

**Título: CELLULASES AND XYLANASE PRODUCTION BY *Penicillium sp.* ISOLATED FROM AGROINDUSTRIAL SOIL**

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**Resumo:**

The wide application of lignocellulolytic enzymes such as cellulases and xylanases in economically relevant industrial processes – for i.g. the production of second generation biofuels, beverage processing, Kraft pulp biobleaching, among others – have been an impulse for scientific research, whose purpose is to optimize the production of these proteins by microorganisms. Cellulase and xylanase comprise groups of enzymes which catalyze, respectively, the depolymerization of cellulose into glucose monomers and provide the hydrolysis of xylan. Furthermore, these enzymes assist the production processes of ethanol. The pursuit for new microorganisms that are able to synthesize these enzymes, associated with the use of low-cost lignocellulolytic substrates in these enzymatic production processes, guarantees major profitability and grants sustainable character to the activity. Therefore, this study aims to analyze the production of cellulase and xylanase by *Penicillium sp.* isolated from agroindustrial soil using wheat bran and sugar cane bagasse as carbon sources, as also to evaluate the best nitrogen source for the production of these enzymes. Submerged fermentation experiments were kept in constant agitation in shaker (37 °C; 150 RPM) for 12 days at an inoculum concentration of 10<sup>6</sup> spores/mL in a Mandels and Weber medium added with sugar cane bagasse (5%) or wheat bran (5%). Five nitrogen sources were tested such as urea, yeast extract, ammonium sulfate, peptone and tryptone, and added at a concentration of 0,2% to the culture medium. All the experiments were executed in duplicate. The enzymatic extraction consisted in filtering the fungal culture every 24 hours, and the enzymatic production analysis was performed accordingly to Ghose (1987). The largest cellulase (3.2 U/mL) and xylanase (65 U/mL) productions were observed in the eighth day of culture, when sugar cane bagasse was the substrate used. The nitrogen sources which had major influence upon enzymatic production such as ammonium sulfate, yeast extract and peptone for both enzymes, were respectively: 1.5 U/mL, 1.46 U/mL and 1.41 U/mL for cellulase and 42.3 U/mL, 39.9 U/mL, and 41.6 U/mL for xylanase. All of the enzymatic production values obtained with the nitrogen sources tested were inferior from those obtained with standard mineral medium cultures. The carbon source is a determining factor on the cost of enzymatic production by fermentation processes in industries. The results of enzymatic production using sugar cane bagasse evidences the superior feasibility of this substrate, thus, aiming its use in such processes when compared to wheat bran. Sugar cane bagasse is a low-cost waste and is highly available in our country due to its intense sugarcane activity.