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Response of the concentration of carbon and nitrogen source in the cellulolytic activity of L. edodes

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INTRODUCTION

White-rot basidiomycetes are characterized by enzymatic digestion of cellulosic biomass by the synergistic action of endo β-1, 4 glucanase, exo-1 β, 4 β-glucanase and cellobiohydrolase. The production of these enzymes can be induced or inhibited depending on the culture environment. In this study, *Letinula edodes* EF 52 was used as an agent for cellulase production, changing the concentrations of nitrogen (ammonium sulfate) and carbon (sugar cane bagasse) by assessing the best enzymatic activities.

RESULTS AND DISCUSSION

Assays were performed in 250 ml Erlenmeyer flask containing 150 ml of culture medium[1] and 5 "plugs" of *L. edodes* with 7 mm diameter kept stirring (150 rpm / 7 days) at 25 ° C. The experimental design has been done by means of a 2^2 factorial design with three replications at the central point, and the effects produced by the variables quantified by the Pareto diagram. The levels of independent variables in ascending order, (-1, 0, +1) were 0.2%, 1.5% and 3% for sugar cane bagasse and 0.1%, 0.25 % and 0.5% for ammonium sulfate. The endo and exo β-1,4 glucanase[2] were determined by using the DNS[3] method and the β-cellobiohydrolase by the GOD-POD kit. Although the activity of endo β-1, 4 glucanase been 60% higher than the values of β-cellobiohydrolase, it showed similar response regarding the effect of bagasse and ammonium's sulfate concentration (Figure 1).

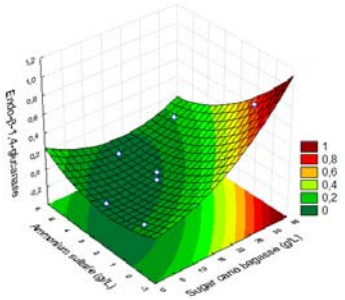

Figure 1. Response surface for the activity of endo β-1, 4 glucanase by EF52.

The response activity of exo β-1, 4 glucanase has been influenced by the concentration of bagasse and ammonium sulfate (Figure 2).

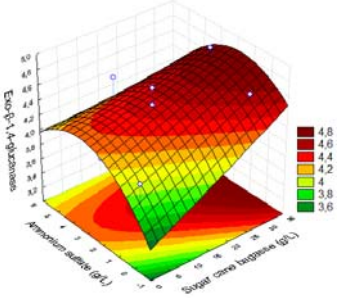

Figure 2. Response surface for the activity of exo β-1, 4 glucanase by EF52.

The highest activities occur in higher concentrations of sugar cane bagasse for all the tested enzymes. However, the influence of the concentration of ammonium sulfate showed variation correlated to the studied enzyme. Through Pareto diagram, the variables showed various effects on linear and quadratic equations according to the cellulases.

CONCLUSION

The concentration of sugarcane bagasse has proportionally with the production of enzymes, thus, as higher the source's concentration, the higher the enzyme production. But for ammonium sulphate this relation is disproportional.

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