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Evaluation of Hollocelulase Production for Lignocellulosic Biomass Degradation by Penicillium polonicum

Authors : H. M. Takematsu, B. R. De Camargo, E. F. Noronha

Abstract : The use of hydrolyzing enzymes for degradation of lignocellulosic biomass is of great concern for the production of second generation ethanol. Although many hollocelulases have already been described in the literature, much more has to be discovered. Therefore, the aim of this study to evaluate hollocelulase production of P. polonicum grown in liquid media containing sugarcane bagasse as the carbon source. From a collection of twenty fungi isolated from Cerrado biome soil, P. polonicum was molecular identified by sequencing of ITS4, βtubulin and Calmodulin genes, and has been chosen to be further investigated regarding its potential production of hydrolyzing enzymes. Spore suspension (1x10-6 ml-1) solution was inoculated in sterilized minimal liquid medium containing 0,5%(w/v) of non-pretreated sugarcane bagasse as the carbon source, and incubated in shaker incubator at 28°C and 120 rpm. The supernatant obtained, was subjected to enzymatic assays to analyze xylanase, mannanase, pectinase and endoglucanase activities. Xylanase activity showed better results (67,36 UI/mg). Xylanases bands were indicated by zymogram and SDS-PAGE, and one of them was partially purified and characterized. It showed maximum activity at 50 °C, was thermostable for 72h at 40°C, and pH5.0 was the optimum observed. This study presents P. polonicum as an interesting source of hollocelulases, especially xylanase, for lignocellulose bio-conversion processes with commercial use.

Keywords : sugarcane bagasse, Cerrado biome , hollocelulase, lignocellulosic biomass
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