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Date:

1a) Based on number of hydrogen atoms attached to carbon atoms containing the hydroxyl group.

- If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group one, three or two, it is called primary alcohol (1°) e.g. $\text{C}_2\text{H}_5\text{OH}$
- If it is the hydrogen atom, it is called secondary alcohol (2°) e.g. $\text{C}_2\text{H}_5\text{CH}(\text{OH})\text{C}_2\text{H}_5$ (2°).
- If no hydrogen atom, it is called tertiary alcohol (3°) e.g. $(\text{C}_2\text{H}_5)_3\text{C-OH}$ (3°).

b) Based on the number of hydroxyl groups they possess

- Monohydric alcohols: Have one hydroxyl group present in the alcoholic structure e.g. $\text{C}_2\text{H}_5\text{CH}_2\text{CH}_2\text{OH}$
- Dihydric alcohols: aka glycols have two hydroxyl groups present in their alcoholic structure e.g. $\text{OH-CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- Trihydric alcohols: aka triols have three hydroxyl groups present in their alcoholic structure e.g. $\text{OH-CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$
- Polyhydric alcohols: or polyols have more than three hydroxyl groups e.g. $\text{C}_2\text{H}_5\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$.

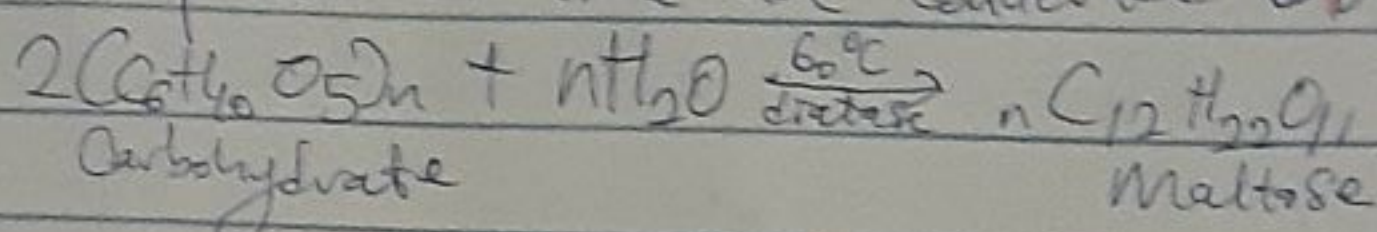
2a) In water, lower alcohols with up to three carbon atoms in their molecules soluble in water because these lower alcohols decrease with increasing relative molecular mass.

b) Inorganic Solvents: All anhydrous alcohols are soluble. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

3) Carbohydrates like starch are major group of natural compounds that can be readily ethanol by the biological process of fermentation.

Step 1:

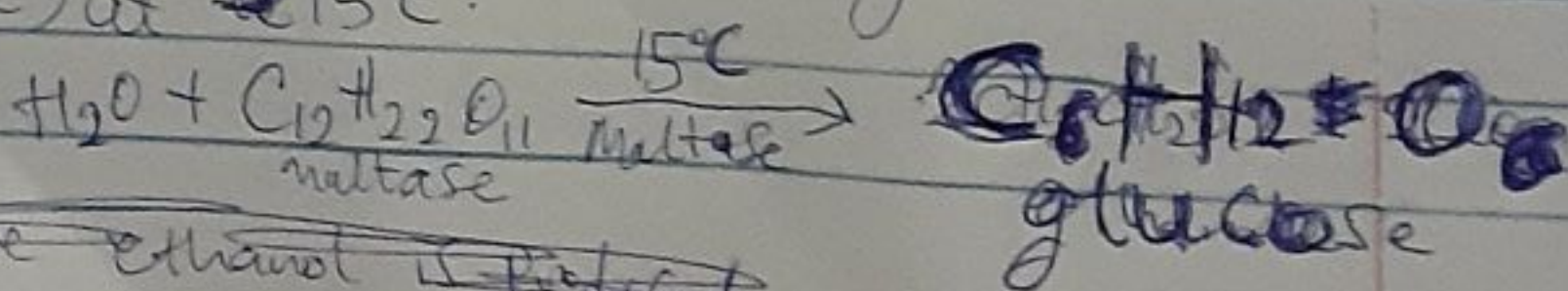
The starch containing content are warmed with Malt to 60°C for a specific period of time are converted to maltose.



