



Category: Metagenomics

# Purification and Characterization of Extracellular enzyme from *Aspergillus fumigatus* and Its Application on a *pennisetum* sp for enhanced glucose production

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## Abstract

*Aspergillus* species are saprophytic fungi widely distributed in nature and are associated with a number of human diseases. The present study was investigated for production of extracellular cellulase from *Aspergillus fumigatus* which could be potentially used for degradation of cellulose in lignocellulosic biomass for bioethanol production. In the present work, *A. fumigatus* were grown in fungal basal medium and preserved at 30 °C for 72 h. The cellulase enzyme was filtered (using Whatman filter paper), precipitated (using ammonium sulphate), dialysed and then purified on a Sepharose 6B ion exchange column. The cellulase enzyme showed a purification of 0.4 fold and the molecular weight was determined as 100 kDa by SDS-PAGE. The optimum pH, temperature, incubation time of the enzyme was determined to be pH 7.0, 35 °C and 24 h respectively. The presence of metal ion Mn<sup>2+</sup>, followed by Ca<sup>2+</sup> and Co<sup>2+</sup> was found to increase the cellulase activity. Notably, the cellulase activity was not significantly affected in the presence of additives like EDTA, and Triton X-100 and β-mercaptoethanol. Response surface methodology was used to design optimisation experiments for saccharification of lignocellulosic biomass (hybrid napier grass) and the response i.e. glucose yield was considered as the product. The glucose yield was considerably increased from 101.4 mg/g to 856.5 mg/g in the optimised conditions of 35°C, pH 5.2 with substrate concentration (ultrasono assisted alkali pretreated biomass) of 3.5 g, with enzyme concentration of 3 ml was incubated for 24 h. Further, the statistical analysis using ANNOVA demonstrated a p- value of less than 0.005 and the R<sup>2</sup> value of 90.18.

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