

Cellulolytic Enzymes Produced by the Edible Mushroom, *Pleurotus sajor-caju*

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ABSTRACT

Pleurotus sajor-caju grows efficiently and degrades all the components present in lignocellulosic residues. Production of cellulase and xylanase enzymes in submerged culture and during solid state cultivation has been studied. An initial pH of 5.0 was found to be optimal for the production of cellulase in shake flasks; this was attained in about 6–8 d in a medium containing either cellulose or rice straw as the sole source of carbon. On the cellulose medium, the maximum filter paper activity attained was 0.15 IU/mL in 7 d whereas the endoglycanase activity of 1.0 IU/mL, xylanase activity of 1.55 IU/mL, and β -glucosidase activity of 0.57 IU/mL were achieved after 9 d fermentation. The reducing sugars were absent in the culture medium. The cellulases (filter paper activity and endoglucanases) were most active at pH 5.0 and 45°C. Xylanase had maximum activity at pH 4.8 and 45°C, and β -glucosidase at pH 5.5 and 40°C. In shake cultures, *P. sajor-caju* produced dispersed suspension of short mycelial threads and various sizes of pellets. The profile and extent of enzyme biosynthesis during submerged cultivation on rice straw was found to be of the same nature as obtained on cellulose.

During solid state cultivation of *P. sajor-caju* on rice straw beds for 36 d, the elaboration of enzyme activities did not appear to follow any definite pattern. However, filter paper activity, which is representative of cellulase action in hydrolyzing cellulose, remained more or less constant during the period of about the first 20 d of cultivation after the appearance of fruit bodies on the surface of rice straw beds. All the activities attained their minimum values after 23 d of cultivation, during which approximately 1 kg of fresh fruit bodies had been harvested. The total fruit bodies harvested till 36th days were approx. 1.1 kg.

Though *P. sajor-caju* elaborates cellulase and xylanase extracellularly, the activity values were not as high as those of other active cellulase producers such as *Trichoderma reesei*.