ELEMSON BOMA JESSE

CHM 102

MEDICAL AND HEALTH SCIENCES

HUMAN ANATOMY

19/MHS03/003

ASSIGNMENT:

1. The two major classifications of alkanols are;

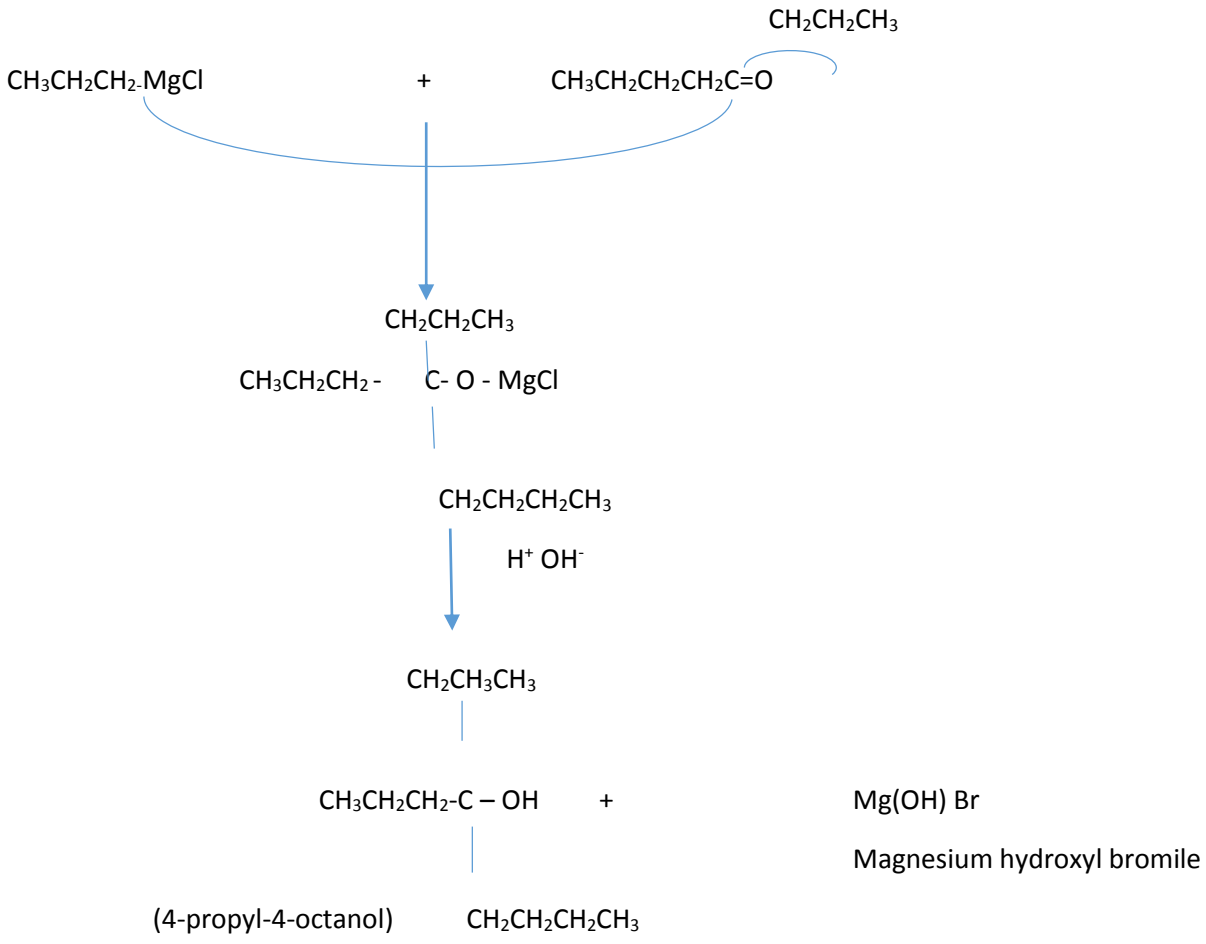
a) Based on the number of hydrogen atoms attached to the carbon containing the hydroxyl group. It consist of primary alkanol, secondary alkanol and tertiary alkanol. Examples; CH3OH Methanol (primary alcohol), $CH_3C(OH)CH_3$ Propan-2-ol (secondary alcohol)

