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ISOLATION OF CELLULOSE DEGRADING FUNGI AND A COMPARISON OF THEIR CELLULOLYTIC ACTIVITY

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Cellulases produced by microorganisms are key enzymes in the natural biomass degradation process which can convert cellulose into bio-based products and bioenergy. Therefore, isolation of microorganisms producing cellulases with high specific activities and greater efficiency is desirable. This study was aimed at isolation of cellulose degrading fungi and identification of more efficient cellulase producers.

Ten cellulolytic fungal species were isolated from various environmental samples by their ability to grow on Stanier's mineral salt agar with filter paper pulp as the sole carbon source. The control plates were without filter paper pulp. Among them nine isolates were identified by colony and microscopic examination as *Trichoderma* sp., *Aspergillus niger, A. flavus, Penicillium* sp., *Fusarium* sp., *Cladosporium* sp., *Paecilomyces sp., Rhizopus* sp. and *Aspergillus* sp. One isolate (X) was not identified.

The crude enzyme preparations were obtained by growing the isolates in liquid cultures with continuous shake and the Congo red clearing zone assay was used for qualitative detection of their cellulolytic activity. In the quantitative assays, the filter-paper-hydrolyzing (FPase) activity of crude enzyme in culture supernatants was estimated by the Dinitro salicylic acid method. The denatured crude enzyme preparations were used as controls. One unit of the enzyme was expressed as the milligrams of reducing sugar liberated per milliliter of enzyme per minute. The highest cellulase producer was *Trichoderma* sp. with an activity of 0.0294 U. The activity of *Cladosporium* sp. was 0.0287 U. The activities of cellulase produced by other fungi were in the range between 0.0251 – 0.0269 U.

The best pH and the duration of culture for maximum production of species X cellulase were studied. The optimum pH was 5.0 and the activity appeared to be rising even after 192 hours in culture. Further studies using species X culture filtrate revealed that the pH and temperature optima of its cellulase were pH 5.0 and 50^0 C respectively. Purification and further characterization of the enzymes may be useful in biotechnology applications.