

رقم البحث: (3)

عنوان البحث باللغة الانجليزية:

Biochemical and Molecular Characterization of Five Bacillus Isolates Displaying Remarkable Carboxymethyl Cellulase Activities

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الملخص باللغة الإنجليزية:

ABSTRACT

Cellulases have many useful applications in industry and biotechnology. So, identification of new bacterial strains expressing cellulases with better properties is desired. Five soil bacterial strains screened for high carboxymethyl cellulase (CMCase) activities were characterized and identified by 16S rRNA analysis as *Bacillus amyloliquefaciens* (FAY088), *B. velezensis* (FAY0103), *B. tequilensis* (FAY0117), *B. subtilis* (FAY0136), and *B. subtilis* (FAY0182). Their CMCase activities were 1.49, 1.26, 1.21, 1.21, and 1.24 U/ml, respectively. The maximum CMCase production was attained by growth at 35 °C, pH 6, and 180 rpm for 5 days. Residual activities of CMCases from FAY088 and FAY0117 were 88% or more after growth at 40 °C, which is same as FAY0182 CMCase at 40 and 45 °C. Additionally, FAY0182 retained 73% residual activity at 50 °C. FAY088 and FAY0182 retained more than 85% at pH 7 and 8. Conversely, residual activities from FAY0103 and FAY0136 declined a lot by increasing growth temperature beyond 40 °C and pH beyond 7. The maximum CMCase stability in all isolates was observed at pH 7, 3-h incubation, and 40 °C except for FAY0103 CMCase showed optimum temperature at 30 °C. More than 70% CMCase stability was retained in case of FAY088 at 50 °C, FAY0117 at 50–70 °C, and FAY0136 at 50–60 °C. FAY088 CMCase seemed to be the least sensitive to temperature variation as it displayed residual activities 67, 72, 78, 84, 77, 74, and 72% at pH 3, 4, 5, 6, 8, 9, and 10, respectively. Finally, the five CMCase-producing isolates are recommended further enzyme applications in biotechnology and industry.