

ISOLATION OF CELLULOLYTIC FUNGI

FROM SELECTED ENVIRONMENTAL SOURCES

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Saprophytic fungi are a main source of degradation in nature; they consume complex compounds such as cellulose and lignin, thus, initiating the decomposition process. The main objective of this study was to screen fungi with high cellulolytic activity and evaluate the activity of their enzymes towards different substrates such as cotton wool, saw dust and straw.

Isolates of cellulose degrading fungi were isolated from 23 different colonies derived from sawdust, straw, decaying wood, leaf litter, mud and beach soil. Batch cultures were made on filter paper substrate in basal medium. To determine the activity of cellulolytic enzymes filter paper assay was conducted for a period of an hour using isolated crude enzymes of each fungus and tested for the released reducing sugar by DNS reagent method. Resultant colour change was measured using UV spectrophotometry at 540 nm. Optical absorbance was compared with a standard glucose curve and resulted enzyme activity ranged between 20 and 24 Filter paper units/ ml, optimum temperature and pH were 50 °C and almost neutral pH respectively.

Fungi isolated from soil were identified as *Fusarium* sp., *Helminthosporium* sp. and a sample suspected as *Trichoderma* sp. (labeled as Mud3). Those isolated from straw were *Aspergillus* sp. and *Rhizopus* sp.. A species suspected as *Cladosporium* (labeled as Saw6) was isolated from saw dust. In addition to filter paper, experiments were conducted using straw, sawdust and cotton wool as the sole cellulose substrate. This helped to find the individual substrate preference as well as obtaining potent evidence for their cellulolytic ability. With the enzyme preparations from 4 day cultures with cotton wool as the substrate Mud3 and *Aspergillus* sp. showed activity of 33.08 and 32.52 FPU/ ml respectively. In sawdust substrate, *Aspergillus* sp. showed activity of 26.35 FPU/ ml and *Helminthosporium* sp. showed activity of 40.36 and 42.61 FPU/ ml respectively. This was true for all repeated batches. Thus, Mud3, Saw6, *Aspergillus* sp. and *Helminthosporium* sp. can be used in cellulosic waste management such as wastes from cotton mills, cotton textile garments, agriculture (straw) and timber, saw mills (saw dust) and in solid state fermentation during the production of biogas.

To support their use in degradation of marine algal debris, batch cultures of inoculated filter papers were immersed in seawater medium with the salinity of 34‰ (parts per

thousand). Here, Saw6 depicted the highest activity of 64.01 FPU/ ml. This is relatively higher than the previous records in cellulolytic basal medium. Thus, Saw6 can be used in degradation of algal debris during the production of compost.