X SEMINÁRIO BRASILEIRO DE TECNOLOGIA ENZIMÁTICA – ENZITEC
7 a 10 de outubro de 2012
Blumenau - SC

Application of sugar cane bagasse as biomass to synthesis of xylanase by different strains of *Lentinula edodes*

Chicatto, J. A[1], Castamann, V. A[1], Nunes, H[1], Costa, A[1], Helm, C. V[2], Tavares, L. B. B[1]

1.Biochemical Engineering Laboratory , DEQ/CCT, University of Blumenau, 89012-900 Blumenau, Brazil

2. Brazilian Agricultural Research Corporation, Embrapa Forestry, Estr. Ribeira, Colombo, PR, Brazil

*julianechicatto@hotmail.com

Keywords: Basidiomycetes, enzymes, surface response.

INTRODUCTION

The xylanase is responsible for the hydrolysis of xylan and the second most abundant in vegetable wall. This enzyme is widely used in the chemical process of food processing and pulp[1], and also has great importance in the enzymatic hydrolysis of woody biomass in order to produce bioethanol[2]. However, the high cost in the production of the enzyme, has prompted studies on methods for obtaining xylanase by fungi. Basidiomycetes contains biochemical properties capable of degrading material lignocelusico[3]. The objective of this study was to investigate the influence of the amount of sugarcane bagasse and the concentration of ammonium sulfate in the production of xylanase in three different strains *L. edodes*.

RESULTS AND DISCUSSION

The methodology followed the full factorial experimental design with three replications at the central point. The levels of independent variables in ascending order (-1, 0, +1) were 0.2%, 1.5% and 3% for bagasse sugar cane and 0.1%, 0.25% and 0.5% ammonium sulfate. To determinate the xylanolytic activity, a solution of 1% xylan was made, where 0.9 ml of this solution was added to 0.1 ml of enzyme extract. It was incubated at 50°C for 15 minutes. Then it was determined the reducing sugars by DNS method[4], it was also read in spectrophotometer at 540 nm. By Pareto diagram to 95% confidence, it was found that the linear and quadratic effects were not significantly different for strain EF50. However, for the strains EF49 (Figure 1) and 52 there were differences in xylanase production and concentrations of cane bagasse sugar.

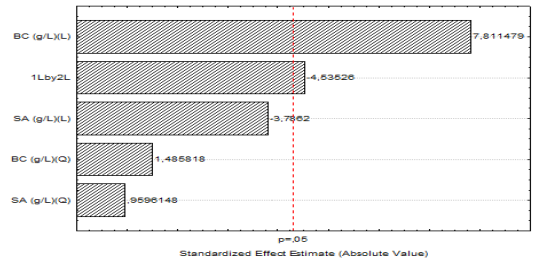

Figure 1. Pareto diagram for strains EF 49.

The response surface diagram indicated that the xylanase activity is a function of independent variables with a maximum activity of 1.0 IU (International Unit) in the strain EF52 (Figure 2).

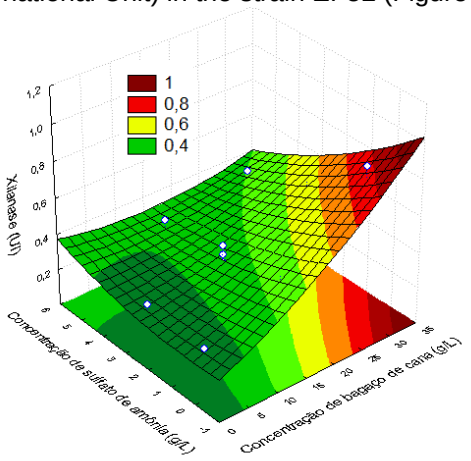

Figure 2. Response surface diagram to xilanase, strain EF52.

When EF52 variable bagasse is in high concentration, acting as agent inductor, along with low concentrations of ammonium sulfate, it acts as a reducing agent in the synthesis of xylanase. As a result EF49 and EF50 showed the maximum production of xylanase with 0.48 and 0.45 IU respectively. Therefore the strain EF49 maximum concentrations of carbon sources and nitrogen acted as inducing agents. Still, for the EF50 strain, the concentration of the carbon source does not alter the production of xylanase, but the various concentrations of the nitrogen source altered this enzyme's production.

CONCLUSION

The strain EF52 was the most produced xylanase. Also, the higher concentration of the carbon source and the lowest concentration of the nitrogen source, higher the production of this enzyme.

ACKNOWLEDGEMENTS

CAPES and Embrapa Forestry.

REFERENCES

[1] SEYIS, I ; AKSOZ, N**.** Investigation of factors affecting xylanase activity from *Trichoderma harzianum 1073 D3***.** Brazilian Archives Biol. Technol. **2005**, 48, 187-193.

[2] PANDEY, A. SOCCOL, C. R. NIGAM, P. SOCCOL, V. T. Biotechnological potential of agro-industrial residues. I: sugarcane bagasse. Bioresour. technol. **2000**, 74, 69-80.

[3] WOOD, T. M. e GARCIA-CAMPAYO, V. Enzymology of cellulose degradation. Int. Biodeter Biodegr. **1990**. 1, 147-161.

[4] MILLER, G. L. Use of dinitrosalicylic acid reagent for determination of reducing sugar. Analyt. Chem. **1959,** 31, 426, 428.