

Optimization of cultural conditions for polygalacturonase production by a newly isolated *Aspergillus fumigatus* R6 capable of retting kenaf

ABSTRACT

Sequential optimization strategy was used to enhance the production of extracellular polygalacturonase by a newly isolated *Aspergillus fumigatus* R6 using rice bran as a substrate in solid state conditions. Three significant variables influencing the polygalacturonase production were identified as initial moisture level, temperature and incubation time ($P < 0.0001$). The model established by face-centered central composite design was significant ($P < 0.05$) with high R^2 (0.98). The model validity was verified and the optimum conditions were at an initial moisture level of 49.6%, 33 °C and 129 h of incubation time with the maximum polygalacturonase activity of 565 U/g, resulted in 2.65 fold increase in polygalacturonase activity compare to the unoptimized conditions. Kenaf stem treated with *A. fumigatus* R6 polygalacturonase enzyme at 72 h produced high strength of kenaf bast fibers (287 MPa) with high Young's modulus (10404 MPa) and the color is in satisfactory.

Keyword: Polygalacturonase; *A. fumigatus*; Central composite design; Solid state condition; Retting