

ISOLATION AND CHARACTERISATION OF CELLULOLYTIC AND PECTOLYTIC MICROORGANISMS FROM NATURALLY DEGRADING SOLID WASTES

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Cellulolytic microorganisms were isolated from natural compost heaps, using different media such as Duboo's cellulose, cellulose mineral salt, cellulose agar, cellulose dextrin agar which contain cellulose as the only carbon source. Using pectin agar medium, which contained pectin as the only carbon source, pectolytic microorganisms were isolated.

Cellulolytic fungal genera isolated were *Helminthosporium* sp., *Aspergillus* sp., *Cephalosporium* sp. and *Gliocladium* sp. There were only cellulolytic actinomycetes (*Streptomyces* sp.) and one cellulolytic bacterium. Pectolytic microorganisms isolated were species of *Aspergillus*, *Penicillium*, *Mucor*, Yeast and a pectolytic bacterium. Cellulolytic and pectolytic enzyme activities of isolated microorganisms were determined using cotton wool, carboxymethyl cellulose (CMC) and pectin as substrates. Sugar produced by degradation of substrates were determined by Somogyi-Nelson micro method. Highest cotton wool degrading activity and CMCase activity were obtained from Gram negative short rod bacterium (8.899×10^{-3} units of enzyme/5ml and 1.2892 units of enzyme/5ml respectively). Highest pectinase activity was obtained from *Penicillium* sp. (ii) (0.0136 units of enzyme/5ml).

All isolated cellulolytic microorganisms showed high growth rate at 30 and 35⁰C while most pectolytic microorganisms showed high growth rate at 35⁰C. Except for species of *Gliocladium* other cellulolytic microorganisms showed high growth rate at acidic pH range (pH 4.5). Among pectolytic microorganisms *Penicillium* sp. (I) and *Aspergillus niger* showed high growth rates at pH 5.5. But *Penicillium* sp. (ii) and *Aspergillus* sp. (ii) showed high growth rates at pH 6.5.

It was clear that these microorganisms have the ability to degrade complex cellulose and pectin molecules to simple compounds but it may not be economical as they showed relatively low capacity. However it would be possible to develop a microbial mixture, using above types of native microorganisms that may have a high potential for degradation of solid wastes.