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COLLEGE: MEDICINE AND HEALTH SCIENCES

DEPARTMENT: MEDICINE AND SURGERY

MATRIC NO: 19/MHS01/400

COURSE: CHM 102.

1. The major classification of alkanols are:

i Classification based on number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen atoms 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 are CH_3OH - Methanol (1°), $CH_3CH(OH)CH_3$ Propan-2-ol (2°).

ii Classification based on the number of hydroxyl groups they possess: Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called glycols or diols and they have two hydroxyl groups present in the alcohol structure while ~~bay~~ trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than three hydroxyl groups. Examples are $HOCH_2CH_2OH$ Ethane-1,2-diol (dihydric alcohol), $CH_3CH_2CH_2OH$ propanol (monohydric alcohol).

3. The industrial manufacture of ethanol includes the following processes:

Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The starch containing materials include molasses and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diatase contained in the malt

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow{60°C/\text{diatase}} nC_{12}H_{22}O_{11}$$

carbohydrate → maltose

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

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{15°C/\text{maltase}} 2C_6H_{12}O_6$$

maltose — glucose

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

$$C_6H_{12}O_6 \xrightarrow{15°C/\text{zymase}} 2CH_3CH_2OH + 2CO_2.$$

glucose

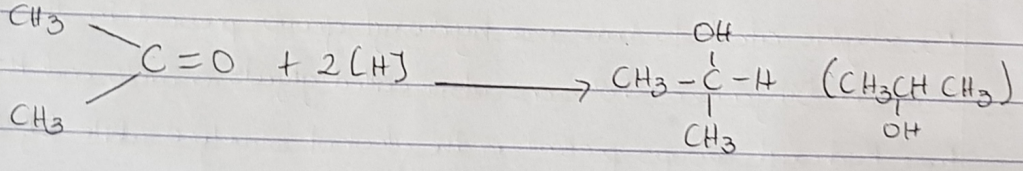
4. Reduction of Alkanone.

When an alkanone is reduced, it ~~reacts~~ produces a secondary alcohol.

$$RR'C=O \xrightarrow{LiAlH_4/(C_2H_5)_2O\ [H_2]} RR'CHOH$$

alkanone — secondary alcohol.

Example.



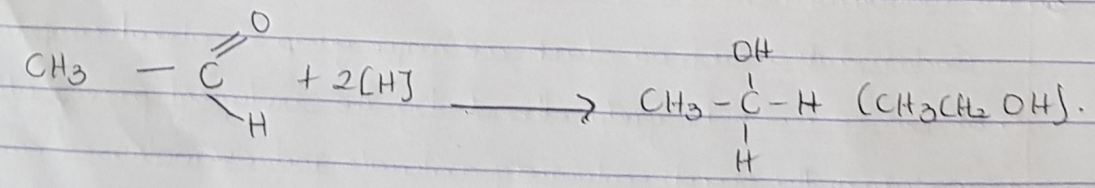
Reduction of Alkanal.

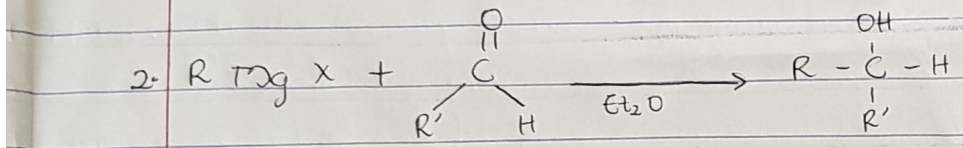
When an alkanal is reduced, it produces a primary alcohol

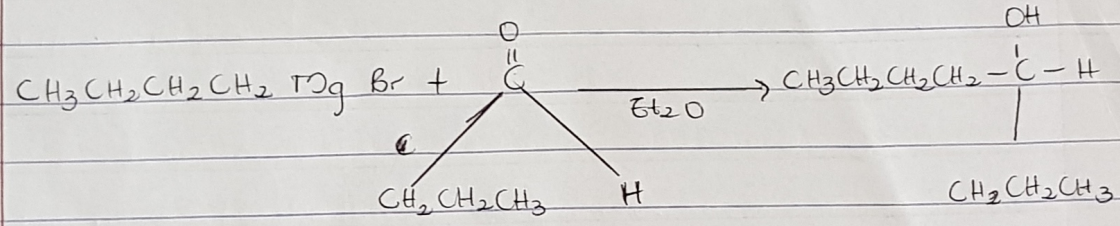
$$RCHO \xrightarrow{LiAlH_4/(C_2H_5)_2O\ [H_2]} RCH_2OH$$

alkanal — primary alcohol

Example



2. 
R MgX +
O
C
R'
H
Et2O
OH
R - C - H
R'


CH3CH2CH2CH2 MgBr +
O
C
CH2CH2CH3
H
Et2O
CH3CH2CH2CH2 - C - H
OH
CH2CH2CH3