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19/MHS01/093

MEDICINE & SURGERY

CHM 102.

1. The 2 major classification of Alkanols.

A. Based on the number of hydroxyl group they possess

✓ Alcohols that have one hydroxyl group present in the structure are called Monohydric alcohols.

Example: $\text{CH}_3\text{CH}_2\text{OH}$, CH_3OH

✓ Alcohols that have 2 hydroxyl groups present in the structure are called Dihydric alcohol. Cetyl. e.g.

$\text{HOCH}_2\text{CH}_2\text{OH}$, $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$.

✓ Alcohols that have 3 hydroxyl groups present are called Trihydric alcohols. ~~Polyhydric~~ Triols. e.g.

$\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})$.

✓ Alcohols that have more than 3 hydroxyl groups are called Polyhydric alcohols or Polyols.

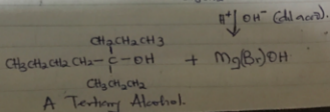
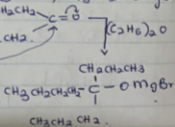
e.g. $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$.

B. Based on the number of hydrogen atoms attached to the Carbon atom containing the hydroxyl group. For Primary alcohols, the Carbon atom containing

the OH has 2 or 3 hydrogen atoms eg. CH_3OH 3
 for secondary alcohols, the Carbon atom contains one hydrogen atom eg. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
 for Tertiary alcohols, the Carbon atom has no hydrogen atoms eg. $(\text{CH}_3)_3\text{C}-\text{OH}$

② A named Grignard reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$
 A named Grignard reagent + Ketone \rightarrow 3° alcohol.

Using; Propylmagnesium Bromide; $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr}$
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr} + \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$

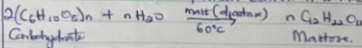


3. Industrial Manufacture of Ethanol showing all Equations.

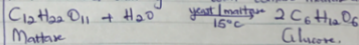
Ethanol is produced industrially by the process of Fermentation. This is the chemical breaking of Carbohydrates such as starch through series of enzymatic reactions to produce Ethanol.

First, The starch containing compound is warmed with malt at 60°C for some time

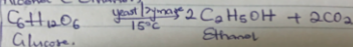
The malt contains diastase, which converts it to Maltose



The maltose is then broken down into glucose when it is warmed with yeast with certain maltose at 15°C

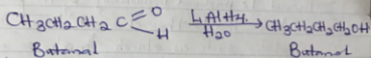


Aft, The Glucose at the same 15°C , is warmed with Enzyme, Zymase, which converts it to Alcohol (Ethanol)



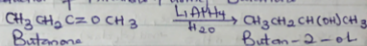
Ethanol ($\text{C}_2\text{H}_5\text{OH}$) is the final product

4 Reduction of Alkanone and Alkanal.
Reduction of Alkanal, using Butanal.



Reducing an Alkanal gives a primary alcohol

Reduction of Alkanone, using Butanone



Reducing an alkanone gives a secondary alcohol