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**COMPUTER ENGINEERING 19/ENG02/051**

**CHM102 ASSIGNMENT**

**1**

Alcohol classification is an application of the neutral bonding patterns for organic compounds. The alcohol functional group requires that one of these bonds form with hydrogen to create the hydroxyl group and the other bond needs to be with carbon to create an alcohol.

**Primary alcohols:** In a primary (1°) alcohol, the carbon which carries the -OH group is only attached to one alkyl group.

CH3-CH2-**OH**

Notice that it doesn't matter how complicated the attached alkyl group is. In each case there is only one linkage to an alkyl group from the CH2 group holding the -OH group. There is an exception to this. Methanol, CH3OH, is counted as a primary alcohol even though there are no alkyl groups attached to the carbon with the -OH group on it.

**Secondary alcohols:** In a secondary (2°) alcohol, the carbon with the -OH group attached is joined directly to two alkyl groups, which may be the same or different.

**OH**

CH3-CH-CH3

**Tertiary alcohols:** In a tertiary (3°) alcohol, the carbon atom holding the -OH group is attached directly to three alkyl groups, which may be any combination of same or different.

**OH**

CH3-C-CH3

CH3

**2**

**Solubility in water:** Alcohols are soluble in water. This is due to the hydroxyl group 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 solubility becomes visible as the mixture forms two immiscible layers of liquid. Also, all monohydric alcohols are soluble in organic solvents

**3**

**BY THE FERMENTAION OF STARCH**

Starch is carbohydrate and is an important source of ethanol. Generally potato, rice, maize or barley is used as source of starch. Use of potato for starch is very common.

STEPS OF PREPARATION

**STEP 1:** EXTRACTION OF STARCH

The crushed potato is steamed at 140OC to 150OC under pressure to prepare starch solution known as MASH.

GERMINATION Before hydrolysis, starch is first undergo germination at 10OC to 13OC for few days. This germinated starch is called MALT.

**STEP 2:** HYDROLYSIS OF STARCH

Starch is hydrolyzed to maltose by an enzyme known as diastase.

2(C6H10O5) + nH2O n(C12H22O11)

Starch Maltose

**STEP 3:** FERMENTATION

Finally yeast is added to maltose.

Yeast secrets two enzymes:

Maltase: converts maltose into glucose.

Zymase: converts glucose into ethanol.

C12H22O11 + H2O 2C6H12O6

C6H12O6 C2H5OH + 2CO2

**4**

2-methylpropanal and butylmagnesium chloride

C4H9

CH3CH(CH3) – C = O + C4H9(Mg)Cl CH3CH(CH3) - C – OMgCl

H

C4H9  C4H9

CH3CH(CH3) – C – OMgCl H+ OH- CH3CH(CH3) – C – OH + Mg(OH)Cl

H H

C4H9

Produces: CH3CH(CH3) – C – OH + Mg(OH)Cl

H

2 methyl-heptan-3-ol

**7**

The reduction of 2-methylpropanal

H

CH3CH(CH3)-C=O LiAlH4 CH3CH(CH3) -C-OH

H H

Aldehyde Primary alcohol

**8**

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

CH3CH2CH2OH + H2SO4  CH3CH(OSO3H)CH3 + H2O

Propan-1-ol

CH3CH(OSO3H)CH3  -H2SO4 CH3CHCH2 + H2O

CH3CHCH2 +H2O CH3C(OH)=CH2

CH3CH(OH)CH3 (**Propan-2-ol)**