605/E2

Amylase production by *A. niger* under solid state fermentation using passion fruit peel as the carbon source

S K Lakmimi and M K B Weerasooriya

Department of Chemistry, University of Kelaniy, Kelaniya

Enzyme amylase possesses diverse applications in a wide variety of industries such as food, fermentation, textile, paper, detergent and pharmaceutical. With the advent of new frontiers in biotechnology, the spectrum of amylase application has expanded into many other fields, such as clinical, medicinal and analytical chemistry. Although amylases can be derived from several sources, including plants, animals and microorganisms, microbial enzymes generally meet industrial demands. A wide range of micro-organisms such as bacteria and fungi namely *Aspergillus* and *Trichoderma* sp are used for the industrial production of amylases.

In the present work amylase enzyme was produced by *Aspergillus niger* under solid state fermentation using passion fruit peel as the carbon source. The culture conditions for maximum amylase production were optimized by varying the incubation period, pH, inoculum volume and concentration of carbon source. Enzyme produced under optimum conditions was purified by ammonium sulphate fractionation followed by ion exchange chromatography. The partially purified enzyme was assayed varying the pH and incubation temperature to determine optimum pH and incubation temperature for the enzyme. Amylase activity was assayed using starch-iodine method.

The maximum activity was shown after 6 days of fermentation at pH 5.0. Optimum level of inoculum and concentration of carbon source were found as 2.00 mL (~spores1x10^4/mL) and 40% (w/v) respectively. Amylase enzyme was partially purified (2.3 fold) by ammonium sulphate precipitation followed by ion exchange chromatography. Optimum pH and optimum incubation temperature of this partially purified enzyme was found as pH 7.0 and 70 $^{\circ}$C, respectively. The results of this study revealed that passion fruit peel powder can be utilized as the carbon source for production of amylase enzyme with a yield of 7870 unit/g. Optimum activity of the enzyme at temperature as high as 70 $^{\circ}$C reveals that it can be exploited in the starch processing industry. Lower substrate cost and higher yield offer the potential for inexpensive production of amylase, making the process industrially and economically feasible.

Keywords: Amylase, *Aspergillus niger*, passion fruit peel, solid state fermentation

bandu@kln.ac.lk Tel: +94 112903270