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DEPARTMENT: PHARMACY MATRIC NO: 19/MHS11/149.

1. CLASSIFICATION OF ALCOHOLS

Alcohols can be classified based on the following;

1. Based on the number of hydrogen atom attached to the carbon atom containing the hydroxyl group. We have;
2. PRIMARY ALCOHOL: this is an alcohol in which the number of hydrogen atom attached to the carbon carrying the –OH group are three or two. Examples are; CH3OH (Methanol)
3. SECONDARY ALCOHOL: This are alcohol which the number of hydrogen atom attached to the carbon atom carrying the –OH group is one. Examples are; CH3CH(OH)CH3 – Prapan-2-ol
4. TERTIARY ALCOHOL: These are alcohols with no hydrogen atom attached to the carbon atom carrying the –OH group. Examples are;

(CH3)3C-OH 2-Methylpropan-2-ol

 Ii Based on the number on hydroxyl group they possess;

1. MONOHYDRIC ALCOHOL: this are alcohols that have one hydroxyl group present in the alcohol structure. E.g CH3CH2CH2OH Propanol
2. DIHYDRIC ALCOHOL: this are alcohols containing two hydroxyl group presents in their alcohol structure. E.g. OHCH2CH2OH Ethane -1,2 diol

 C. TRIHYDRIC ALCOHOL: These are alcohol with three hydroxyl group present in their alcohol structure. E.g OHCH2CH (OH) CH (OH) CH3 Butan-1, 2, 3-triol

 d. POLYHYDRIC ALCOHOL: These are alcohol with more than three hydroxyl group present in the structure. E.g. CH3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH3 Heptane-2,3,4,5,6-pentaol.

1. Solubility of alcohols:

IN WATER; Alcohol is soluble in water due to the hydroxyl group present in the alcohol which is able to form hydrogen bonds with water molecules. Alcohols with a smaller hydrocarbon chain are very soluble. As the length of the hydrocarbon chain increases, the solubility in water decreases. With four carbon in the hydrocarbon chain and higher, the decrease in the solubility becomes visible as the mixture forms two immiscible layers of liquid.

IN ORGANIC SOLVENT:

All monohydric alcohols are soluble in organic solvents. Alcohols above 4 carbon are more soluble in organic solvent.

1. INDUSTRIAL PREPARATION OF ETHANOL:
2. The starch containing materials include molasses, potatoes, cereals, rice etc. warming with malt to 600C for a specific period of time and converted into maltose by the enzyme **diastase** contained in malt.

2(C6H10O5) n + nH20 nC12H22O11

Carbohydrate 60oC/ diastase Maltose

1. The maltose is broken down into glucose on the addition of yeast which contains the enzyme **maltase** and a temperature of 15oC.

 C12H22O11 + H2O 2C6H12O6

Maltose 150C/maltase glucose

1. The glucose at constant temperature of 150C is then converted into ethanol by an enzyme **zymase** contained in yeast.

C6H12O6  2CH3CH2OH + 2CO2

Glucose 150C/ zymase Ethanol carbon (IV) oxide

1. The reaction between 2-methylpropanal and butylmagnesiumchloride.

 d- d+ d+ d-

CH3CH2CH2CH2MgCl + (CH3)2 CH-C=O (2methylpropanal)

 (Butylmagnesiumchloride) |

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1. The reduction reaction of 2-methylpropanal

 CH3 O CH3 OH

 | || NaBH4 | |

 H3C − CH ── C ──H H3O+ H3C −CH− C−H

 2-Methylpropanal 2-Methylpropanol

1. Conversion of Propan-1-ol to propan-2-ol

CH3CH2CH2OH CH3CHOHCH3

Propan-1-ol propan-2-ol

CH3CH2CH2OH + H2SO4 CH3CH2CH2OH2OSO3H

 -H2O

 CH3CH2CH2OSO3H

 -H -H2SO4

 CH3CHOHCH3 H+  OH- CH3CH=CH2

 Propan-2-ol propene