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CHM 102 ASSIGNMENT

1) Two major classifications of Alkanols.
There are two major ways of classifying alkanols which are:

=> This type of classification is based on the number of hydrogen atoms attached to the carbon ~~to~~ atom containing the hydroxyl group. This classification divides alkanols into three. They are:

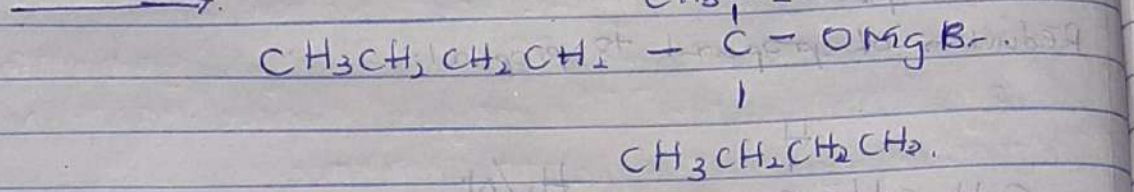
- Primary alkanols: Alkanols in which the carbon bearing the hydroxyl group has two or three hydrogen atoms attached to it. e.g. CH_3OH, CH_3CH_2OH
- Secondary alkanols: Alkanols in which the carbon bearing the hydroxyl group has one hydrogen atom attached to it. $CH_3CH(OH)CH_3$.
- Tertiary alkanols: Alkanols in which the carbon bearing the hydroxyl group has ~~one~~ no hydrogen atom attached to it. $(CH_3)_3C-OH$

=> The second type of classification is based on the number of hydroxyl groups that alkanols possess. They divide alkanols into four.

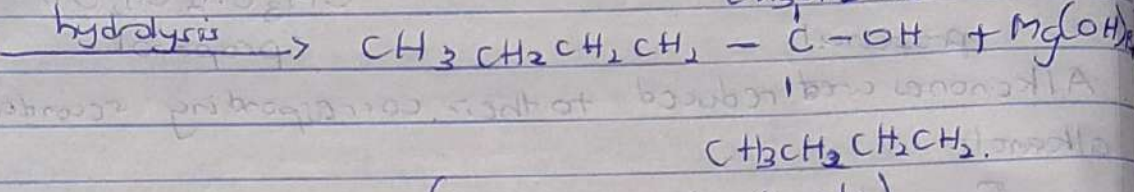
- Monohydrid alkanols: Alkanols which have one hydroxyl group present in the alkanol ~~group~~. Structure e.g $CH_3CH_2CH_2OH$
- Dihydric alkanols: Alkanols which have two hydroxyl groups present in the alkanol structure. They are also reffered to as glycols. e.g $HOCH_2CH_2OH$
- Trihydric alkanols: Alkanols which have three hydroxyl groups present in their alkanol structure. They are also reffered to as triols. e.g $OHCH_2CH_2(OH)CH_2OH$.
- Polyhydric alkanols: Alkanols which have more than three hydroxyl groups in their alkanol structures. They are also reffered to as polyols. eg $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$.

2. $CH_3CH_2CH_2CH_2C(=O)CH_2CH_2CH_3$ + $CH_3CH_2CH_2CH_2MgBr$ (Buthyl magnesium bromide)

$\longrightarrow$



hydrolysis $\longrightarrow$



(4-buthyl-octan 4-ol.)

The name of the Grignard reagent is Buthyl magnesium Bromide. ($CH_3CH_2CH_2CH_2MgBr$).

3. Generally, starchy foods such as rice, maize or barley are used as a source of starch. Potato among the lot is the most common.

⇒ Extraction of starch: The potatoe is crushed and then steamed at 140°C to 150°C under pressure to prepare starch solution known as mash. Before hydrolysis, starch undergoes germination at 100°C to 130°C for a few days. This germinated starch is called malt.

⇒ Hydrolysis of Starch: starch is hydrolysed to maltose by an enzyme known as diatase.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[50°-60°]{\text{Diatase}} n(C_{12}H_{22}O_{11})$$

starch. (maltose)

⇒ Yeast is then added at room temperature. Yeast contains 2 enzymes. Maltase which converts the maltose to glucose.

$$C_{12}H_{22}O_{11}(aq) + H_2O(l) \xrightarrow{\text{maltase}} 2C_6H_{12}O_6(aq)$$

(maltose) (glucose)

And zymase which then decompose the glucose into ethanol and carbon(iv)oxide.

$$C_6H_{12}O_6(aq) \xrightarrow{\text{Zymase}} 2C_2H_5OH(aq) + 2CO_2(g).$$

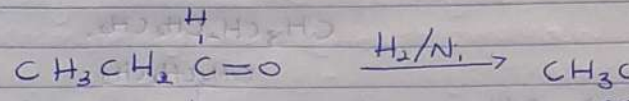
(glucose) (ethanol)

4.

4. Alkanals are reduced to their corresponding primary alkanols.

Example:

Reduction of propanal to propanol.

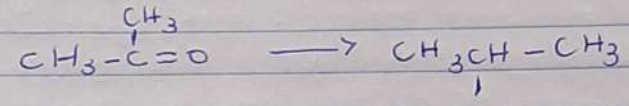


propanal — propanol.

Alkanones are reduced to their corresponding secondary alkanols

Example:

Reduction of propan-2-one to propan-2-ol.



propan-2-one — propan-2-ol.