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19/MHS01/440

MEDICINE AND SURGERY

CHEM 102

1. Alkanols , popularly known as alcohols, can be majorly classified into two which are:
2. Classification based on the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group. If the numbers of hydrogen attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol ( 1°), if it is one hydrogen atom it is called secondary alcohol (2°) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (3°). Examples include; CH3OH (methanol,1°), CH3CH(OH)CH3 (propan-2-ol,2°).
3. Classification based on the number of hydroxyl group they possess. Monohydric alcohols have only one hydroxyl group present in the alcohol structure. Dihydric alcohols, also known as glycol, have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure. Polyhydric alcohols have more than three hydroxyl groups. Examples include; CH3CH2CH2OH (propanol, monohydric), HOCH2CH2OH (ethane-1,2-diol, dihydric).
4. In water: alcohols are soluble in water. This is due to the hydroxyl group in the alcohol which is able to form hydrogen bonds with water molecules. Alcohols with smaller hydrocarbon chain are very soluble, as the length of the hydrocarbon chain increases, the solubility in water decrease. The reason why the solubility decreases as the length of hydrocarbon chain increases is because it requires more energy to overcome the hydrogen bonds between the alcohol molecules as the molecules are more tightly packed together as the size and mass increases.

In organic solvents: all monohydric alcohols are soluble in organic solvents.

1. Ethanol fermentation, also called alcoholic fermentation, is a biological process which converts sugars such as glucose, fructose and sucrose into cellular energy, producing ethanol and carbon dioxide as by-products. Starch is carbohydrate and is an important source of ethanol. Generally potato, rice, maize or barley are used as source of starch. The starch containing materials are mashed and on warming with malt to 60°C for a specific period of time are converted into maltase by enzyme diastase contained in malt.

2(C6H1005) + nH2O nC12H22O11

Carbohydrate 60°C/diastase maltose

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

C12H22011 + H2O 2C6H12O6

15°C/ maltase

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

2C6H1206  2CH3CH2CH2OH + 2CO2

1. Aldehyde: CH3CH-C=O

CH3 H

Grignard reagents: CH3CH2CH2CH2MgCl

CH4

CH3CH2CH2CH2MgCl + CH3CH – C=O CH3CH2CH2CH2 – C – OMgCl

CH3  H CH3CH

H+ OH-

CH4

CH3CH2CH2CH2 – C – OH + Mg(OH)Cl

CH3CH

1. Question invalid.
2. Question invalid

LiAlH4

1. CH3CH – C=O CH3CHCH2OH

CH3 H H20 CH3

1. CH3CH2CH2OH + H2SO4 CH3CH2CH2OH2OSO3H

-H20

CH3CH2CH2OSO3H

H2SO4

CH3CH=CH

H+  OH-

CH3CH(OH)CH3