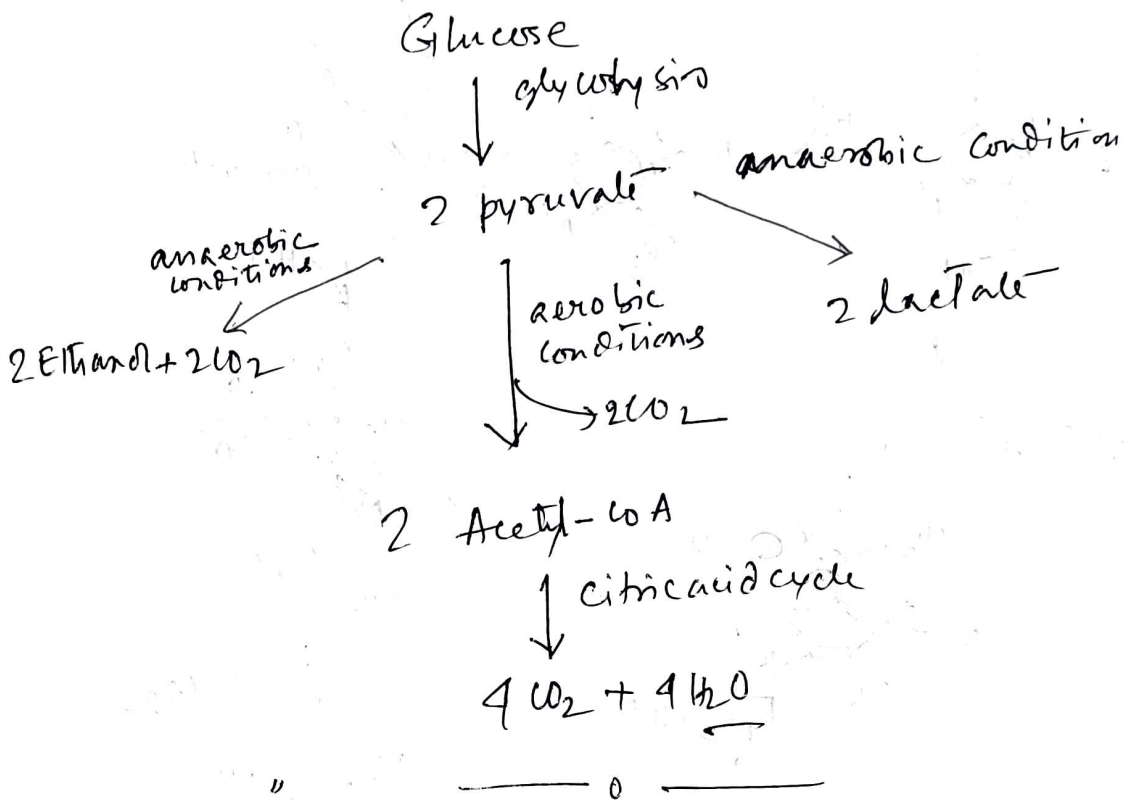
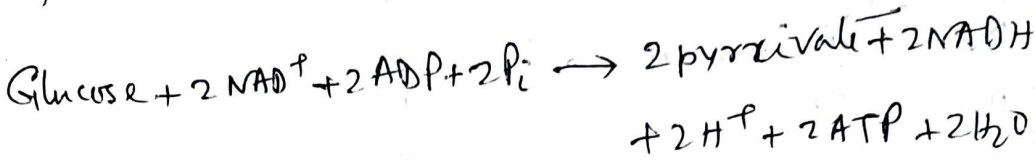


Fates of Pyruvate :- The pyruvate formed by glycolysis is further oxidized metabolized via one of three catabolic routes. In aerobic organism or tissue, under aerobic condition glycolysis is only the first stage in complete degradation of glucose. Pyruvate is oxidised, with loss of its carboxyl group as  $\text{CO}_2$ , to yield the acetyl group of acetyl coenzyme A, the acetyl group is then oxidised completely to  $\text{CO}_2$  by the citric acid cycle. The electrons from these oxidation are passed to  $\text{O}_2$  through a chain of carriers in mitochondrion to form  $\text{H}_2\text{O}$ . The energy from the  $e^-$  transfer reactions drives the synthesis of ATP in the mitochondrion.

