

EVALUATION OF FOUR CELLULOSIC SUBSTRATES FOR CELLULASE PRODUCTION AND ENZYMIC SACCHARIFICATION

N Fernando and P S Peiris

Industrial Microbiology Section

*Ceylon Institute of Scientific and Industrial Research
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Pretreated rice straw, sugar-cane bagasse, saw dust and newsprint were tested as substrates for cellulase production by five cellulolytic organisms (four isolates and Trichoderma reesei QM 9414) grown in liquid culture on Mandels Reese medium. Filter paper (FP) activity was monitored as a measure of the total cellulase activity over a period of 15 days. Trichoderma reesei showed the best FP activity on all substrates tested; its activity increased at least upto 11 days; a maximum of 1.6 FP units were recorded on bagasse. Among the isolates, Trichoderma sp. (IMB-Tr) showed significant activity on all substrates. All isolates demonstrated FP activity on each of the substrates tested.

The cellulase for saccharification was prepared by growth of Trichoderma reesei on crystalline cellulose for 15 days in a 5 litre fermenter under controlled conditions. High FP activity has been reported on growth of Trichoderma reesei on crystalline cellulose. Concentration of the culture filtrate by ultrafiltration produced an enzyme preparation having a FP activity of 3.3.

Saccharification of 5% (w/v), pretreated (0.1 g NaOH/g substrate), straw, bagasse, saw dust and newsprint with the Trichoderma reesei enzyme (13 FP units/g substrate) produced 14.0, 9.6, 4.3 and 2.9 g/l of reducing sugars respectively in 30 hours.

Of the substrates evaluated, rice straw appears to be the best for cellulase production and enzymic saccharification.