AMYLASE PRODUCTION BY SOLID STATE FERMENTATION BY FUNGUS *Penicillium* sp. IN AGROINDUSTRIAL RESIDUES

Authors: Basseto, E. N.[1]; Santos, F. R. S.[1]; Garcia, N. F. L.[1]; Leite, R. S. R.[1]

Institution: [1]Federal University of Grande Dourados, Faculty of Biological and Environmental Sciences (FCBA/UFGD), Laboratory of Enzymology and Fermentation Processes (Highway Dourados - Itahum, Km 12 - Dourados, Mato Grosso do Sul)

Amylases are enzymes responsible by catalyze the hydrolysis of starch, releasing dextrins, maltose and glucose. These enzymes have different biotechnological applications, can be used for various segments industrial, such as biofuel, textile, pharmaceutical, food and beverage. However, high production costs, hinders the use of these enzymes on an industrial scale. In this context, the use of agro-industrial wastes for cultive in solid state of microorganisms, in order to produce the enzymes, can contribute to reducing the final cost of these biocatalysts, favoring its application on a larger scale. This study aimed to optimize conditions cultive in solid state of the fungus *Penicillium* sp. for the production of amylase. The tests were performed using different agro-industrial residues as substrates (wheat bran, soybean meal, corn cobs, corn stover, rice husk). Other parameters of process fermentation were evaluated, including: initial moisture content of the medium (50 - 80%), temperature (25 - 45°C) and cultive time (24 - 144 hours). The fungus was cultivated in Erlenmeyer flasks of 250 mL containing 5 grams of substrate moistened with nutrient solution composed of ammonium sulfate 0.1%, magnesium sulfate heptahydrate 0.1% and calcium nitrate 0.1% (w/v). The enzymatic extract was obtained by adding 50 mL of distilled water, kept under stirring for 1 hour at 100 rpm, followed by centrifugation (2,500 xg for 5 minutes). The supernatant was used for determination of enzymatic activity. The highest production of amylase was obtained on wheat bran containing 55% moisture, kept at 30°C for 96 hours, reaching about 43.39 ± 0.15 U/g $^{-1}$ dry substrate. The results allow to conclude that the filamentous fungus *Penicillium* sp. features potential for production amylase, using agro-industrial waste as low cost substrates, which encourages the continuing work, aimed at future stages of characterization of this enzyme.

Keywords: industrial enzymes, fungal amylases, filamentous fungi.

Development agency: FUNDECT, CNPq and CAPES.