)

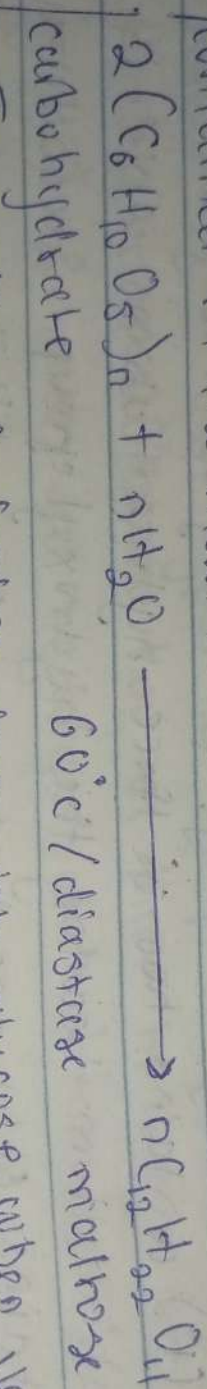
Tertiary alcohol - $(\text{CH}_3)_3\text{C-OH}$ 2-Methylpropan-2-ol (3°)

This classification is based on the number of hydroxyl group they possess. It can be grouped into 4: mono-, di-, tri- & poly hydrolic alcohol. Monohydric alcohol has only one hydroxyl group present in the alcohol structure. Dihydric alcohol has two hydroxyl groups present. Trihydric alcohols have three hydroxyl groups present. While, polyhydric alcohols/polyols have four or more hydroxyl groups. Ex: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ Butan-1-ol, $\text{HOCH}_2\text{CH}_2\text{OH}$ Ethane-1,2-diol monohydric alcohol, dihydric alcohol

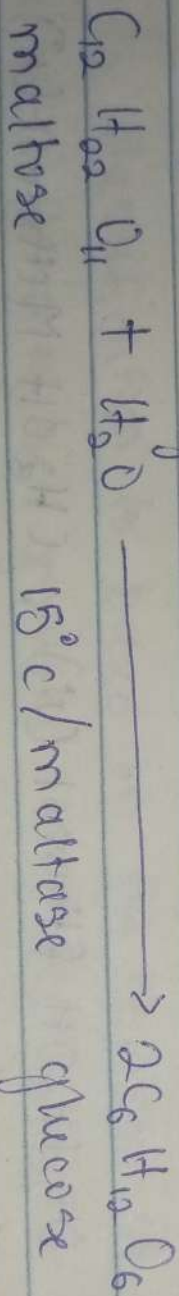
3.

Ethanol can be produced through the following process:

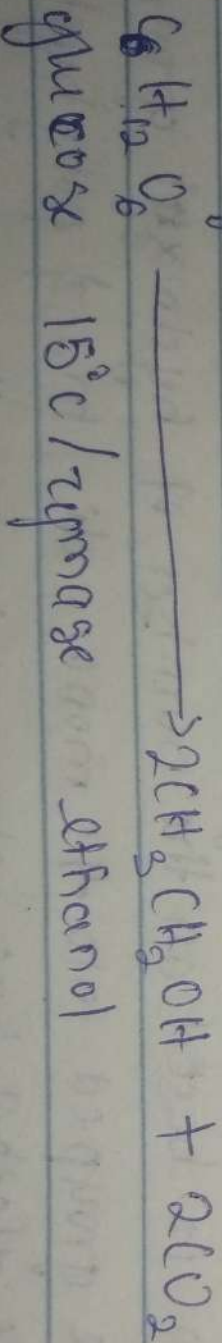
Starchy food materials such as potatoes, yam, rice, cereals, etc are warmed with malt to 60°C for a specific period of time. During this heating, it is converted into maltose by the enzyme diastase contained in the malt.



