A new cold-adapted, organic solvent stable lipase from mesophilic Staphylococcus epidermidis AT2

ABSTRACT

The gene encoding a cold-adapted, organic solvent stable lipase from a local soil-isolate, mesophilic Staphylococcus epidermidis AT2 was expressed in a prokaryotic system. A two-step purification of AT2 lipase was achieved using butyl sepharose and DEAE sepharose column chromatography. The final recovery and purification fold were 47.09 % and 3.45, respectively. The molecular mass of the purified lipase was estimated to be 43 kDa. AT2 lipase was found to be optimally active at pH 8 and stable at pH 6–9. Interestingly, this enzyme demonstrated remarkable stability at cold temperature (<30 °C) and exhibited optimal activity at a temperature of 25 °C. A significant enhancement of the lipolytic activity was observed in the presence of Ca2+, Tween 60 and Tween 80. Phenylmethylsulfonylfluoride, a well known serine inhibitor did not cause complete inhibition of the enzymatic activity. AT2 lipase exhibited excellent preferences towards long chain triglycerides and natural oils. The lipolytic activity was stimulated by dimethylsulfoxide and diethyl ether, while more than 50 % of its activity was retained in methanol, ethanol, acetone, toluene, and n-hexane. Taken together, AT2 lipase revealed highly attractive biochemical properties especially because of its stability at low temperature and in organic solvents.

Keyword: Staphylococcal lipase; Mesophilic; Purification; Cold-adapted; Organic solvent stable