Production and characterization of lipases derived from fungus selected in cane plantation environment

Machado, A.S. [1], Lobato, P.D.R. [1], Pereira, J.S. [1], Oliveira, J.S. [2], Valério, H.M. [1], Alves, J.M.S. [1]

Instituição: [1] Unimontes - Universidade Estadual de Montes Claros (Campus Universitário Professor Darcy Ribeiro - Campus Montes Claros - Minas Gerais; [2] UFMG - Universidade Federal de Minas Gerais - Departamento de Bioquímica e Imunologia - Laboratório de Sinalização Celular e Nanobiotecnologia - Belo Horizonte - Minas Gerais.

Resumo:

Lipases (triacylglycerol ester hydrolases, EC (3.1.1.3) corresponding to a group of hydrolytic enzymes that act on the organic-aqueous interface, catalyzing the hydrolysis of long chain triglycerides to form diglycerides, monoglycerides, free fatty acids and glycerol. In environments with low water concentration, lipases catalyze esterification reactions, transesterification and interesterification. Lipases are considered an important biocatalysts group with great biotechnological potential due to its wide variety of reactions. In this study, a wild *Aspergillus niger* strain obtained from samples of sugar cane environment soil in the Cerrado Mineiro was analyzed for their ability to produce extracellular lipase in submerged fermentation and fermentation in solid substrates using three different substrates, represented by oil coconut, olive oil and tributyrin. The enzymatic activity was determined by spectrophotometric method with a maximum enzymatic activity of 1.77 x 104 U/L on the submerged fermentation using olive oil as substrate, after 144 hours of culture. Then, the crude extract from submerged fermentation was partially purified using the ammonium sulfate precipitation technique, resulting in two samples, one with saturation of 75% and 100% of another, which have been subjected to hydrophobic chromatography (Phenyl Sepharose) and gel filtration FPLC (Superose 12) system. The final yield of the purification process was 25% for sample A and 37% for sample B. After partial purification, two proteins were isolated with apparent mass of 65 kDa and about 20 kDa each, being necessary to perform confirmatory tests to determine if the *A. niger* strain studied produces more than one lipase isoform. These characteristics make the A. niger lipase becomes a notable lipolytic enzyme with suitable properties for various biotechnological applications.

Palavras-chave: *Aspergillus niger*; fermentation; purification, lypolitic hidrolyses

Agência de fomento: Petrobrás