Prof ANIL KUMAR zoology
B.Sc HONS Part-III Paper-V
Topic: Give an account of various Steps of Glycolysis

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Q. 1. Give an account of various steps of Glycolysis.

Ans. Glycolysis is a process by with glycogen or glucose or other sugars are converted into pyruvic acid. This process occurs in the cytoplasm of the cell. This process does not utilize oxygen. Hence this is an anaerobic process. This is also called embdin meyer hot path way.

Steps in glyrolysis :

1. Glucose is phosphorylated by ATP in the presence of glucohexokinase to. form glucose-b-phosphate.

$$\text{Glucose} \xrightarrow[\text{ATP ADP}]{} \text{Glucose} - 6 - \text{Phosphate}$$

2. Glucose-6-phosphate is then converted into fructose 6-phosphate by the enzyme glucose phosphate isomerase.

$$\text{Glucose} - 6 - \text{Phosphate} \xrightarrow{\text{Glucose Phosphate}} \text{Fructose} - 6 - \text{Phosphate}$$

3. Fructose-6-phosphate is then phosphorylated by ATP in the presence of phosphofructokinase to form fructose 1, 6-diphosphate.

$$\text{Fructose} - 6 - \text{Phosphate} \xrightarrow[\text{ATP ADP}]{\text{Phosphofructokinase}} \text{Fructose 1.6 diphosphate}$$

4. The fructose 1,6-diphosphate is split into two substances namely glyceraldehyde 3 phosphate and dihydroxyacetone phosphate.

$$\text{Fructose 1,6-diphosphate} \xrightarrow{\text{Aldolase}} \text{Glyceraldehyde 3 phosphate} + \text{Dihydroxyacetone phosphate}$$

5. The two molecules of glyceraldehydephosphate are phosphorylated and oxidised into two molecules of 1,3-diphosphoglycuric acid, catalysed by the enzyme phosphoglycraldehyde dehydrogenase. NAD and inorganic phosphates are required.

Glyceraldehyde 3 phosphate $\xrightarrow{\text{Aldolase}}$ 1,3 diphos phoglyaceraldehyde

1,3 diphsophoglyceraldehyde $\xrightarrow{-2H}$ 1,3-diphosphoglyceric acid

6. 1,3 disphosphoglyaric acid is conveted into 3 phosphoglyceric acid by means of phosphoglycerate kinase in the presence of Mg^{++}.

1, 3-diphosphoglyaric acid $\xrightarrow[\text{ATP ADP}]{Mg^{++}}$ 3 phesphoglycine acid.

7. 3-phosphoglyaric acid is converted to 2-phosphoglyceric acid by the inzyme phosphoglyceromutase utilizing 2,3 diphosphoglycerate as coenzyme.

3 Phosphoglyaric acid $\xrightarrow[\text{glycromutase}]{-2H}$ 2 Phosphoglyaric acid

8. 2 phosphoglyceric acid is converted into phosphoenol pyruvic acid by dyhtydration in the presence of enolase.

2 phosphoglyceric acid $\xrightarrow{\text{Enolase}}$ phosphaenol pyruvic acid

9. Phosphoenolpyruvic acid now transferms its energy rich phosphate to ADP under the infulence of phosphopyruvate kinase.

Phosphoenolypruvic acid $\xrightarrow[\text{ATP ADP}]{\text{P.P. Kinase}}$ Enolpyruvic acid

10. The enolpyruvic acid is spontaneously transformed into pyruvic acid.

Enolpyruvic acid → Pyruvic acid.

Pyruvic acid is the main end product of animal tissues.

Thus during glycolysis each molecule of glucose yield two molecules of pyruvic acid with the formation of ten molecules of ATP.

Glucose + 2 ADP+ 2 Pi + 2 DPN → 2 pyruvic acid + 2 ATP + 2DPNH + $2H^{+}$.