b) Based on the number of the hydroxyl groups they possess. It consists of; monohydric, dihydric, trihydric alkanol. Examples are; CH3CH2CH2OH Propanol (Monohydric alkanol), $CH_3CH(OH)CH_2CH(OH)CH_2CH_3$ Hexane-2,4-diol(Dihydric alkanol)

2. $CH_3CH_2CH_2MgCl$ + $CH_3CH_2CH_2CH_2C{=}OCH_2CH_2CH_3$

Propyl magnesium chloride — 4-Octanone

(Grignard reagent) — Octan-4-none



3. Industrial production of ethanol

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, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials includes; rice and cereals and on warming with malt to 60 degree Celsius for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

$2(C_6H_{10}O_5)n + nH_2O \longrightarrow nC_{12}H_{22}O_{11}$

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 degree Celsius.

$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}0_6$

Maltose 15°C/maltase Glucose

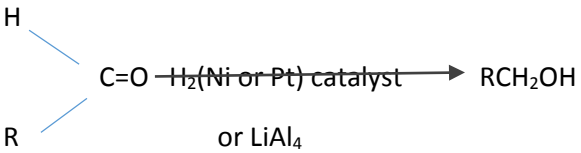
The glucose at constant temperature of 15 degree Celsius is then converted into alcohol by the enzyme Zymase contained also in yeast.

$C_6H_{12}O_6 \longrightarrow 2CH_3CH_2OH + 2CO_2$

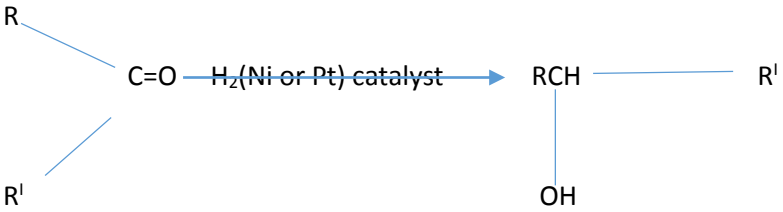
Glucose 15°C/zymase Ethanol.

4. Production of alkanones and alkanals

Alkanals and Alkanones are reduced to primary and secondary Alkanols respectively by reaction with hydrogen in the presence of a platinum or nickel catalyst or with aluminium proponide or with complex metal hydride, such as Lithium tetrahydridoaluminate(iii) ($LiAlh_4$) or sodium tetrahydridoborate (iii) ($NaBH_4$)

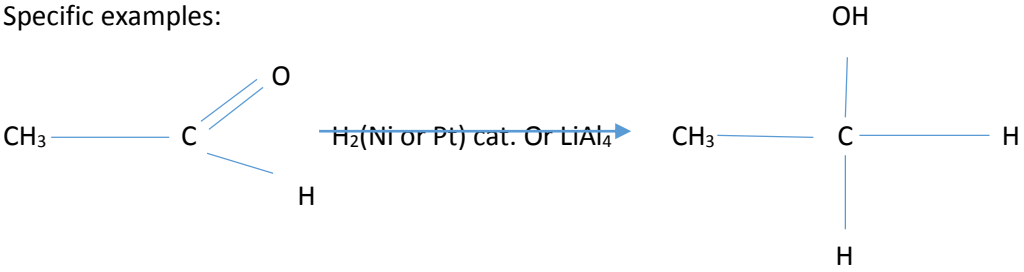


Alkanals Primary Alkanols



Alkanones Secondary Alkanols

Specific examples:



Ethanal

Ethanol