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Anatomy

MHS.

1.Classification of Alcohols. A.Classification based on the number of hydrogen atoms attached to the carbon atom contained the hydroxyl group.If the numbers of hydrogen atoms attached to the carbon atoms bearing the hydroxyl group are three or two,it is called primary Alcohols.if it is bearing one hydrogen atom,it is secondary alcohols.If it is bearing no hydrogen atom,it is called a tertiary alcohols. Examples are:

Primaryalcohols:CH3OHMethanol(1°) ,CH3CH2OH Ethanol(1°)

Secondary alcohols:CH3CH(OH)CH3 Proopan-2-ol(2°).

Tertiary alcohol:(CH3)3C-OH.

B. This is based on the number of hydroxyl groups they possess.Monohydric alcohols have one hydroxyl group present in the alcohol structure.Dihydric alcohols are those with two and also called glycols.trihydric have three and also called trials.polyhydric alcohols or polyps have more than three hydroxyl groups. Examples are:

CH3CH2CH2OH(Monohydric alcohol)

HOCH2CH2OH(Dihydric alcohol)

OHCH2CH(OH)CH2OH(Trihydric alcohol)

CH3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH3(polyhydric alcohol).

3.1). **By fermentation**

The important reaction in the production of ethanol by fermentation is the catalytic conversion of the sugar (glucose) into alcohol by the enzyme zymase, which is found in yeast.

The sugar is usually obtained from cheap sources that may be available.

E.g. i. From starchy food stuffs like rice, potatoes and barley: the starchy food stuffs are pressure- cooked to release the starch granules and then treated with malt (partially sprouted barley) for about an hour at 60oC.

The malt supplies an enzyme, diastase which hydrolyses the starch to sugar (maltose).

 2C6H10O5(aq)

Starch +H2O(l)   diastase →

 C12H22O11(aq)

maltose

 Yeast is added at room temperature- yeast contains two enzymes - maltase and zymase. Maltase hydrolyses maltose to glucose.

 C12H22O11(aq)+H2O(l)   moltase →

 2C6H12O6(aq)

Zymase catalyses the decomposition of glucose to ethanol and carbon(IV) oxide.

 C6H12O6(aq).

3.***The reduction of an aldehyde***

You get exactly the same organic product whether you use lithium tetrahydridoaluminate or sodium tetrahydridoborate.

For example, with ethanal you get ethanol:

CH3CH2OH + O2 → CH3COOH + H2O.

Notice that this is a simplified equation - perfectly acceptable to UK A level examiners. [H] means "hydrogen from a reducing agent".in general terms, reduction of an aldehyde leads to a ***primary alcohol***.

***The reduction of a ketone***

Again the product is the same whichever of the two reducing agents you use.

For example, with propanone you get propan-2-ol:

CH3-C(CH3)=O +H2-------------(In presence of platinum) give propan-2-ol.

Reduction of a ketone leads to a ***secondary alcohol***.