

## Comparison of the Kinetic Properties of Crude and Purified Xylanase from *Bacillus pumilus* with Commercial Xylanase from *Aspergillus niger*

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Xylanases showing better stability at alkaline pH and higher temperatures have potential applications in several industrial processes. The objective of this study is to compare the kinetic properties and stability of crude and purified xylanase from *Bacillus pumilus* with commercial xylanase from *Aspergillus niger*. *Bacillus pumilus* which can grow and produce xylanase above 40°C and pH 9.0 was selected for this study. Crude, purified and commercial xylanases showed zero order kinetics for 10 minutes and highest activity was obtained at 60°C and pH 9.0. The optimum pH for crude, purified and commercial xylanases were 9.0, 9.0 and 7.0 respectively at 60°C and the Michaelis constant by Lineweaver-Burk Plot for xylan were 3.1, 2.3 and 0.03gL<sup>-1</sup> under the respective optimized conditions. The half-life of the crude and purified xylanase was highest at pH 9.0 and 50°C while that for the commercial enzyme was at pH 7.0 and at 60°C.

**Key words-** Xylanase, Kinetic properties, Michaelis constant, Vmax, Stability, Half life

### Introduction

Xylan is the second most abundant renewable polysaccharide in nature [1]. Xylan is present in appreciable amounts in pulp and in agricultural residues. Xylanases are used to convert the xylan to xylose in the paper-pulp industry [2], to treat the agricultural wastes and recently to improve the bread quality [3]. The *B. pumilus* strains reported so far, have produced xylanases showing optimal activities at pH 8.0 & 65°C [4], pH 6.5 & 40°C [5], pH 9.0 & 60°C [6] and pH 6.5 & 50°C [7]. In this report the kinetic properties of the crude and purified xylanase produced by *Bacillus pumilus*, (which was isolated and identified in our Laboratory) was compared with one of the commercially available xylanase from *Aspergillus niger*. If this enzyme is similar or superior to other enzymes reported, it could be recommended for the industries.

### Materials and Methods

#### Materials

Commercial xylanase from *Aspergillus niger* was purchased from Sigma Chemical Company, USA.

#### Microorganism

The *Bacillus pumilus* which was isolated, identified and characterized in the Biochemistry laboratory, Faculty of Medicine was used [8].

#### Media

The activation medium contained (gL<sup>-1</sup>) xylan 20.0 and nutrient broth 25.0. Fermentation medium contained (gL<sup>-1</sup>) xylan, 20.0; peptone, 20.0; yeast extract, 2.5; CaCl<sub>2</sub>.2H<sub>2</sub>O, 0.005; MgCl<sub>2</sub>.6H<sub>2</sub>O, 0.005; FeCl<sub>3</sub>, 0.005; K<sub>2</sub>HPO<sub>4</sub>,

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