

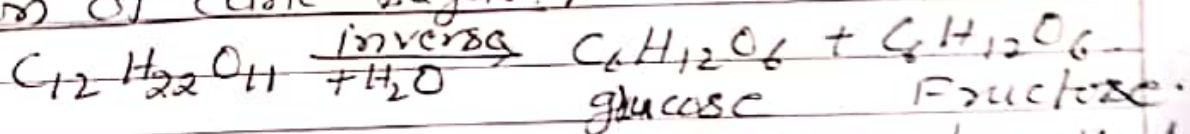
Enzyme catalysis: ↗

Enzymes are nitrogen containing high molecular mass organic compounds. They are ~~poetic~~ protein in nature and are found in the living cells of plant and animals. They form colloidal solution in water. Therefore, reactions catalysed by enzymes are included in heterogeneous catalysis. A number of reactions in animals and plants are catalysed by enzyme.

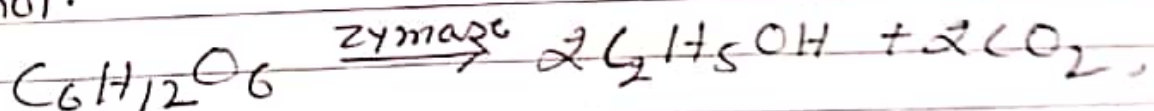
Conversion of sugar into ethanol.

The reaction proceeds in the following steps. Different enzymes are used in different steps.

(i) inversion of cane sugar: ↗



(ii) conversion of glucose or fructose into ethyl alcohol.

Characteristics of enzymes: ↗

- (i) Enzymes are very specific in their action. They catalysed only one chemical reaction.
- (ii) Only small amount of enzymes can be highly efficient. It is because enzymes are reproduced at the end of the reaction.
- (iii) In the presence of enzymes catalyst, the reaction proceeds through a new path of low activation energy. Enzymes increase the rate of reaction upto 10^{20} times.

Teacher's Signature: _____

(iv) Enzyme catalyst quickly attained the equilibrium constant.

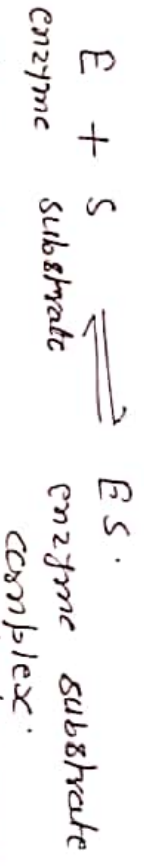
(v) The temperature at which the efficiency of the enzyme is maximum is called optimum temperature. The optimum temperature for most of the enzymes is about 37°C (300K)

(vi) Co-enzymes act as promoter for enzyme catalyst. Co-enzymes increase the activity of enzymes.

Kinetics of enzyme catalysis

Enzyme catalysed reactions take place in two steps.

Step I:



In second step, the enzyme substrate complex decomposes to give the Product (P) and enzyme.

Step II



The first step is fast and reversible while the second step is slow and irreversible. The second step is rate determining step. The rate of reaction changes from first order to zero order as the concentration of substrate is increased.