Characterization of pectinase from mango (Mangifera indica Cv. chokanan) peel

ABSTRACT

Today, pectinase has emerged as an integral part of the food and feed industries. Plant peel could be a potential source of pectinase, which has been extracted and purified from mango (Mangifera indica cv. Chokanan) peel using the aqueous two-phase system (ATPS). In the present study, the effects of temperature, pH and metal ions on the stability and activity of pectinase were investigated. In addition, the molecular weight of this enzyme was determined as 31 kDa with SDS-PAGE. Pectinase showed the highest enzyme activity at 60ºC for 30 min after incubation at different temperatures (20 to 80ºC). Also, this enzyme has been shown to be thermostable because more than 90% of residual enzyme activity was retained at temperatures of 20 to 60ºC for 30 min. Pectinase was incubated in different pH from 3 to 9 and the highest enzyme activity was achieved at pH 8. Furthermore, the enzyme was stable at pH 5 to 9 after enzyme incubation at different pH for 24 h at 4ºC. Activity of the enzyme was significantly decreased at pH 3 and 9 due to the protein denaturation. Pectinase activated by Ca2+ showed that this cation has an important effect on activity and stability of the enzyme; but Li+, Na+ and K+ had no effect on its activity. Also, the reduction in the activity of pectinase was observed in the presence of Fe2+, Cu2+, Mn2+, Zn2+ and Al3+. Therefore, pectinase extracted from mango peel has potential applications in various industries like food and feed because it is thermostable under high temperatures in either alkaline medium or when there is the presence of metal ions.

Keyword: Pectinase; Mango peel; pH stability; Optimum pH; Thermal stability; Molecular weight; Optimum temperature; Pectinase activity; SDS-PAGE; Metal ions