

Solid-state fermentation of palm kernel cake with *Aspergillus flavus* in laterally aerated moving bed bioreactor

Abstract

Solid-state fermentation (SSF) was employed to enhance the nutritive values of palm kernel cake (PKC) for poultry feeding. *Aspergillus flavus* was isolated from local PKC and utilized to increase the mannose content of PKC via the degradation of β -mannan in PKC; evaluation was done for batch SSF in Erlenmeyer flasks and in a novel laterally aerated moving bed (LAMB) bioreactor. The optimum condition for batch SSF in flasks was 110% initial moisture content, initial pH 6.0, 30 °C, 855 μ m particle size, and 120 h of fermentation, yielding 90.91 mg mannose g⁻¹ dry PKC (5.9-fold increase). Batch SSF in the LAMB at the optimum condition yielded 79.61 mg mannose g⁻¹ dry PKC (5.5-fold increase) within just 96 h due to better heat and mass transfer when humidified air flowed radially across the PKC bed. In spite of a compromise of 12% reduction in mannose content when compared with the flasks, the LAMB facilitated good heat and mass transfer, and improved the mannose content of PKC in a shorter fermentation period. These attributes are useful for batch production of fermented PKC feed in an industrial scale. © 2010 Springer Science+Business Media, LLC.