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Chm 102

1a) Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atoms attached to the Carbon leaving the hydroxyl group are three or two. It is called primary alcohol eg methanol and ethanol. If it is one hydrogen atom, It is called Secondary alcohol eg propan-2-ol and if is hydrogen atom is attached to the Carbon atom bearing the hydroxyl group. It is called tertrary,

b) Based on the number hydroxyl groups the possess monohydric alcohol has one hydroxyl group present in the alcohol Structure eg propanol. Dihydric alcohol or glycerol have two hydroxyl groups present in the alcohol structure eg ethene-1, 2-diol while trihydric alcohol or triol have three hydroxyl groups present in the structure of the alcohols eg propene-1,2,3-triol - Polyhydric groups eg heptane-2,3,4,5,6-pentaol.

2. Reagents ethylmagnesium chloride [CH_3CH_2MgCl]

$$CH_3\overset{2-}{C}H_2\overset{2+}{Mg}Cl + CH_3CH_2CH_2\overset{2+}{C}=\overset{2-}{O}CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2-\underset{\underset{CH_3CH_2}{|}}{\overset{\overset{CH_2CH_2CH_3}{|}}{C}}-OMgCl$$

$$\xrightarrow{H^+/OH^-} CH_3CH_2CH_2CH_2-\underset{\underset{CH_3CH_2}{|}}{\overset{\overset{CH_2CH_2CH_3}{|}}{C}}-OH + Mg(OH)Cl$$

3. Carbohydrate such as starch are major group of natural compounds and can be made to yield ethanol by the biological process of fermessing the biological catalyst, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. On warming the starch containing material such as cereals with malt to 60°c for a setting period of time are converted into maltose by the enzyme diatase carbon in the malt.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[\text{diatase}]{60^\circ c} nC_{12}H_{22}O_{11}$$

maltose

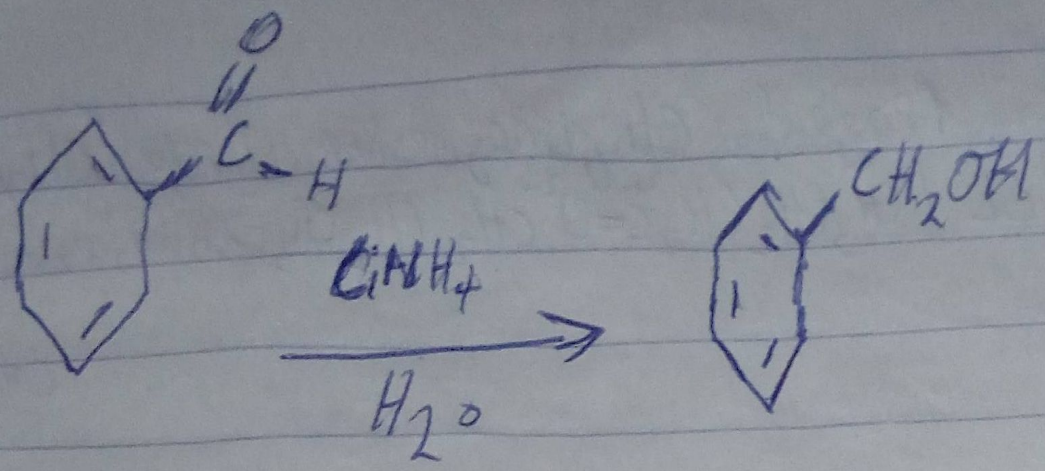
The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°c.

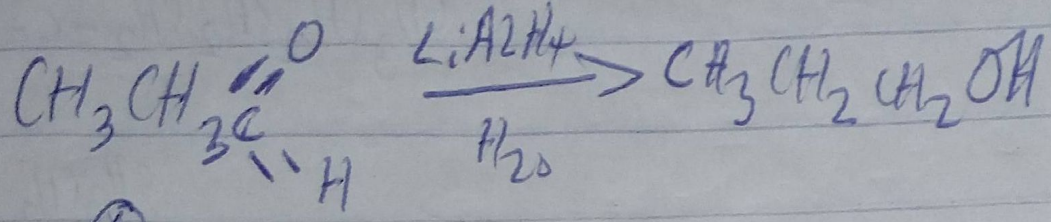
$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[15^\circ c/\text{maltose}]{} 2C_6H_{12}O_6$$

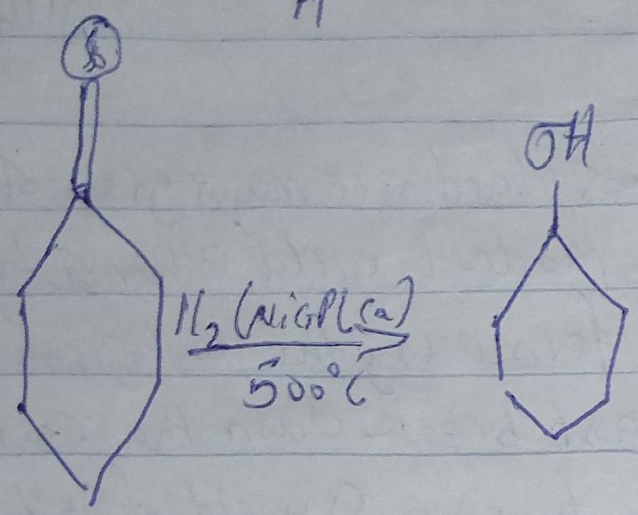
glucose

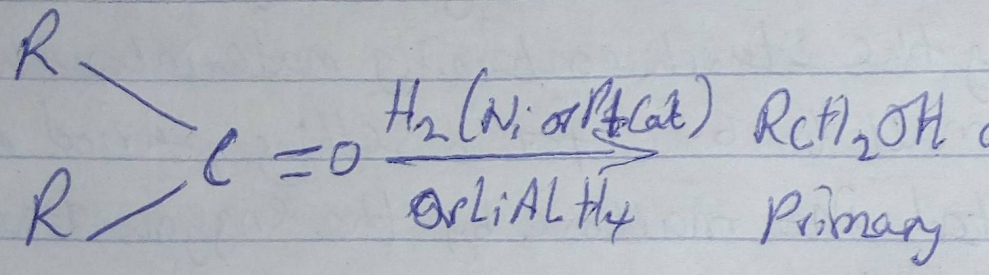
The glucose at constant temperature of 15°c is then converted into alcohol by the enzyme zymase contained also in yeast.

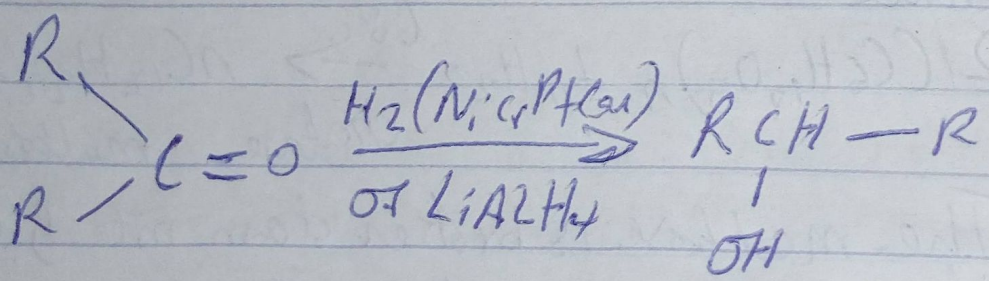
$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[15^\circ c/\text{zymase}]{} \underset{\text{ethanol}}{2CH_3CH_2OH} + 2CO_2$$











Secondary alcohol