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1.) • Alcohols can be classified 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 atom bearing the hydroxyl group are three or two the unit is a primary alcohol (1°) e.g CH_3OH (methanol), If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group is one then it is a secondary alcohol (2°) e.g $CH_3CH(OH)CH_3$ (propan-2-ol) and if there is no hydrogen atom attached to the carbon atom bearing the hydroxyl group it is called a tertiary alcohol (3°) e.g $(CH_3)_3C\text{-}OH$ (2-methyl propane 2-ol)

• Alcohols can also be classified based on the number of hydroxyl groups they possess. For Example Monohydric alcohols - Alcohols that have one hydroxyl group present in the alcohol structure e.g CH_3CH_2OH (ethanol), Dihydric alcohols or Glycols - Alcohols that have two hydroxy group present in the alcohol structure e.g $CH_3CH(OH)CH_2CH_2OH$ (Butan-1,3-diol), Trihydric alcohols or Triols - Alcohols that have three hydroxyl group present in the alcohol structure e.g $OHCH_2CH(OH)CH_2OH$ (Propane-1,2,3-triol) and Polyhydric alcohols or polyols which have more than three hydroxyl group present in the alcohol structure e.g $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$ (Heptane-2,3,4,5,6-pentaol)

CH_3CH_2 8-

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

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[15°C]{\text{(yeast) maltase}} 2C_6H_{12}O_6$$

maltose water glucose

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

$$C_6H_{12}O_6 \xrightarrow[15°C]{\text{zymase}} 2CH_3CH_2OH + 2CO_2(g)$$

glucose Ethanol

4 Alkanone - Reduction of alkanone gives secondary alcohols

$$CH_3C_2H_5-C=O \xrightarrow[LiAlH_4]{} CH_3C_2H_5CHOH$$

(2° alcohol)

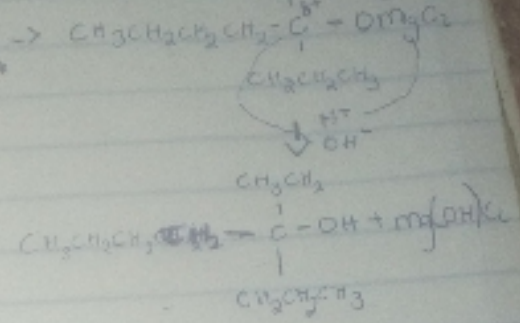
Alkanals - Reduction gives ~~alkano~~ primary alcohols

$$CH_3CH_2CH=O \xrightarrow[LiAlH_4]{H_2O} CH_3CH_2CH_2OH$$

(1° alcohol)

Triols: Alcohols that have three hydroxyl group present in the alcohol structure e.g. $OHCH_2CH(OH)CH_2OH$ (Propane-1,2,3-(triol)) and Polyhydric alcohols or polyols which have more than three hydroxyl group present in the alcohol structure e.g. $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$ (Heptane-2,3,4,5,6-pentaol)

2) $\overset{\delta-}{CH_3}CH_2\overset{\delta+}{Mg}Cl + CH_3CH_2CH_2CH_2\overset{\delta+}{C}=\overset{\delta-}{O}CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2-\overset{\delta+}{C}-\overset{\delta-}{O}MgCl$



3) Production of Ethanol

Carbohydrates e.g. 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 breaks down the carbohydrate molecules into ethanol to give a yield of 95%. On warming with water 60°C for a specific period of time it's converted into maltose by the enzyme diastase contained in the malt.

$$2(C_6H_{12}O_6)_n + H_2O \xrightarrow[60°C]{\text{Diastase (malt)}} nC_{12}H_{22}O_{11}$$

Carbohydrate water (warm) maltose