Name: Bulus Ritkhat Amos

Couse: Medicine and surgery

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CHM 102

(1)

i. Monohydric alkanol: these ae alkanols with only one hydroxyl group (OH) in their molecule. The first three members of the family are:

-Methanol: CH₃OH (commonly known as wood spirit)

-Ethanol: CH₃CH₂OH

-Propanol: CH₃CH₂CH₂OH

ii. Polyhydric alkanol: this class of alkanols contain more than one hydroxyl group per molecule. It occurs in two sub-classes namely; the dihydric alkanol and the Trihydric alkanol.

Example:

Dihydric alkanol: Ethane-1,2-diol (ethylene glycol)

Trihydric alkanol: Propan-1,2,3,triol (glycerol)

(2)

Grignard synthesis of alkanols

CH₃CH₂MgBr + CH₃CH₂CH₂CH₂C=OCH₂CH₂CH₃ −−−−−−−−−−−→

CH₃CH₂-CH₃CH₂CH₂CH₃CH₂CH₂CH₂C- 0-MgBr−−−− H⁺ OH⁻

(hydrolysis)−−−−−−→CH₃CH₂-CH₃CH₂CH₂-C-CH₃CH₂CH₂CH₂-OH + Mg (OH)Br

(3)

Fermentation is the chemical process that involves the breaking down of molecules such as glucose anaerobically with the release of carbon dioxide and alcohol.

The production of ethanol by fermentation occurs in three basic steps:

From starch grains

2(C₆H₁₀O₅) n + nHO −−−−−diastase(60◦c)−−−−→C₁₂H₂₂O₁₁

C₁₂H₂₂O₁₁ + H₂O −−−−−−maltase (15◦)−−−−−−−→C₆H₁₂O₆

C₆H₁₂O₆ −−−−−−−−−zymase(15◦c)−−−−−−−−−−→2C₂H₅OH + 2CO₂

(4)

Reduction of alkanone

Alkanone are reduced to the corresponding secondary alkanol.

Reduction of alkenone using Conc.H₂SO₄

Propan-1-ol to propan-2-ol

CH₃-CH₂-CH₂-OH ---------Conc.H₂SO₄/170◦C-------------→CH₃CH=CH₂

Propan-1-ol (-H₂O) propan-1-ene

CH₃CH=CH₂ ------------------------HBr--------------------------→CH₃-HCBr-CH₃

CH₃-HCBr-CH₃ -----------------------KOH-----------------------→CH₃-OHCH-CH₃

Propan-2-ol

Reduction of alkanal

Alkanals can be reduced to the corresponding primary alkanol by reducing agents such as lithium tetahydeidoaluminate(iii) (LiAlH₄).

E.g. Ethanal is reduced to ethanol

CH₃-C=O – H +2(H) --------------------------→ CH₃CH₂OH

Ethanal ∆ ethanol