D-34: Cellulolytic bacteria associated with rice straw

D M Sirisena, T P Manamendra
(Dept of Botany, Univ of Kelaniya)

The ability of microrganisms to degrade cellulosic material is of considerable interest both in terms of microbial ecology and biotechnology. Most agricultural residues of crop plants particularly cereals, are rich in cellulosic material and there is a potential of converting them to alcohol, glucose, single cell protein etc. In addition, agricultural residues such as rice straw is useful as a substitute for expensive chemical fertilizers used in paddy cultivation, if they are decomposed efficiently.

Due to high cellulolytic activity of some bacteria and their short generation time, recently cellulolytic bacteria have become a focus of investigation. In this study 3 cellulolytic bacterial strains were isolated and identified from decomposing rice straw. They were able to utilize cellulose, rice straw powder and carboxymethylcellulose, a semi-synthetic cellulosic material, as substrates. Two of these strains, *Listeria* sp and *Enterobacter* sp were abundant during initial stages of decomposition whereas the other strain, *Pseudomonas* sp became dominant towards the late stages of the process. Comparison of their endo-1,4-B-glucanase (carboxymethylcellulase) activity indicated a higher level of enzymatic activity in the *Pseudomonas* sp than in the other 2 strains. The rate of saccharification of cellulose and carboxymethylcellulose by *Pseudomonas* sp and *Listeria* was compared by estimating the release of glucose. The *Pseudomonas* sp released 2.025 and 1.813 mmol/l glucose when cellulose and carboxymethylcellulose was used as substrate respectively. Concentrations of glucose produced by the *Listeria* sp were 1.813 mmol/l with cellulose and 1.5 mmol/l with carboxymethylcellulose.