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ASSIGNMENT.

1. Alcohols can be classified based on the following:

- i. The number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group: if the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group is two or three, it is referred to as a primary alcohol (1°). If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group is one, it is referred to as secondary alcohol (2°) BUT, if no hydrogen atom is attached to the carbon atom, it is referred to as tertiary alcohol (3°).

Examples are:

Methanol – Primary alcohol.

Propan-2-ol – Secondary alcohol.

2-Methylbutan-2-ol – Tertiary alcohol.

- ii. The number of hydroxyl groups present: alcohols with just one hydroxyl group are referred to as MONOHYDRIC, those with two hydroxyl groups are referred to as DIHYDRIC, and those with three are referred to as TRIHYDRIC or TRIOLS. While those with more than four are referred to as POLYHYDRIC or POLYOLS.

Examples are:

CH₃OH (Methanol) – Monohydric Alcohol

OHCH₂CH₂OH (Ethane-1, 2-diol) – Dihydric Alcohol

OHCH₂CH(OH)CH₂OH (Propan-1, 2, 3- triol) – Trihydric Alcohol

2. Solubility of alcohols in water: lower alcohols with up to three carbon atoms in their molecules are soluble in water because of their tendency to form hydrogen bond with water. Thus, the solubility of alcohols decreases as their relative molecular mass increases.

3. Industrial manufacturing of ethanol:

STEP 1: The hydrolysis of starch.

Starch is hydrolyzed to maltose by an enzyme known as diastase under 60 degrees Celsius.



Carbohydrate 60°C Diastase Maltose

(Starch) (Enzyme)

STEP 2: Conversion of maltose.

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



Maltose

15°C/maltose

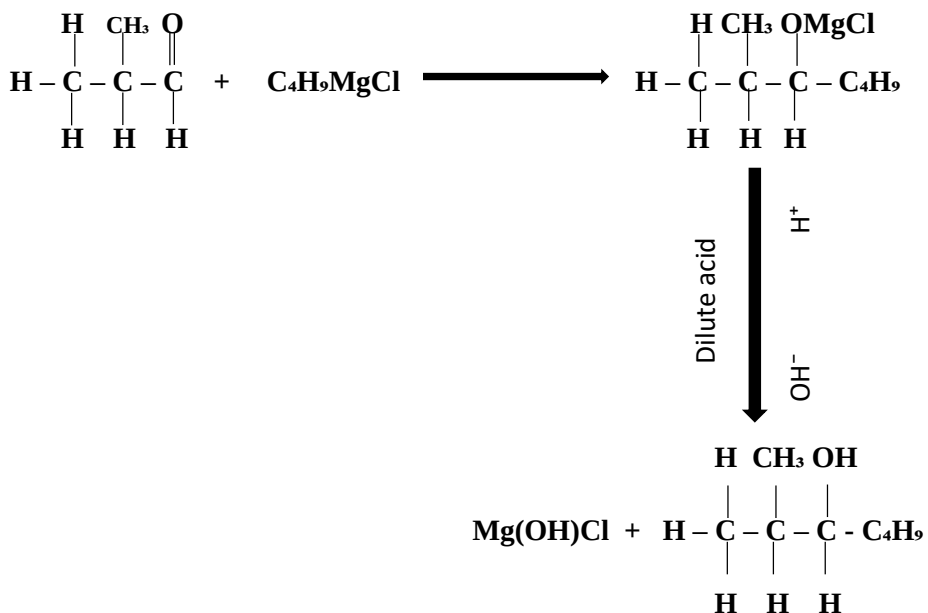
glucose

STEP 3: The glucose of constant temperature of 15°C is then converted into alcohol by enzymes zymase contained also in yeast.

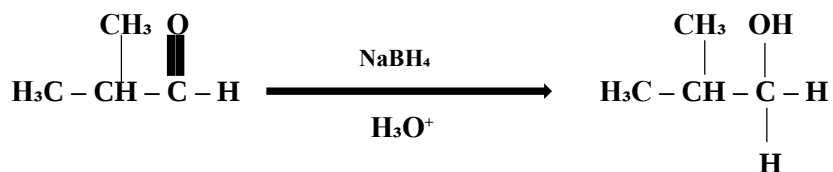


Glucose 15°C/zymase Ethanol

4. Reaction between 2-methylpropanal and butylmagnesiumchloride:



5. Reduction reaction of 2-methylpropanal:



6. Conversion of propan-1-ol to propan-2-ol:

