

Abstract:

Aspergillus niger IIB-247 was used for production of Glucose oxidase using medium containing glucose 6%, peptone 0.3%, $(\text{NH}_4)_2\text{HPO}_4$ 0.04%, KH_2PO_4 0.0188%, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 0.0156%, CaCO_3 3.5%. Maximum production (12.12 ± 0.01 U/mg) was obtained at pH 7 and temperature and 30°C respectively after 72 hours of fermentation. Optimum glucose oxidase production coincided with glucose depletion (87.5%). Ammonium sulfate precipitation and Ion exchange chromatography resulted in 53.5 % yield and 16.81 fold purification with enhancement of specific activity of (203.56 ± 0.02 U/mg). Kinetic characterization of enzyme revealed D-Glucose as highly specific substrate for enzyme with K_m value of 30.5 mM. Thermodynamic evaluation of enzyme revealed activation energy (E_a) as 13.14 KJ/mol, enthalpy of activation (ΔH) as 10.87KJ/mol and entropy of activation (ΔS) as -1.139 KJ/mol respectively. Optimum temperature and pH for catalytic activity of the enzyme were found as 25°C and pH 7. The enzymes catalytic activity was observed to be reduced by some heavy metals such as i.e. Hg^{2+} , Pb^{2+} , Cu^+ and Cd^{2+} . The enzyme remained stable at pH 6. Maximum shelf life of the enzyme was observed in lyophilized form at -20°C for a period of 2 months.