

PRODUCTION OF XYLANASE BY *Aspergillus niger* USING EFFLUENT FROM CELLULOSE INDUSTRY

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The industries of cellulose represent a sector with a large generation of pollutants due the growing demand for its product and the fact of its effluents are composed predominantly of chlorine, which is the main compound used in the stage of chemical bleaching of the paper pulp. For these reasons there are demands to the development of technologies free of the use of chemicals, stimulating the bleaching through microbial enzymes. The biotechnological production of enzymes from agro-industrial effluents emerges as an alternative to the reuse of raw materials, before considered of major environmental impact, resulting in processes more sustainable and less polluting. The xylanase acts hydrolyzing the connections of xylan present in the constitution of the plant cell wall resulting in a reduction of products chemicals in bleaching stage. Therefore, the aim of this study was to produce fungal xylanase using alkaline effluent, in liquid state, generated after the second bleaching stage by a pulp industry in the state of São Paulo. The enzyme production was realized by submerged liquid fermentation with *Aspergillus niger* (IOC/CCFF 3998), using culture medium and cultivation conditions described in the literature, it was used the effluent in detriment of the main inducer of xylan. The variables, dependent and independent, were determined and analyzed statistically by factorial experiment (2ⁿ) showing the best condition for the production of enzyme. The better condition was confirmed analyzing the protein concentration by method Bradford, determination of xylanase activity and calculation of specific activity. The data of the factorial experiment showed that the effluent was efficient to induce the production of xylanase in the concentration range 25 to 50% and 5 to 10 days growth. The best observed enzyme activity was in concentration of 50% of alkaline effluent and 7 days growth (157.9 U/mg). Therefore, higher concentrations effluent and long periods of incubation do not favored the xylanase production by *A. niger*. In addition, these results are important because contribute to the limitation of waterwaste and with the reduction of toxic compounds emissions.

Keywords: fungal xylanase, *Aspergillus niger*, effluents, cellulose industry, factorial experiment.

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