Degradation of Cellulose and Pectin in Organic Wastes by Selected Fungal Strains

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Solid waste management is becoming more complicated due to rise in population, industrialization and changes in life styles. In nature, microbial diversity exhibits wide range of activity, association and interaction with each other and with their environment. Microbes releasing pectinolytic and cellulolytic enzymes are playing a major role in degradation and decomposition of organic compounds. This study aimed to investigate the degradation of cellulose and pectin in organic waste by fungi. A total of 10 fungal species were isolated from waste samples collected from municipal waste dump near Vincent Dias stadium in Badulla. Pectinolytic and cellulolytic activity of isolates were tested by standard plate assays and best strains to degrade cellulose and pectin were selected (F3, F6A, F6B, F8 and F10). Selected fungal species were inoculated to particles (> 1 cm diameter) of corn cobs, banana peduncle and jack fruit axis and incubated under laboratory conditions. Weight loss percentage (WL %), sugar production and Fourier Transform Infrared (FTIR) spectroscopy data were gathered from samples within 5 days interval for 50 days. Experiment was conducted by following complete randomized design with three replicates. The highest weight loss percentage was obtained in F10 treated corn cobs sample (WL% = 1.3). Weight loss percentages and sugar analysis values with respect to the time started to be static after 45 days. It may be due to the fact that the microbial growth has entered a stationary phase' since available nutrients have decreased in the medium. According to the FTIR data, the F3 and F6B treated corn cob samples and F8 treated banana peduncle samples had significantly high ($p \leq 0.05$) absorbance in polysaccharide window (900 — 1200 cm^{-1}) at the fifth day of incubation. In conclusion, all fungi stains used in the study have the ability to degrade organic waste efficiently.

Keywords: Cellulose, Pectin, Organic waste, Fungi