

Cold-adapted organic solvent tolerant alkalophilic family I.3 lipase from an Antarctic *Pseudomonas*

Abstract

Lipolytic enzymes with cold adaptation are gaining increasing interest due to their biotechnological prospective. Previously, a cold adapted family I.3 lipase (AMS8 lipase) was isolated from an Antarctic *Pseudomonas*. AMS8 lipase was largely expressed in insoluble form. The refolded His-tagged recombinant AMS8 lipase was purified with 23.0% total recovery and purification factor of 9.7. The purified AMS8 lipase migrated as a single band with a molecular weight approximately 65 kDa via electrophoresis. AMS8 lipase was highly active at 30 °C at pH 10. The half-life of AMS8 lipase was reported at 4 and 2 h under the incubation of 30 and 40 °C, respectively. The lipase was stable over a broad range of pH. It showed enhancement effect in its relative activity under the presence of Li⁺, Na⁺, K⁺, Rb⁺ and Cs⁺ after 30 min treatment. Heavy metal ions such as Cu²⁺, Fe³⁺ and Zn²⁺ inhibited AMS8 activity. This cold adapted alkalophilic AMS lipase was also active in various organic solvent of different polarity. These unique properties of this biological macromolecule will provide considerable potential for many biotechnological applications and organic synthesis at low temperature.

Keyword: Family I.3 lipase; AMS8 lipase; Solvent tolerant; Cold-adapted; *Pseudomonas* sp.; Inclusion bodies; Alkaline lipase