Aspergillus niger

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RESEARCH ARTICLE

Abstract

Mutant strains from *Aspergillus niger* UAM-GS1 were produced by UV radiation to increase their hemicellulolytic and cellulolytic activity production. The mutant strains showing more enzymatic activity were those labelled GS1-S059 and GS1-S067. These strains also showed the largest relationship between diameter of hydrolysis zone and colony diameter. The mutant GS1-S067 showed a colony radial extension rate and a biomass growth rate [g biomass/(cm^2 h)], 1.17 times higher than that achieved by strain UAM-GS1. The high invasive capacity makes this mutant strain a promising alternative for its use in solid substrate fermentation (SSF). The morphological properties of the two mutant strains were evaluated by using scanning electron microscopy. The diameter of the sporangium of the mutant strains GS1-S059 and GS1-S067 was significantly larger ($P < 0.05$) than that found for the parental strain. The hypha length and diameter of the mutant strains significantly changed ($P < 0.05$) compared to the parental strain. A Pearson correlation analysis on hypha length, sporangium diameter, and cellulase and xylanase activities indicated that there was a strong relationship among these variables in relation to mannanase activity. Mutant strains GS1-S059 and GS1-S067 significantly increased their level of mannanase, xylanase and cellulase production, compared to the parental strain, improving their potential industrial applications.

Article

Filamentous fungi are important in industrial enzyme production, since they are able to synthesize and secrete large amounts of extra cellular proteins. These organisms grow in liquid and solid-state cultures by hyphal extension and branching. The importance of morphological and physiological studies on fungi in liquid cultures has been recently reviewed (Papagianni, 2004). Fungal macro- and micro-morphology affect the rheology of the fermentation medium, thereby having a significant impact on the mixing, mass transfer and