

TITLE: Influence of physico-chemical effects on the production and optimization of pectinolytic enzymes of *Paecilomyces formosus* when grown in residues from coffee processing

AUTHORS: ANDRADE, M.C.; FILHO, E.X.F.;

INSTITUTION: Universidade de Brasília, Brasília, DF (Campus Universitário Darcy Ribeiro, Instituto de Biologia, Bloco K térreo, Departamento de Biologia Celular, CEP 70.910-900, Brasília-DF, Brasil).

ABSTRACT:

The conversion process of any raw lignocellulosic biomass in its native recalcitrant form, a hydrolyzed form susceptible to biotechnological use requires a pre-treatment process with the function of recovery or fractionation of lignocellulose components, in addition to increasing the porosity and area of accessible to the degradation enzymes. For the present study, the fractional factorial response surface was used as a statistical tool to analyze the pectinolytic enzymatic production of the filamentous fungus *Paecilomyces formosus*. The effect of 3 variables of the pre-treatment process (biomass concentration, time and temperature of exposure) and 4 variables of the cultivation process (liquor pH, incubation temperature, agitation and nitrogen concentration) were analyzed. The enzymatic activities were used using the 3, 5 - dinitrosalicylic acid method, by measuring the amount of total reducing sugars released. The severity factor of each liquor was robust and observed during the enzymatic activities during the incubation period due to a higher generation of inhibitory components to the microbial growth. As for the biomass concentration, the small portions of pre-treated biomass (1%) provide the highest concentrations of these sugars as a function of the increase in temperature and time that are incubated. Only pH exerted a direct influence on the enzymatic activity during the whole incubation process, with no pectinolytic secretions in the treatments with more liquid pHs (4) were reached. The effect of the interaction between pH and temperature demonstrated the stability of pectinases, since these enzymes are pH-dependent. Nitrogen supplementation through an organic source did not generate any action as an enzymatic activity, whereas the variation of the velocity and consequent level of *P. formosus* in which demand for oxygen at the end of the crop is required is pronounced. It concludes, which is lower for the variables (pre-treatment temperature of 140 ° C, exposure time of 6 minutes, 1% biomass, pH 4.0, 20 ° C, 87 rpm and no addition of nitrogen) lead to larger specific activities.

KEYWORDS: Coffee husks, Pectinases, *Liquid Hot Water*, *Paecilomyces formosus*, *Enzymes*

DEVELOPMENT AGENCY: CAPES, CNPq, FAPDF.