The second route for pyruvate is its reduction to lactate via lactic acid fermentation, when vigorously contracting skeletal muscle must function under low oxygen conditions,  $\text{NADH}$  can't be reoxidized to  $\text{NAD}^+$ , but  $\text{NAD}^+$  is required as an electron acceptor for the further oxidation of pyruvate. Under these conditions pyruvate is reduced to lactate, accepting electrons from  $\text{NADH}$  and thereby regeneration of  $\text{NAD}^+$ .

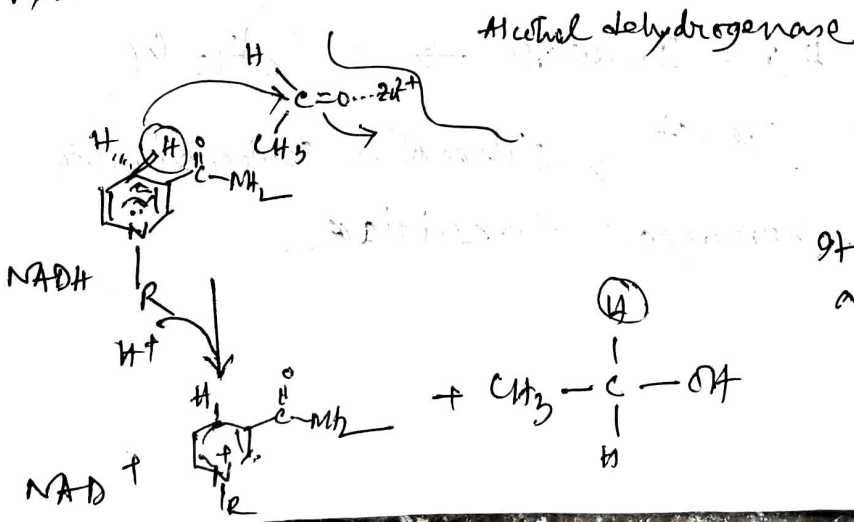
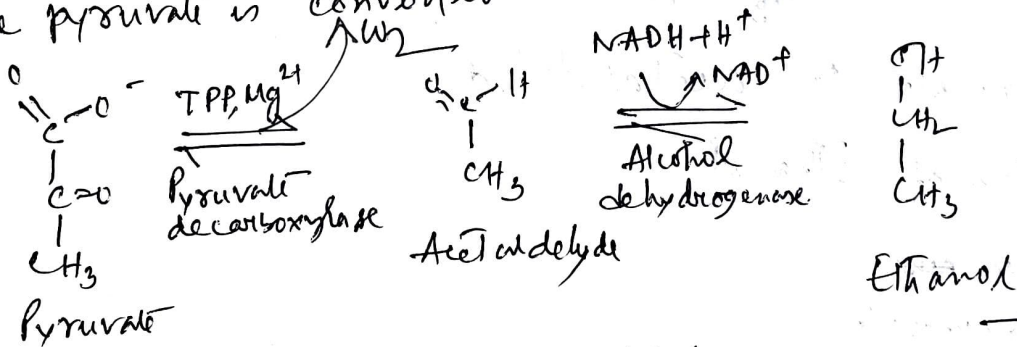
The third major route of pyruvate catabolism leads to ethanol. In some plant tissues and in certain invertebrates, protists and microorganisms such as yeast, pyruvate is converted under anaerobic

condition to ethanol and CO<sub>2</sub>, a process is called ethanol fermentation.

