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MEDICINE AND SURGERY

19/MHS01/323

CHM 102 ASSIGNMENT

1) Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

Answer.

→ Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group:

* If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called primary alcohol (1°).

* If the number of hydrogen atom is one, it is called Secondary alcohol (2°).

* If the number of hydrogen atom is 0, it is called Tertiary alcohol (3°).

Example: $\text{CH}_3\text{CH}_2\text{OH}$ (Ethanol) (1°)

$\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ Propan-2-ol (2°).

→ Based on the number of hydroxyl groups they possess.

* Monohydric alcohols have one hydroxyl group present in the alcohol structure. E.g. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (Propanol).

* Dihydric alcohols are also called glycols have two hydroxyl groups present in the alcohol structure. E.g. $\text{HOCH}_2\text{CH}_2\text{OH}$

* Trihydric alcohols or triols have three hydroxyl groups present in their alcohol structure. E.g. $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$

* Polyhydric alcohols or polyols have more than three hydroxyl groups. E.g. $\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2$
Heptane-2,3,4,5,6-pentaol (polyhydric alcohol).

2) Discuss the solubility of alcohols in water, organic solvents.

Answer.

Solubility 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.

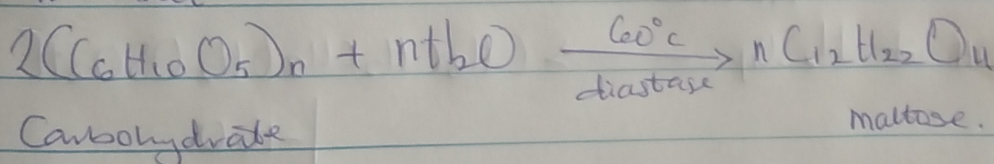
Solubility in Organic solvents.

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.

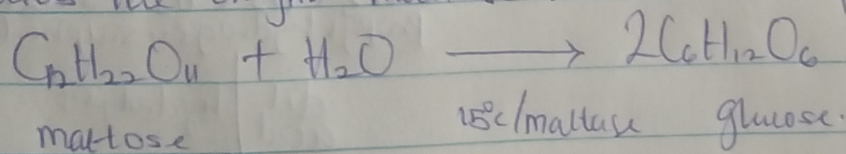
3) Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory.

Answer.

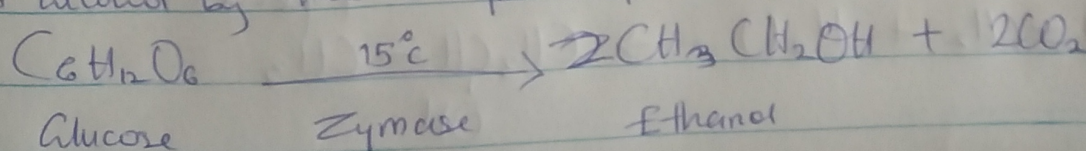
✓ The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



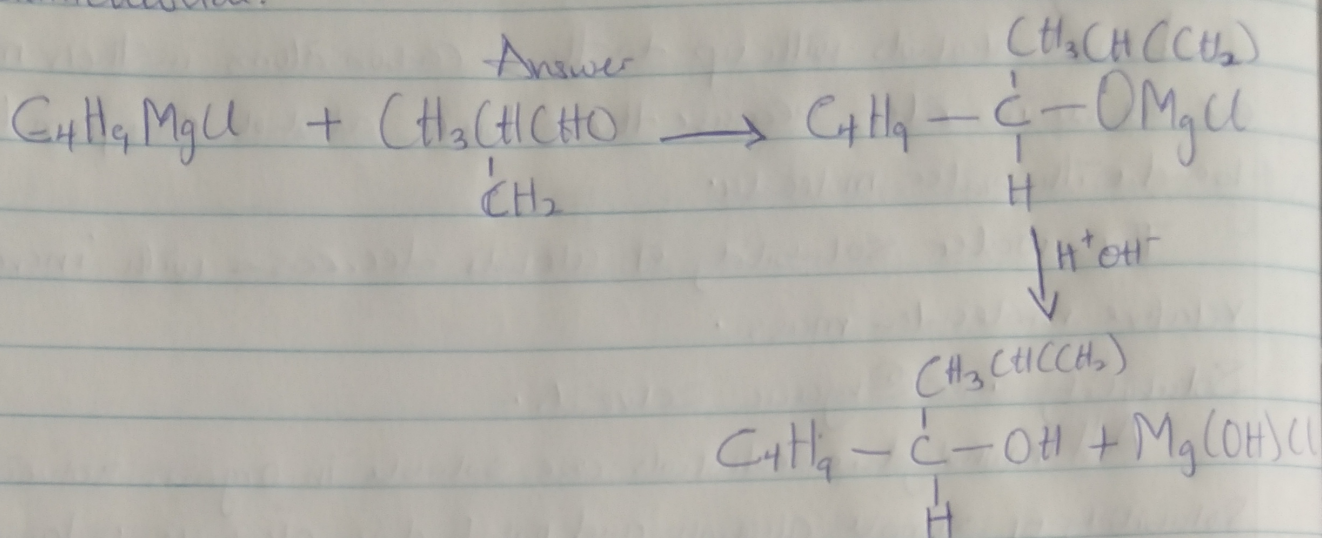
✓ The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C.



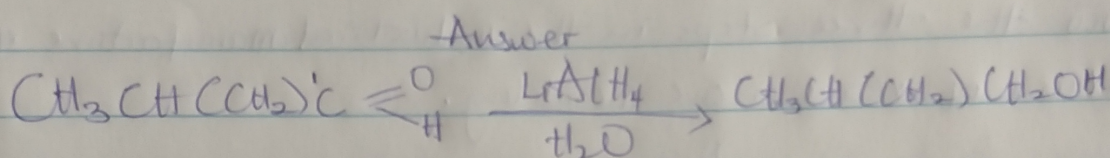
✓ The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also in yeast.



4) Show the reaction between 2-methylpropanal and butylmagnesium chloride.



7) Show the reduction reaction of 2-methylpropanal



8) ~~Show the~~ Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

