Abstract

With an increasing demand of an alternative source of energy to run industries, thermostable lipases are considered to be important enzymes for the hydrolysis of oils and fats, fats modification, flavor improvement in food processing and resolution of racemic mixtures. Consequently, lipase gene encoding for 275 amino acid from highly thermostable *Thermoanaerobacterium thermosaccharolyticum* was cloned in pET21a (+) vector and expressed in *E. coli* BL21 codonplus. An intracellular, lipase protein displayed a single band of molecular size of 31kDa on SDS-PAGE after single step purification by Ni-TED affinity chromatography. The purified enzyme lipase showed an optimal residual activity at pH 10.0 and 70°C. The enzyme was relatively stable at range of pH (6-10) and temperature from (50-70°C). Enzyme activity of lipase was enhanced by BaCl2, KCl and $CaCl_2$ and inhibited by MoO_3. 10%, 20% and 30% of organic solvents including absolute ethanol, acetone, methanol, n-butanol, and iso-propanol drastically inhibited the enzymatic activity of lipase while maximum residual activity was increased about 1% in the presence of Tween 20, 8% in the presence of 10% β-mercaptoethanol and 4% increase in the presence of 10% triton X-100. All these significant properties make lipase gene biotechnology and industrially important candidate for the useful biological process.