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Mechanical Engineering
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CHM 102.

1) A) Classification of alcohols based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen attached to the carbon atom containing the hydroxyl group are three or two, it is a primary alcohol (1°), if it is one hydrogen atom, it is secondary alcohol (2°) and if no hydrogen atom is attached it is a tertiary alcohol (3°). e.g $\text{CH}_3\text{CH}_2\text{OH}$ - Ethanol (1°)

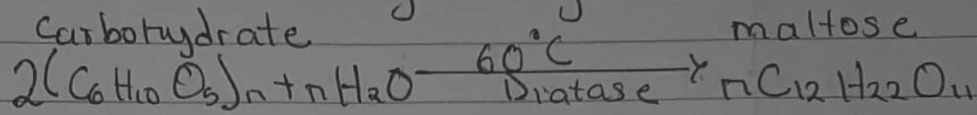
B) Classification based on the number of hydroxyl group they possess: Monohydric alcohols have one hydroxyl group present in the alcohol structure, dihydric alcohol also known as glycols have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl group in the structure and polyhydric alcohols or polyols have more than three hydroxyl groups e.g $\text{HOCH}_2\text{CH}_2\text{OH}$ → Ethane-1,2-diol (Dihydric alcohol)

2a) 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

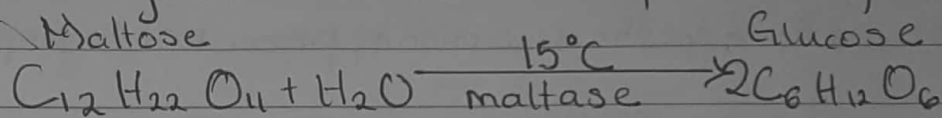
Solubility of alcohols in organic solvents: All monohydric alcohols are soluble in organic solvent. The solubility of simple alcohols and polyhydric alcohol is largely due to their ability to form hydrogen bonds with water molecules.

3 Steps Involved in Industrial Manufacture of Ethanol

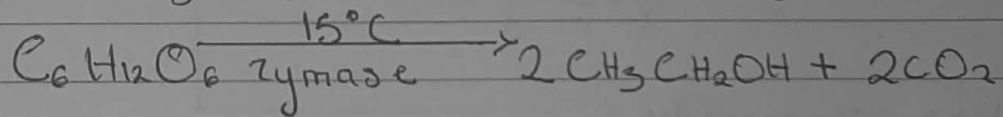
The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time, are converted into maltose by the enzyme diastase contained in malt.



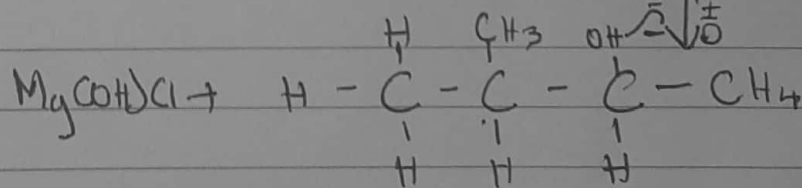
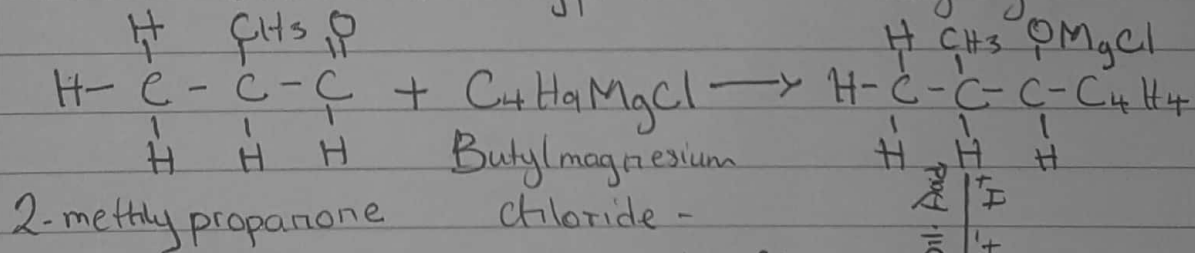
The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C



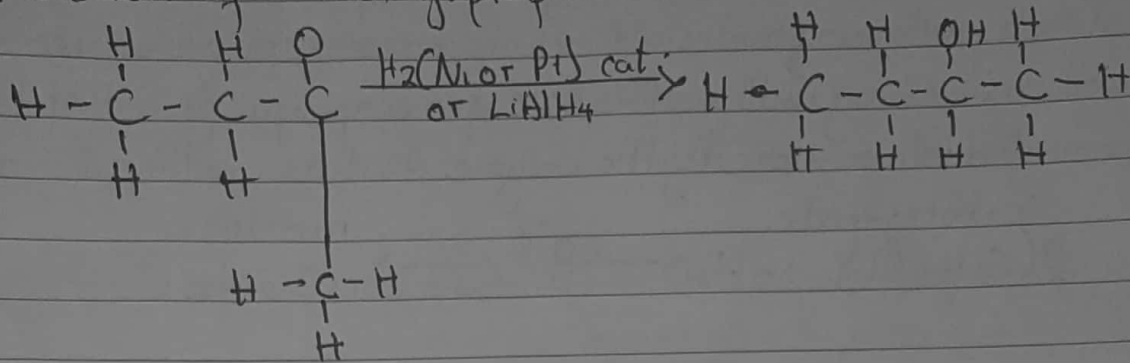
The glucose at constant temperature of 16°C is then converted into alcohol by the enzyme zymase also contained in yeast



4 Reaction Between 2-methylpropanone and butylmagnesium chloride



7 Reaction of 2-methyl propanal



2-methyl propanal

8 Propose a scheme for the conversion of propan-1-ol to propan-2-ol