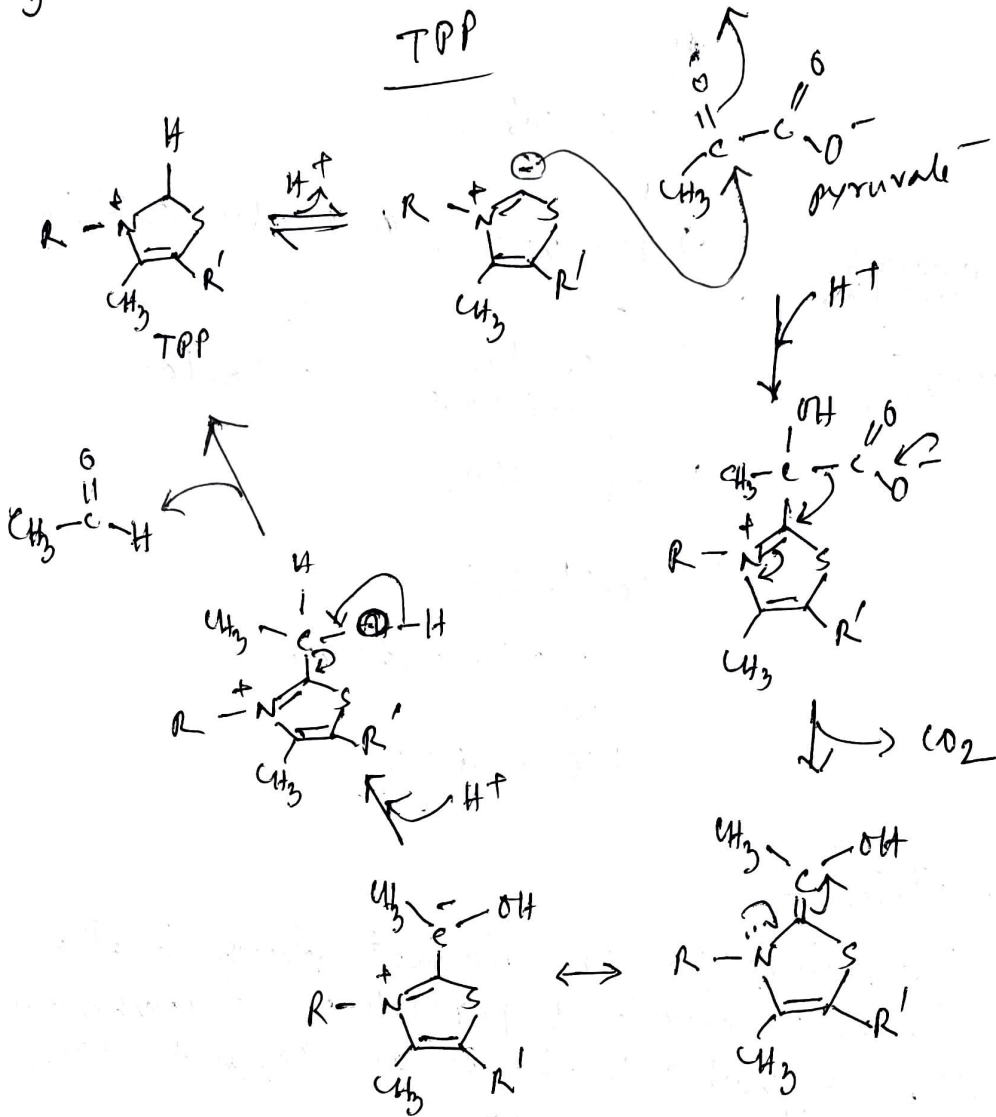
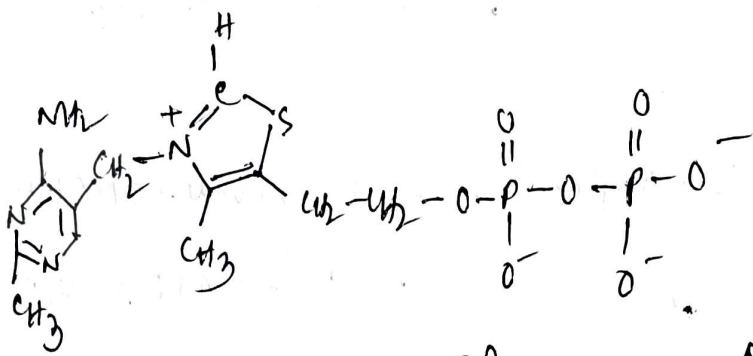


