Production, purification,thermodynamics and kinetic characterization of endo-1,4-β-xylanasé (xylanase) using a cloned gene from *Anerocellum thermophilum* expressed in BL21 codon plus was done in this research. Crude enzyme obtained yield enzyme activity and total protein (19.35±0.05 U/ml/min. and 1.87±0.05 mg/ml) after 24 hours of submerged fermentationat 37°C and 200rpm. In order to achieve the purity level of xylanase, ammonium sulphate precipitation and anion exchange chromatography applying DEAE-Cellulose column, resulted in 35.9% yield and 2 folds of purification with the enhancement in the specific activity (20.02 ±0.05 U/mg). The optimal temperature and pH for the catalytic activity of xylanase were evaluated to be 60°C and pH 6, respectively. Thermodynamics study of xylanase revealed that the activation energy (E_a) and enthalpy of activation (ΔH) of xylanases as 16.64 KJ/mol and 14.42 KJ/mol, respectively. The kinetic characterization of an enzyme revealed that beechwood xylan as a specific substrate with K_m value of 30.04mM. The activity of xylanase was evaluated in the presence of metal ions, detergents and carrying concentrations of EDTA. Catalytic activity was found to be hindering in the presence of salts containing metal ions of Mg^{+2}, Cu^{+2}, Na^{+}, Mn^{+}, Fe^{+2} and Hg^{+}. The decline in the activity of an enzyme was also seen in the presence of a chelating agent (EDTA).