<u>Glycolyns</u> and <u>fermentation</u> do not require oxygen (anaerobic). <u>Aerobic respiration</u> does require oxygen as a final electron acceptor and captures large amounts of energy from a glucose molecule as ATP as compared to glycolysis and fermentation.



The 10 steps in Glycolysis

- Step 2. The atoms of glucose-6-phosphate are rearranged to form fructose-6-phosphate

• Step 3. Fructose-6-phosphate is phosphorylated by ATP to form fructose 1,6-biphosphate

Energy-conserving stage of glycolysis

- Step 6. Inorganic phosphates are odded to the two G3P, and two NAD+ are reduced a form 1,3-biphosphoglyceric acid
 Step 7. Tries ADPoer 9 phosphorylated by substrate-level phophorylation to form 2 ATP in addition to 3-
- phosphoglyceric acid
- Step 8 & 9. The remaining phosphates are moved to the middle carbons and a water molecule is removed from each substrate to form phosphoenolpyruvic acid (PEP)
- Step 10. Two ADP are phosphorylated by substrate-level phophorylation to form 2 ATP. Two pyruvate molecules are formed

Note: Glycolysis provides relatively small amount of energy (ATP & NADH). Uses 2 ATP to produce 4 ATP. Electrons are removed from NADH during fermentation, producing NAD+ which is needed to keep glycolysis going.

Advantages of solid state fermentation

- A lower chance of contamination due to low moisture levels. Ease of product separation esa
 Energy efficiency of 35
 Development of fulle differentiated structures.

Disadvantage

- nature of the media, due • Heterogeneous to poor mixing characteristics.
- At high agitation speeds mycelial cells may be damage.

• Heat Transfer: One of the main difficulty is to control the temperature during the fermentation process. Heat is generated during the metabolic activities of micro-organisms, since the substrate used has low thermal conductivity heat removal will be slow. •When the heat generated goes beyond certain level, which will result in product denaturation and will affect growth of microbe, ultimately ending up in reduction in yield and quality of the product.