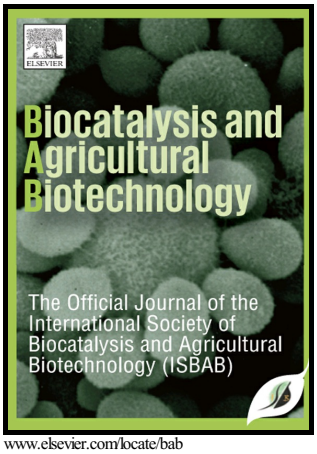

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PII: S1878-8181(18)30092-6
DOI: https://doi.org/10.1016/j.bcab.2018.08.016
Reference: BCAB849

To appear in: *Biocatalysis and Agricultural Biotechnology*

Received date: 26 January 2018
Revised date: 20 March 2018
Accepted date: 28 August 2018

Cite this article as: Lucas Oliveira Souza, Aila Riany de Brito, Renata Cristina Ferreira Bonomo, Nivio Batista Santana, José Lucas de Almeida Antunes Ferraz, André Gustavo de Araújo Fernandes, Marcio Luiz Oliveira Ferreira, Julieta Rangel de Oliveira, Elizama Aguiar-Oliveira and Marcelo Franco, Comparison of the biochemical properties between the xylanases of *Thermomyces lanuginosus* (Sigma®) and excreted by *Penicillium roqueforti* ATCC 10110 during the solid state fermentation of sugarcane bagasse, *Biocatalysis and Agricultural Biotechnology,* https://doi.org/10.1016/j.bcab.2018.08.016

Comparison of the biochemical properties between the xylanases of *Thermomyces lanuginosus* (Sigma®) and excreted by *Penicillium roqueforti* ATCC 10110 during the solid state fermentation of sugarcane bagasse

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ABSTRACT

The biochemical properties of xylanase secreted by *Penicilium roqueforti* ATCC 10110 during the solid state fermentation of sugarcane bagasse were compared to xylanase by *T. lanuginosus* (Sigma®). The xylanase by *P. roqueforti* was maximized (19.95 $IU.g^{-1}$) using the Box-Behnken experimental design and the optimized variables temperature, humidity and time. The addition of sucrose and glucose increased xylanase production. Biochemical properties related to time, pH, temperature, effect of ions and organic compounds and kinetic activity were studied and correlated for these two enzymes. Only xylanase by *P. roqueforti* was thermostable (50-80°C) besides the activating effect in the presence of ions (Co^{+2}, Ca^{+2}, Na^{+1}, Mg^{+2}, Cu^{+2}) among organic compounds only Trolox had an activating effect for both enzymes. Due to the degree of purity the values of Km and Vmax were distinct between the two enzymes. During 150 days xylanase activity remained above 95% if kept frozen. Xylanase by *P. roqueforti* extracted from the fermentation of sugarcane bagasse can be applied in food, beverage, pulp and paper processing.

Keywords: Box-Behnken experimental design, enzymatic stability, kinetic parameters

1. Introduction

During the processing of sugarcane approximately 30% of bagasse are generated, which are mainly reused as fuel for the feeding of boilers (Gottschalk et al. 2010). The polysaccharides, macro and micronutrients present in this bagasse can be used as substrates for the growth of microorganisms and secretion of organic compounds with high added value as the extracellular enzymes (Wang et al. 2012; Anwar et al. 2014), and among these the xylanases (endo-1,4-β-xylanase, EC 3.2.1.8) are responsible for the hydrolysis of xylan of the main componentes oh hemicellulose, through the depolymerisation of the main chain, releasing d-xylose. Xylanases have diverse industrial applications, such as cellulose pulps bleaching, animal feed, juice clarification, baking and many others (dos Santos et al. 2011; Huang et al. 2014).

The production of microbial xylanase using pure xylan as a substrate has been widely criticized, since the cost of the substrate amounts to about 30% of the total cost of producing