NAME: UBANI-UCHE CHIZURUM CHIDIUTO.

DEPARTMENT: NURSING.

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1) Alcohol is classified into two categories:

a. Based on the number of hydrogen atom on the carbon carrying the OH group. If the carbon carrying the OH group has 3 or 2 hydrogen atoms attached to it, it is therefore called primary alcohol (1°). Then if it is carrying on hydrogen atom, it is called secondary alcohol (2°), if it is not carrying any hydrogen atom on the carbon atom bearing the OH group, it is then called the tertiary alcohol (3°).

b. Based on the number of OH group present in the alcohol structure. If the alcohol structure has one OH group present, it is called monohydric alcohol. If it has two OH group present in the alcohol structure, then it is called dihydric or glycol alcohol. If it has three OH group present in the alcohol structre, it is called Polyhydric alcohol or Polyol.

Example: $CH_3CH(OH)CH_2CH_2OH$ (glycol).

2) Lower alcohols with up to three carbon atoms in their molecules are soluble in water because they can form hydrogen bond with water molecules. The water solubility of alcohol decreases with increasing relatile molecular mass. All monohydric alcohols are soluble in organic solvent. Solubility of a simple alcohol ~~are soluble~~ and Polydric alcohols is due to their ability to form hydrogen bonds with their water molecules.

3) Carbohydrates such as starch produce ethanol via fermentation process.

- STEP 1:

Breaking down of carbohydrate into maltose with the acid of the enzyme diastase found in malt at a temperature of 60°C.

$\underset{\text{carbohydrate.}}{2(C_6H_{10}O_5)_n} + H_2O \xrightarrow[60°C]{\text{diastase}} \underset{\text{maltose}}{nC_{12}H_{22}O_{11}}$

- STEP II:

Breaking down of maltose into glucose on the addition of yeast which contains the enzymes maltose at a temperature of 15°C.

$\underset{\text{maltose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{\text{maltos/15°c}} \underset{\text{glucose.}}{2C_6H_{12}O_6}$

- STEP III:

Conversion of glucose to ethanol by the enzymes zymase contained in yeast at a temperature of 15°c.

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

4) $(CH_3)_2CHC{=}O + CH_3CH_2CH_2CH_2MgCl \longrightarrow$

$(CH_3)_2CH-\underset{\displaystyle CH_3CH_2CH_2CH_2}{\overset{\displaystyle H}{\underset{|}{C}}}-OH + Mg(OH)Cl \xleftarrow{H^+\,OH^-} (CH_3)_2CH-\underset{\displaystyle CH_3CH_2CH_2CH_2}{\overset{\displaystyle H}{\underset{|}{C}}}-O\,mgcl$

7) $H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\underset{|}{CH}}}-\overset{\displaystyle O}{\overset{\|}{C}}-H \xrightarrow{NaOH+/H_2O} H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\underset{|}{CH}}}-\underset{\displaystyle H}{\overset{\displaystyle OH}{\underset{|}{C}}}-H$

2-methyl Propanal

2-methyl Propanol.

8) $CH_3CH_2CH_2OH + H_2SO_4 \longrightarrow CH_3CH_2CH_2OH_2^{\oplus}OSO_3H$

Propan-1-ol

$\downarrow H_2O^-$

$CH_3CH(OH)CH_3 \xleftarrow{H^+\ OH^-} CH_3CH=CH_2 \xleftarrow{H_2SO_4} CH_3CH_2CH_2OSO_3H$

Propan-2-ol