TITLE: GROWTH OF *STREPTOMYCES THERMOCERRADOENSIS* I3 IN SEMI-SOLID FERMENTATION AS A STRATEGY FOR PRODUCTION OF XYLANASES AND CELLULASES, AIMING THE USE OF AGRO-INDUSTRIAL RESIDUES

AUTHORS: GAMA, A.R.; BRITO-CUNHA, C.C.Q.; CARNEIRO, L.C.; BATAUS, A.M.

INSTITUTION: INSTITUTO DE CIÊNCIAS BIOLÓGICAS – UNIVERSIDADE FEDERAL DE GOIÁS (AVENIDA ESPERANÇA S/N, ICB II, CAMPUS SAMAMBAIA, CEP 74690-900, GOIÂNIA – GO, BRAZIL)

ABSTRACT:

The semi-solid fermentation (SSF) is a potential biotechnological possibility for the production of lignocellulosic enzymes that can be used in different processes, such as the hydrolysis of substrates, to obtain fermentable sugars. SSF has several advantages due to its low cost and high efficiency techniques, as well as the use of agro-industrial wastes such as wheat bran, sugarcane bagasse, wheat bran, rice straw, among others. In this work, the SSF supplemented with wheat bran was selected for the production of cellulases and xylanases by *Streptomyces thermocerradoensis* I3, filamentous bacteria belonging to the group of Actinomycetes that mainly present soil habitats. After 72 hours of SSF culture, the crude extract (CE) was obtained and placed during 5 minutes by Ultrasonic Sonicator / Cell Disruption (Eco-sonic) at 25 Watts power for the disruption of cells and homogenization of CE. The CE submitted to the Sonicator showed approximately twice the enzymatic activity (xylanase: 10.18 U/mL; CMCase: 116.47 U/mL) and total proteins quantified by the Bradford assay (0.494 mg/mL) when compared to values obtained in the CE that was not submitted to the Sonicator (Xylanase: 6.7 U/mL; CMCase: 64.8 U/mL; Bradford: 0.261 mg/mL). The purification of CE was performed by two techniques. Firstly, the CE was filtrated in Amicon Ultra-15 mL column (Merck Millipore) with limit of 50 kDa and of 30 kDa. The last one technique employed was Gel filtration chromatography by using Sephadex G-75. Both purification techniques showed two proteins in SDS-PAGE, being their molecular weights 44 kDa and 14 kDa, approximately. CE enzymes did not bind to Avicel, thus indicating the absence of carbohydrate binding modulus (CBM). From the obtained results, it can be concluded that the production of lignocellulosic enzymes in SSF supplemented with wheat bran is effective and can be potentiated by using Ultrasonic Sonicator.

Keywords: Actinomycetes, lignocelluloses, hydrolytic enzymes, lignocellulosic residues.