NB: where n is large

Step 2:

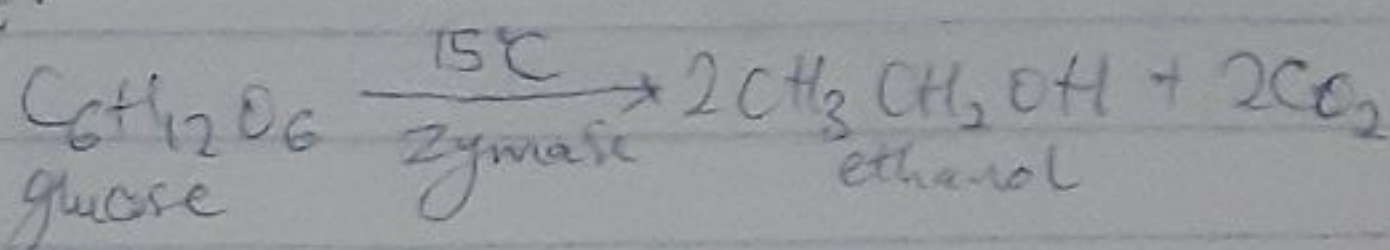
The maltose is broken down to glucose on addition of yeast (maltase) at 15°C.



~~Therefore ethanol is produced~~

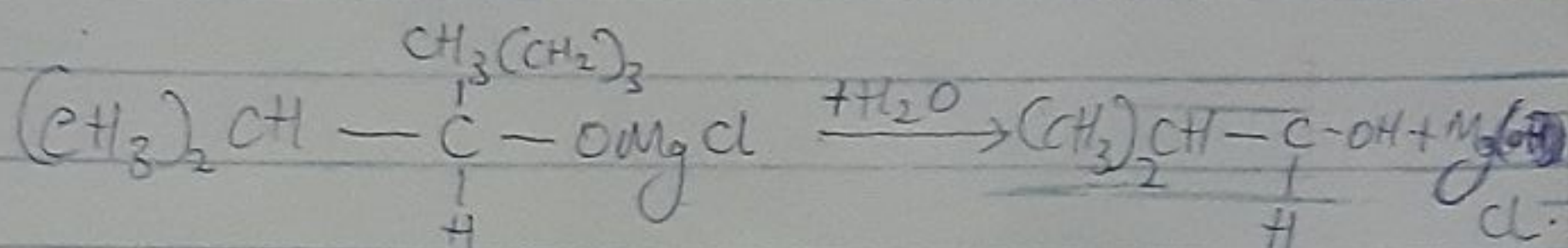
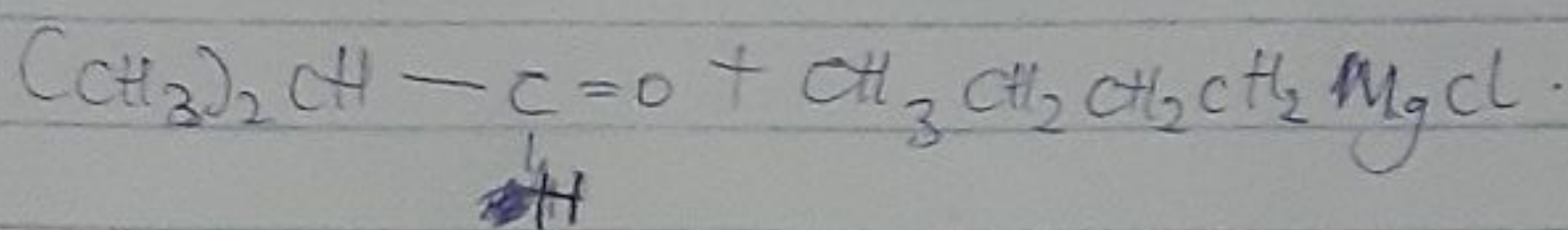
Step 3:

The glucose at constant temperature 15°C is then fermented into alcohol by the enzyme Zymase contained also in yeast.

