Etukudo Samuel Okanime
Pharmacy
19/MHS11/055
CHM 102

Assignment

(1)- Classification based on the number of hydrogen atoms attached to the carbon atom containing the OH group.

(i) If 2 or 3 hydrogen atoms are attached to the carbon atom bearing the OH group, it is called a primary alcohol (1°) eg Ethanol

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

(iii) If no hydrogen atom is attached to the carbon atom it is a tertiary alcohol e.g 2-Methyl propan-2-ol

- Classification based on the number of hydroxyl (OH) groups present in the compound

(i) Monohydric: They possess one hydroxyl group (OH) eg Ethanol

(ii) Dihydric: They possess two hydroxyl groups e.g butan-1,2-diol. They are also known as glycols

(iii) Trihydric: They possess three hydroxyl groups e.g glycerol

(iv) Polyhydric: They possess more than three hydroxyl groups

⇒ Pentan-1,2,3,4-tetranol

② Grignard Synthesis of Alkanols

Grignard reagent - C_6H_5MgBr

~~CH₃ CH~~

$$C_2H_5C_2H_4C=OC_3H_7 + C_2H_5MgBr \rightarrow C_4H_9C_3H_7C_2H_5-C-OMgBr$$

$$\downarrow$$

$$C_4H_9C_3H_7C_2H_5-C-OH + Mg(OH)Br$$

③ Carbohydrates such as starch are a major group of natural compounds that can be made to yield Ethanol by the biological process of fermentation. The biological catalysts, enzyme found in yeast breakdown the carbohydrate molecules into ethanol to give a yield of 95%. On warming starch with malt to 60° for a specific period of time are converted into maltose by the enzyme diatase (contained in the malt.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[\text{60°C / diatase}]{} n(C_{12}H_{22}O_{11})$$

Carbohydrate — Maltose

The maltose is broken down into glucose: On addition of yeast which contains the enzyme maltase at temperature of 15°

$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}O_6$

Maltose 15°C/Maltase Glucose

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

$C_6H_{12}O_6 \dashrightarrow 2CH_3CH_2OH + 2CO_2$

Glucose 15°C/Zymase Ethanol

④ Alkanones: Reduction of alkanones gives secondary alkanols

$CH_3C_2H_5C{=}O \dashrightarrow CH_3C_2H_5CHOH$ (2°) alcohol

$LiAlH_4$

Alkanals: Reduction of alkanals gives primary alkanols

$C_2H_5CH{=}O \dashrightarrow CH_3CH_2CH_2OH$

$LiAlH_4/H_2O$