Purification and characterisation of a novel amylase enzyme from red pitaya (Hylocereus polyrhizus) peel

ABSTRACT

An amylase enzyme from pitaya peel was purified 234.2-folds with 72.1% recovery using ammonium sulphate precipitation, gel filtration and ion exchange chromatography. Gel filtration chromatography and SDSï PAGE revealed that the enzyme is monomeric with a molecular weight of 42.1 kDa. The apparent Km and Vmax of the amylase were 2.7 mg/ml and 34.30 u/min/mg of protein, respectively. The enzyme was highly active and stable over a wide pH range from pH 3 to pH 11.0, with optimum activity being observed at pH 5.0. The enzyme was highly selective for soluble starch, amylopectin, glycogen and pululan. The purified amylase did not require calcium and displayed extreme stability with regard to surfactants and oxidising agents. EDTA, a powerful chelating agent, did not have any significant effect on the stability of the enzyme. Such characteristics have not been previously reported for this type of enzyme from fruit peel. This enzyme, which possesses unique properties, could be widely used in different types of industries, especially in food and biotechnological applications.

Keyword: Amylase; Pitaya peel; Purification; Characterisation; Yield