The maltose is broken down into glucose when yeast is added which contains the enzyme maltase & at a temperature of 15°C

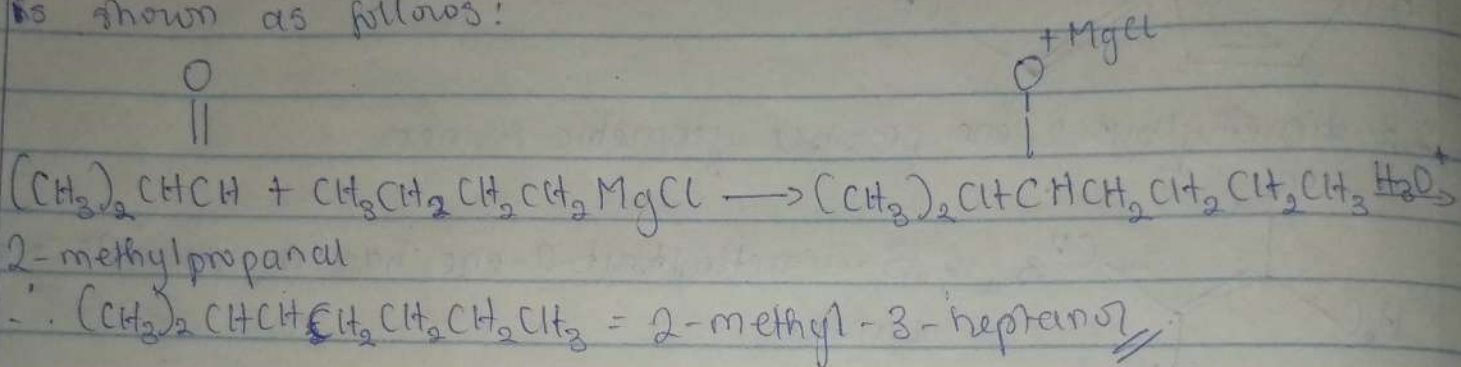


The glucose which is at constant temperature of 15°C is then converted into alcohol by the enzyme zymase which is contained also in yeast.

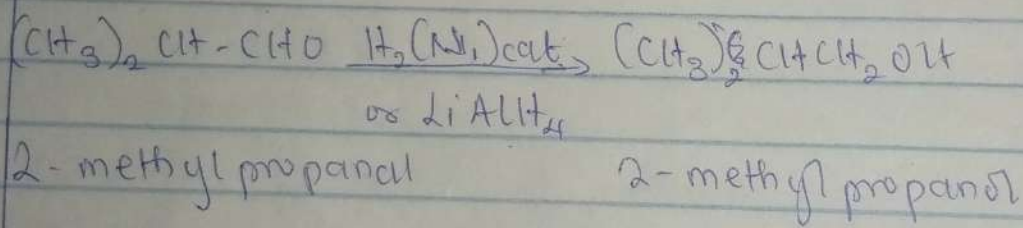


2. Solubility of alcohols in water: Lower alcohols are soluble in water because those kind of alcohols form hydrogen bond with water molecules. The solubility of alcohol in water decreases with increasing relative molecular mass. Whereby, monohydric alcohol are soluble in organic solvents. The ability to form hydrogen bonds with water molecules is due to the solubility of simple & polyhydric alcohol.

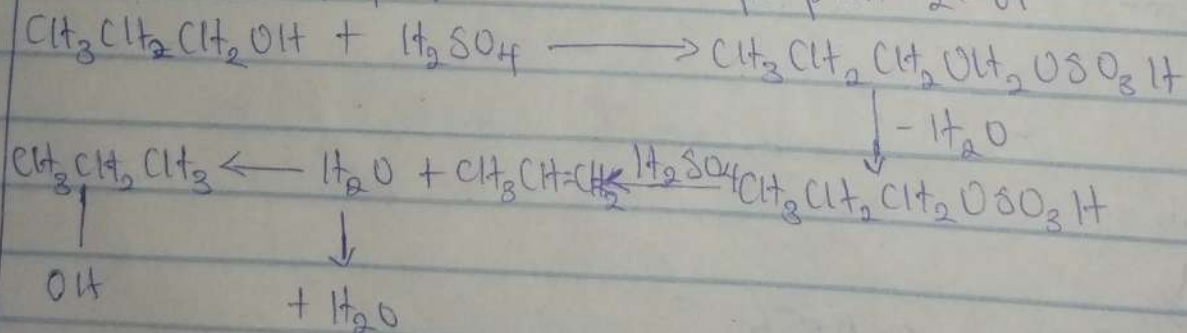
4. The reaction between 2-methylpropanal & butyl magnesium chloride is shown as follows:



7. The reduction reaction of 2-methylpropanone is shown below:



8. Conversion of propan-1-ol to propan-2-ol



\therefore It forms propyl hydrogen sulphate.