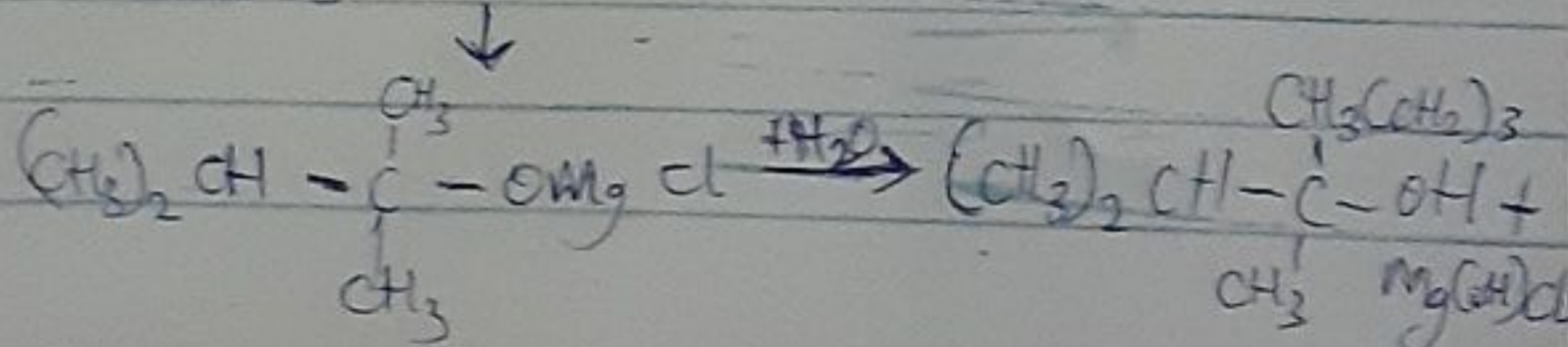
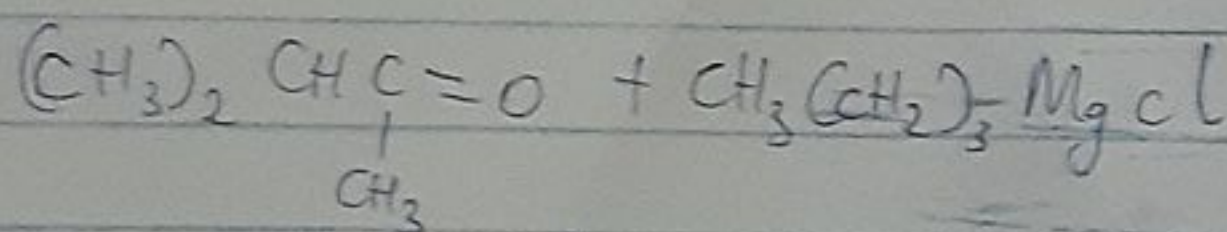


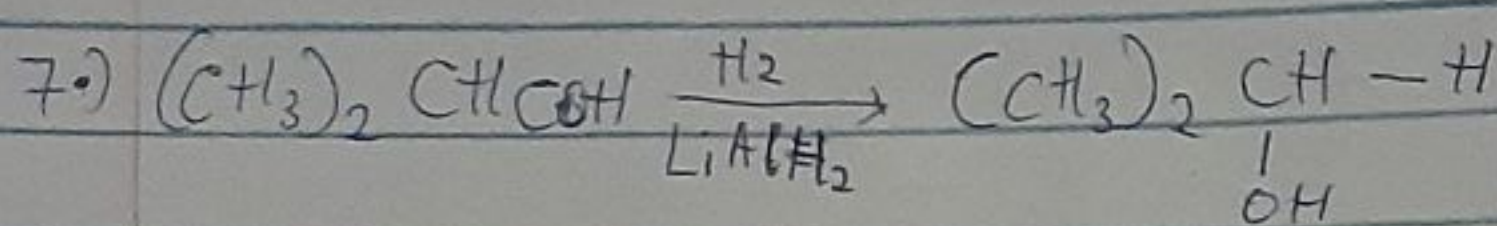
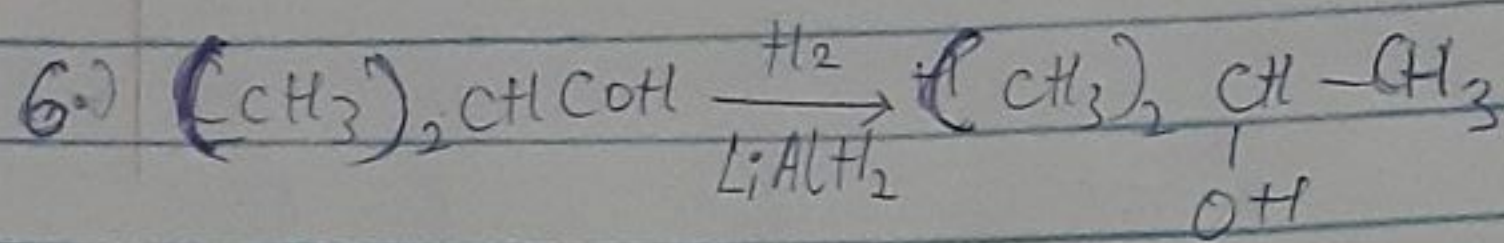
Therefore ethanol is produced.

4) 2-methyl propanal, butylmagnesium chloride
 $(\text{CH}_3)_2\text{CHCHO} + \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{MgCl}$



5) 2-methyl propanone, butylmagnesium chloride
 $(\text{CH}_3)_2\text{CHCOCH}_3 + \text{CH}_3\text{CH}_2\text{CH}_2\text{MgCl}$





8.) Propan-1-ol to propan-2-ol

