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 COURSE — CHEM 102  
 DEPARTMENT — PHARMACY

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ASSIGNMENT

1) Classification of Alcohols

(A) Classification based on the number of hydrogen atoms attached to the carbon atom containing the OH group:

i) If 1 or 2 hydrogen atoms are attached to the carbon atom bearing the OH group, it is called a primary alcohol (1°).

ii) If one hydrogen atom is attached to the carbon atom it is called a secondary alcohol (2°).

iii) If no hydrogen is attached to the carbon atom, it is a tertiary alcohol (3°).

Examples:

Methanol  $CH_3OH$  (1°)

propan-2-ol  $CH_3CH(OH)CH_3$  (2°)

(B) Classification based on the number of hydroxyl groups they possess.

Monohydric alcohols have one OH group present in the alcohol structure. Dihydric alcohols are called glycols, they have 2 hydroxyl groups present in the structure while trihydric alcohols or triols have 3 OH groups present in the structure of the alcohol. polyhydric alcohols or polyols have more than 3 OH groups.

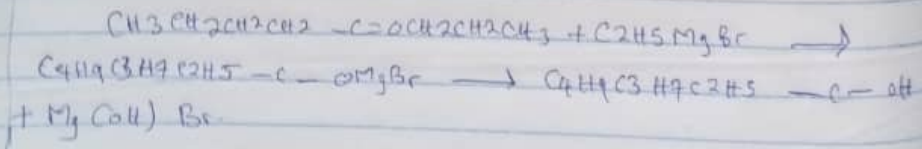
Examples:

Monohydric alcohol — propan-1-ol  $CH_3CH_2CH_2OH$

Dihydric alcohol — ethane-1,2-diol  $HOCH_2-CH_2OH$

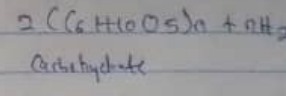
2) Grignard synthesis of Alkanols

Grignard reagent —  $C_2H_5MgBr$



3) Industrial manufacture of Carbohydrate

Such as starch are that can be made to yield ethanol. The biological catalysts, enzymes, convert starch into maltose. On warming starch with maltose are converted into maltose.



The maltose is broken down by the enzyme maltase and contains the enzyme maltase and  $C_{12}H_{22}O_{11} + H_2O \rightarrow$  Maltose.  $15^\circ C/maltase$

The glucose at constant temperature the enzyme Zymase contained alcohol  $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$  Glucose.  $15^\circ C/Zymase$

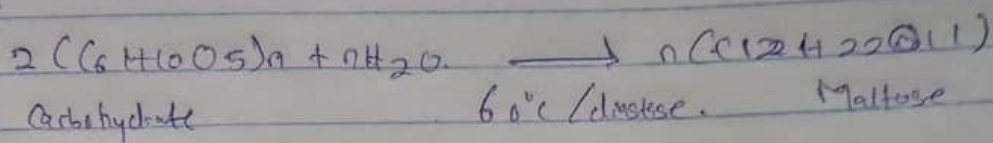
4) Alkanone. Reduction of  $CH_3COCH_2CH_3 - C=O$

Alkanols. Reduction of alkanone  $CH_3CH_2CH_2OH - C=O$

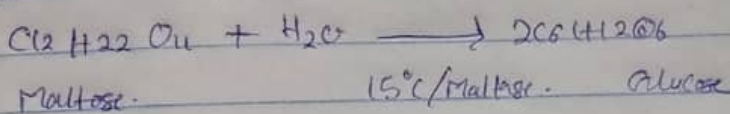
### 3) Industrial manufacture of ~~Alcohol~~ Ethanol:

Carbohydrate such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast breakdown the carbohydrate molecules into ethanol to give a yield of 95%.

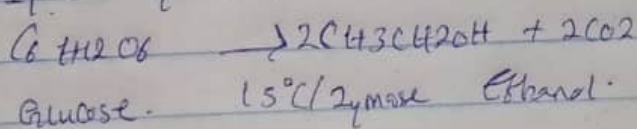
On warming starch with malt to  $60^\circ$  for a specific period of time are converted into maltose by the enzyme diastase contained in the malt:



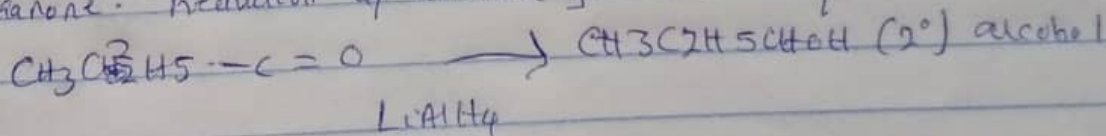
The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of  $15^\circ$ .



The glucose at constant temperature of  $15^\circ C$  is then converted into alcohol by the enzyme Zymase contained also in yeast.



### 4) Alkanone. Reduction of alkanone gives secondary alkanols



Alkanals. Reduction of alkanals gives primary alkanols

