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Partial purification and characterization of a β-Glucosidase produced by solid state fermentation of *Aspergillus niger*

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β-glucosidase (BG) is a hydrolytic enzyme with specificity for wide variety of β-D-glycoside substrates. It catalyzes the hydrolysis of terminal non-reducing residues in β-D-glucosides. BG is an enzyme with several biotechnological applications. Specially, the hydrolysis of lignocellulosic biomass intending to produce bioethanol evolves the synergetic action of endocellulases, exocellulases and β-glucosidases (BGs), which ultimately produces glucose from cellobiose. This disaccharide is a potent inhibitor of cellobiohydrolases and endoglucanases. Its accumulation causes a significant decline in the saccharification rate [1]. Nevertheless, inhibition caused by cellobiose can be minimized by BG supplementation. BG can be isolated from many sources, including fungi, bacteria, plants and animals. In this work BG was produced by solid state fermentation of *Aspergillus niger* [2] and it was partial purified from clarified crude enzyme using ion exchange chromatography in a column packed with MANAE-agarose. The purification rendered an enzyme solution with specific activity (66.5 $U/mg_{protein}$) ca. 6 times higher than the crude enzyme. Electrophoresis SDS-PAGE and size-exclusion chromatography exhibited a majority band near to 60kDa. Crude and purified BG exhibited maximum activity at 55°C and pH 4.5. Nevertheless, purified BG was less stable than the crude enzyme; half-lives at 37°C were 342h and 53h and at 50°C were 148h and 8h, for crude and purified BG, respectively. These results show that purified BG requires further stabilization procedure.

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References:

[1] Busto et al. (1997), Proc. Biochem., 32(5), 441-449.

[2] Farinas et al. (2010), New Biotechnology, 27(6), 810-815.

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