

High level expression and characterization of a novel thermostable, organic solvent tolerant, 1,3-regioselective lipase from Geobacillus sp. strain ARM.

ABSTRACT

The mature ARM lipase gene was cloned into the pTrcHis expression vector and over-expressed in Escherichia coli TOP10 host. The optimum lipase expression was obtained after 18h post induction incubation with 1.0mM IPTG, where the lipase activity was approximately 1623-fold higher than wild type. A rapid, high efficient, one-step purification of the His-tagged recombinant lipase was achieved using immobilized metal affinity chromatography with 63.2% recovery and purification factor of 14.6. The purified lipase was characterized as a high active (7092Umg⁻¹), serine-hydrolase, thermostable, organic solvent tolerant, 1,3-specific lipase with a molecular weight of about 44kDa. The enzyme was a monomer with disulfide bond(s) in its structure, but was not a metalloenzyme. ARM lipase was active in a broad range of temperature and pH with optimum lipolytic activity at pH 8.0 and 65°C. The enzyme retained 50% residual activity at pH 6.0-7.0, 50°C for more than 150min.

Keyword: Lipase; Thermostable; Organic solvent tolerant; 1,3-regioselective; Expression.