



ISOLATION AND OPTIMIZATION OF CELLULASE PRODUCING BACTERIA FOR SECOND-GENERATION BIO-ETHANOL PRODUCTION

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Abstract

Cellulase is an inducible enzyme through medium optimization since there is a complex relationship between bacterial growth and enzyme yields with a variety of environmental factors. Thus, to obtain the maximum yield of cellulase, optimization is a cost-effective important aspect. In the present study, efficient cellulolytic bacteria were isolated and screened from compost soil, cow dung and termite gut content. Gram's iodine staining on Carboxy Methyl Cellulose (CMC) agar plates and Dinitrosalicylic acid (DNS) assay were performed, as primary and secondary screening tests, for isolates to evaluate the potential for cellulase production. In addition, the process parameters (nitrogen source, phosphorus source, CMC%, and temperature) were optimized to get maximum cellulase production and the isolates were identified using the 16S r-RNA gene sequencing analysis. During the study, two strains were isolated and identified from compost soil (*Nocardiopsis* sp.) and termite gut (*Bacillus* sp.) which showed higher potential for cellulase production. Average Diameter (AD) of clear zones for *Nocardiopsis* sp. & *Bacillus* sp., were 19.33 ± 0.06 mm and 33.67 ± 0.057 mm respectively with Gram's iodine stain. Further, total cellulase activity for *Nocardiopsis* sp. & *Bacillus* sp., were 0.93 ± 0.012 U and 0.35 ± 0.021 U respectively for DNS assay and both species showed the same optimum conditions with all parameters for maximum cellulase production; peptone as a nitrogen source, 0.2% K_2HPO_4 as phosphorus source, 1.2% CMC, 37 °C temperature.

Keywords: Carboxy Methyl Cellulose, Cellulase producing bacteria, Optimization of cellulase production