

Optimization of Nutrient Medium Containing Agricultural Residues for Cellulase and Xylanase Production by *Aspergillus japonicus* Using Experimental Design

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Cellulose is the world's most abundant natural biopolymer and hemicellulose unite a big group of high molecular weight polysaccharides, insoluble in water alkaline solution. Cellulose and hemicellulose biodegradation by cellulases and hemicellulases produced by numerous microorganisms are a potentially important procedure in the industrial production. This study aims to optimize the culture medium composition in order to increase the CMCase and xylanase production in SR liquid medium using experimental designs. Optimal concentrations of yeast extract, peptone and carbon source in the submerged fermentation medium have been identified for the maximum cellulolytic production from the fungus *Aspergillus japonicus*. A two level full factorial design was applied to study the effects of three factors in different concentrations: yeast extract (2g/L and 8g/L), peptone (0.1g/L and 1g/L) and carbon source (10.0g and 15.0g) and the data analysis were performed by response surface methodology using the software STATISTICA 6.0. Activities of both enzymes were determined by reducing sugar using DNS. The fermentation was carried out at 30°C under agitation of 100 rpm. The carbon source used was wheat bran and sugar cane bagasse (3:1w/w), and soy bran and corn cob (3:1 w/w) for cellulase and xylanase, respectively. An equation was fitted to experimental data taking into account only the factors with significance higher than 5%. The result showed that cellulase and xylanase activities obtained with the optimized nutrient medium are 50% and 16.3% higher, than the achieved with the standard SR medium.

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