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Course: CHM 102

Assignment

1) Classification of Alcohols:

i) Based on the number of hydrogen atoms attached to the carbon atom with the hydroxyl group

- Primary alcohols (1°): have 2 or 3 hydrogen atoms
Example: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (propanol)

- Secondary alcohols (2°): have 1 hydrogen atom.
Example: $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$ (butan-2-ol)

- Tertiary alcohols (3°): have no hydrogen atom.
Example: $(\text{CH}_3)_3\text{C}-\text{OH}$ (2-methyl propan-2-ol)

ii) Based on the number of hydroxyl groups in the compound.

- Monohydric alcohols: have one hydroxyl group.
Example: CH_3CH_2 (ethanol)

- Dihydric alcohols: have two hydroxyl groups.
Example: $\text{HOCH}_2\text{CH}_2\text{OH}$ (ethane-1,2-diol)

- Trihydric alcohols: have three hydroxyl groups.
Example: $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2$ (1,2,3-butanetriol)

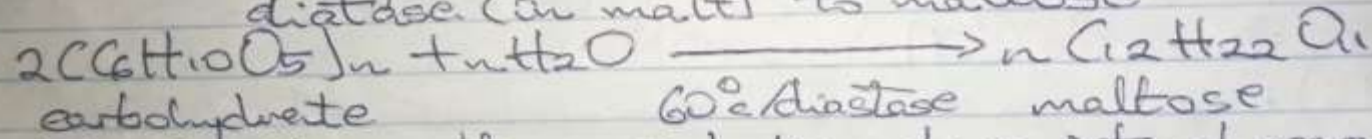
- Polyhydric alcohols: have four or more hydroxyl groups.
Example: $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$ (hexane-2,3,4,5-tetraol)

2) Solubility of alcohols

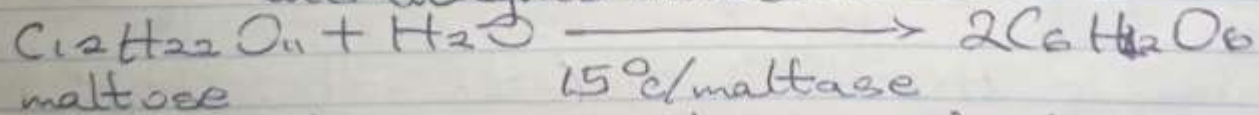
- In water: lower alcohols with up to three carbon atoms in their molecules are soluble in water. The water solubility decreases with increasing relative molecular mass.
- In organic solvents: all monohydric alcohols are soluble in organic solvents.

3) Industrial manufacture of ethanol:

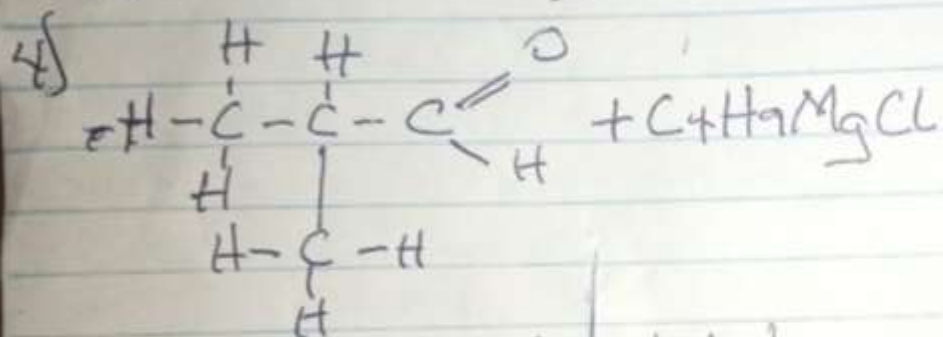
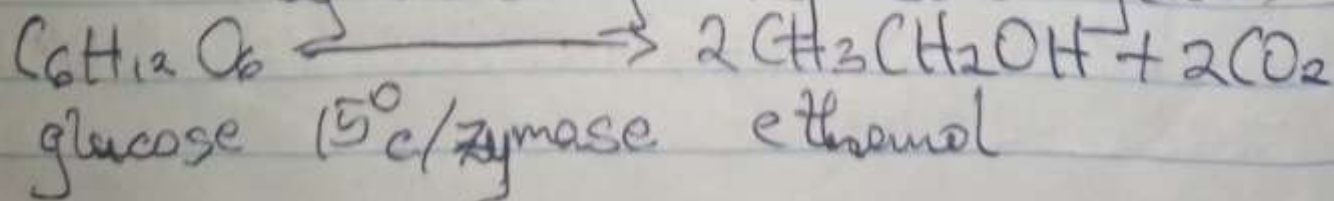
- Step 1: Starch containing materials on warming with malt to 60°C for a specific period of time by the enzyme diastase. (in malt) to maltose



- Step 2: the maltose is broken down into glucose on addition of yeast which contains the enzyme maltase at 15°C



- Step 3: the glucose at a constant temperature of 15°C is then converted into ethanol by the enzyme zymase (in yeast)



2-methyl propanal \downarrow butylmagnesiumchloride

