① Alcohols are classified into 3

ⓐ Primary Alcohols (1°) → When 2 or 3 atoms of Hydrogen are attached to the Carbon atom with OH

Example; CH_3OH → Methanol

ⓑ Secondary Alcohols (2°) → When 1 atom of hydrogen is attached to the Carbon atom with OH

Example; $CH_3CH_2CH_2CHOHCH_2CH_3$ → Hexanol

ⓒ Tertiary Alcohols (3°) → No atom of hydrogen attached the the Carbon with the OH

Example; $(CH_3)_3C-OH$ → Butanol

② Alcohols are soluble in water due to the hydroxyl group in the alcohol which is able to form hydrogen bonds with water molecules.

③ Industrial manufacture of alcohol by:

ⓐ Reacting ethene with steam using solid silicon dioxide coated with phosphoric(v) acid as a catalyst.

$$CH_2=CH_{2(g)} + H_2O_{(g)} \xrightleftharpoons{H_3PO_4} CH_3CH_2OH_{(g)}$$

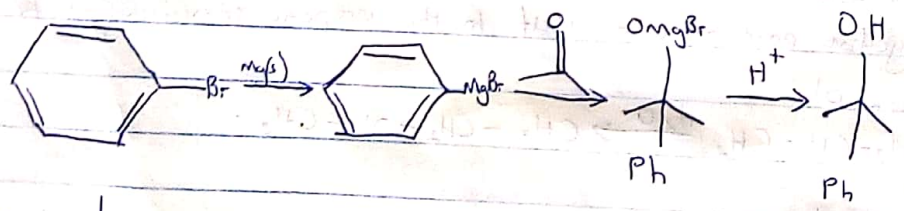
ⓑ Fermentation

The starting material is a starchy plant material.

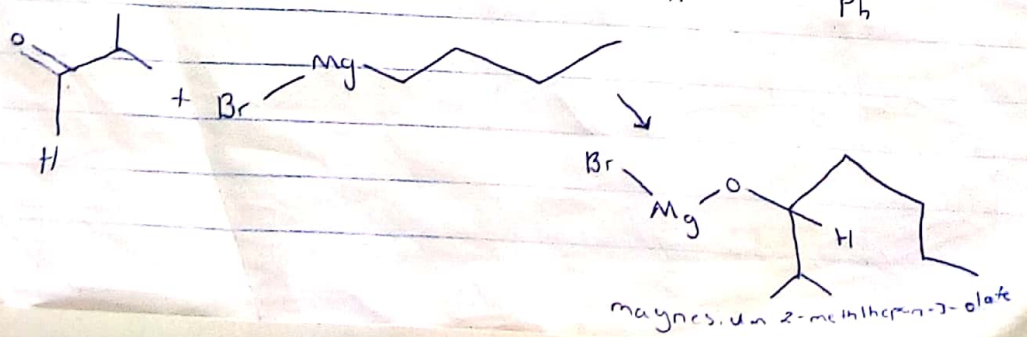
- Break down the complex carbohydrates in the starch into simpler ones.
- Add yeast and keep the mixture warm (35°C)
- Enzymes in the yeast convert the carbohydrates into simpler ones and then converts them into ethanol

$$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}O_6$$

④

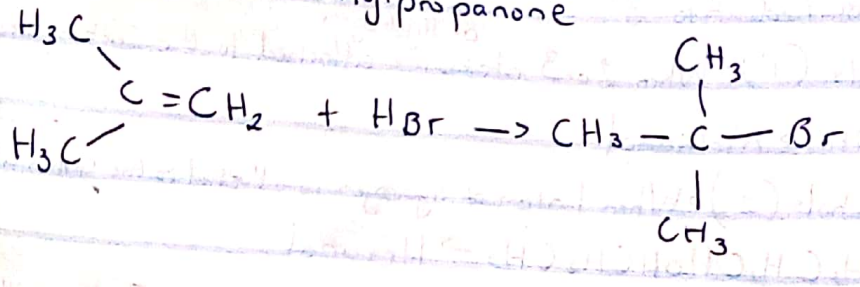


⑤



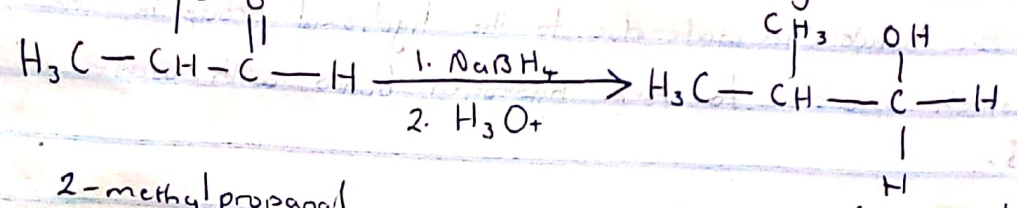
magnesium 2-methylbutan-2-olate

⑥ Reduction of 2-methylpropanone



⑦ Reduction of 2-methylpropanal

The reducing agent used is Sodium borohydride ($NaBH_4$)



2-methylpropanal

2-methylpropanol

⑧ Conversion of propan-1-ol to propan-2-ol.

→ For the conversion, ~~you~~ concentrated sulfuric acid (H_2SO_4) and water will be needed.

→ Propan-1-ol is treated with H_2SO_4 causing dehydration to occur converting it to Propene.

$$CH_3CH_2CH_2OH \xrightarrow{\text{Conc. } H_2SO_4} CH_3CH = CH_2$$

→ Using Markownikoff's addition which states that when an unsymmetrical reagent is used, the negative part of the reagent gets attached to the carbon atom of the alkene that has less number of hydrogen atoms.

→ The agent used here is H_2O which comprises of H^+ and OH^-.

→ The negative part attaches itself to the propene converting it to Propan-2-ol.

$$CH_3-CH=CH_2 \xrightarrow{H_2O} CH_3-CH_2-OH-CH_3$$