

Screening and Isolation of Hyper-cellulolytic Bacteria using Agricultural Residues and Soils in Thailand

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Abstract

450 samples of agriculture residues and soils were inoculated into a synthetic medium containing Whatman filter paper and crystalline cellulose powder as the sole carbon source and incubated at 60°C under anaerobic condition. The cultures were further enriched by cultivating with crystalline cellulose powder as the substrate, and four strains having effective hydrolytic activity were eventually isolated from bagasse and paper residues by single colony isolation using the roll-tube method. The culture supernatants of four strains, which were identified as *C. thermocellum* by 16S rRNA gene sequences, were shown to have more than two times higher specific activity than that of the *C. thermocellum* ATCC27405 strain with the turbidometric assay using crystalline cellulose powder (Sigmacell Type-20). The high activity resided in the cellulose binding fractions prepared from the bacterial cultures. Among these strains, two strains possessing high hydrolytic activities against Avicel, filter paper, and xylan showed differences in SDS-PAGE pattern for the cellulose binding fractions when compared with that obtained from the *C. thermocellum* ATCC27405 culture. These results suggest the isolated strains form the cellulosomes with different subunit compositions for efficient hydrolysis of crystalline cellulose.

Keywords: Screening, Cellulolytic, Bacteria, Cellulosome

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