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MATRIC NO:- 19/MHS01/010 DEPT:- MBBS

1) a. The first classification is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. They are divided into three which are primary alcohol - when the number of ~~hydrogen~~ hydrogen atom attached to the carbon atom bearing the hydroxyl group are three or two, secondary alcohol (2°) if there are one hydrogen atom, and tertiary alcohol (3°) - if ~~the number of hy~~ there are hydrogen atom attached to the carbon atom. e.g CH_3OH → Methanol (primary alcohol), $CH_3CH(OH)CH_3$ propan-2-ol (secondary alcohol), $(CH_3)_3C-OH$ - 2methylpropan-2-ol (tertiary alcohol).

b. This is based on the number of hydroxyl groups they possess. Monohydric alcohol has one hydroxyl group present in the alcohol structure. Dihydric alcohol has ~~also called~~ two hydroxyl groups present in the alcohol structure, trihydric alcohols has 3 hydroxyl groups present in the structure and polyhydric alcohols has more than three hydroxyl groups. e.g CH_3CH_2OH Ethanol (monohydric), $HOCH_2CH_2OH$ Ethan-1,2-diol (Dihydric), $OHCH_2CH(OH)CH_2OH$ propan-1,2,3-triol (Trihydric alcohol) $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH_3$ Heptan-2,3,4,5-~~penta~~ tetrol (polyhydric)

2) Solubility in water:- lower alcohols with up to three carbon atoms in their molecules are soluble in water because of the increase in hydrogen bond, solubility in organic solvents:- All monohydric alcohols are soluble in organic solvents.

3) Carbohydrates 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 enzyme found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%

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$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[60^\circ C]{\text{diastase}} n\,C_{12}H_{22}O_{11}$$

Carbohydrate → maltose

The maltose is broken into glucose on addition of yeast which contain the enzyme maltase and at a temp. of 15°C

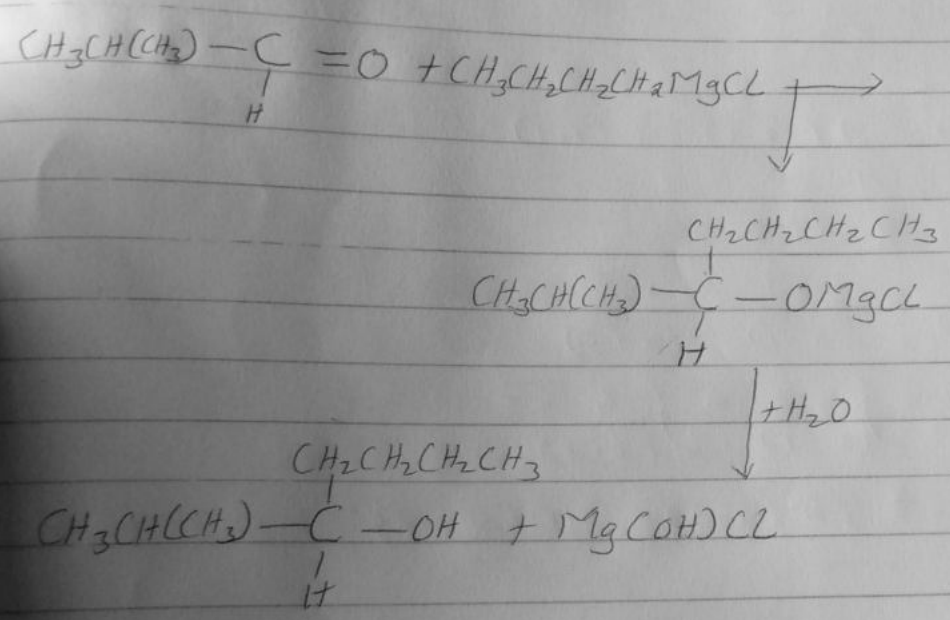
$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[15^\circ C]{\text{maltase}} 2\,C_6H_{12}O_6$$

maltose → glucose

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

$$C_6H_{12}O_6 \xrightarrow[15^\circ C]{\text{zymase}} 2\,CH_3CH_2OH + 2CO_2$$

ethanol



7) $H-\underset{H}{\overset{H}{C}}-\underset{H}{\overset{CH_3}{C}}-\underset{H}{C}=O + H_2O \longrightarrow CH_3CH(CH_3)CH_2OH$

2 methyl propanal → 2 methyl propanol

8) $CH_3CH_2CH_2OH + H_2SO_4 \longrightarrow CH_3CH_2CH_2OH_2OSO_3H$

$$\downarrow -H_2O$$

$$CH_3CH_2CH_2OSO_3H$$

$$\downarrow$$

$$CH_3CH=CH_2 + H_2SO_4$$

$$\downarrow +H^+, OH^-$$

$$CH_3CH(OH)CH_3$$ Propan-2-01