ENHANCED XYLANASE PRODUCTION USING ALTERNATIVE CARBON SOURCES BY A NEWLY ISOLATED OF Aspergillus niger

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Xylanase (endo-1, 4-β-D-xylanohydrolase; EC 3.2.1.8) is an enzyme involved in depolymerization of xylan, a hemicellulosic polysaccharide of plant cell wall. It has potential applications in the clarification of fruit juices, pre-bleaching of pulp, improving the digestibility of animal feed stocks, bioconversion of lignocellulosic material and agro-wastes to fermentable products, including ethanol and xylitol production. The aim of this study was to investigate the production of xylanase by Aspergillus niger recently isolated from Atlantic Forest biome using various agro-industries residues as carbon source. The fungus was developed in Czaepk mineral medium supplemented with 1% agro-waste (sunflower bagasse, Pecan shell, Passion Fruit Peel, Soybean meal, orange peel, banana peel, biomass sorghum straw, low lignin sorghum straw, pear peel and rice meal) as source of carbon under static condition and submerged (orbital shaker at 120 rpm) culture, and incubated at 37°C for 5 days. The assays were carried out with 1% Beechwood xylan and the reducing sugar was determined by dinitrosalicylic acid method. The highest xylanase production was observed with corn stover in both static and submerged cultivation, and the enzymatic activities reached 325.87 and 208.5 U/mL, respectively. The alternative sources such as passion fruit peel (102 U/ mL), biomass sorghum straw (142 U/mL), low lignin sorghum straw (64 U/mL), rice meal (43.4 U/mL) and pear peel (36.5 U/mL) were also excellent inducers of xylanase production mainly in submerged cultivation. Furthermore, biomass sorghum straw (48.8 U/mL), low lignin sorghum straw (25 U/mL) was also effective in inducing xylanase under static cultivation. Thus, alternative carbon sources, such as corn stover, sorghum straw and passion fruit peel exhibited great potential as inducers for the production of xylanase by Aspergillus niger newly isolated from Atlantic Forest of Paraná, Brazil. Thus, this fungus is a promising candidate for generating significant amounts of xylanase using inexpensive agro-industrial residues.

Keywords: xylanase, agro-waste, Aspergillus

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