"Ethanol Fermentation"

Yeast and other microorganisms ferment glucose to ethanol and CO<sub>2</sub>. Glucose is converted to pyruvate by glycolysis and the pyruvate is converted to ethanol and CO<sub>2</sub> in two steps.



TPP: Thiamine pyrophosphate  
 It carries active aldehyde gr.

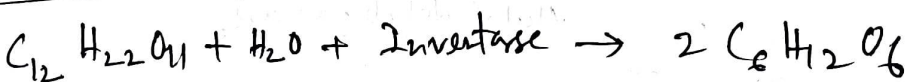


Pyruvate to acetaldehyde

Production of Ethanol

~~From Sucrose~~

From Sucrose:



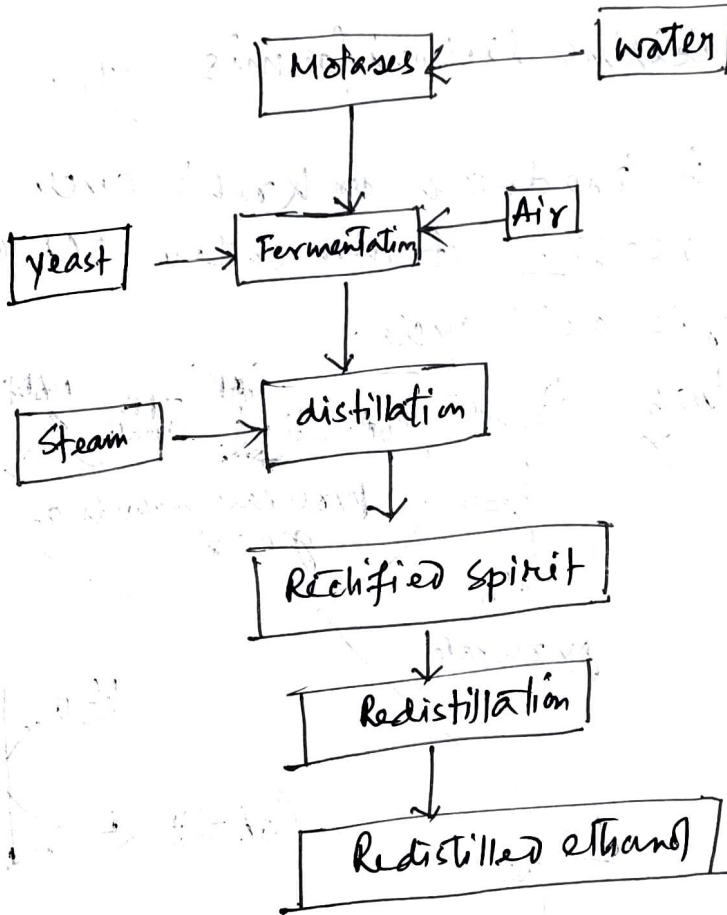
glucose  $\xrightarrow{\text{Yeast}}$  ethanol + carbon dioxide

yeast  $\rightarrow$  *Saccharomyces Cerevisiae*

## From Molasses

Molasses is a heavy viscous material obtained from the sugar industries as a byproduct which contains sucrose, fructose and glucose at a concentration of 50-60% (W/V).

Flow chart diagram:-



## From starch

Starch is a polymer of glucose, so at first it is hydrolysed by enzymatic process or by mineral acid to glucose, then it is fermented to get ethanol.

