

Novel Endoglucanase (Endo5A) from natural isolate

Endoglucanases act randomly at internal amorphous sites in the cellulose polysaccharide chain initiating the cellulose degradation by generating oligosaccharides of various chain lengths and consequently new chain ends. Endoglucanases have many applications in biopolishing cotton fabric, improving the processing of paper pulp, de-inking paper, enhancing the efficiency of laundry reagents and increasing the utilization efficiency of plant materials in animal feed manufacture. These industrial applications necessitate endoglucanases to be sufficiently robust and stable under conditions of intended industrial applications. Hence, we identified the endoglucanase, secreted by the *Paenibacillus* sp. ICGEB2008 for cellulosic hydrolysis and expressed in heterologous system. The purified β -1,4-endoglucanase (GH5 family protein) was further characterized for its temperature and pH optima. Also, activity of recombinant isoform was compared with native Endo5A to confirm that heterologous expression has not distorted the activity.

The purified endoglucanase has specific activity comparable or even higher than commercially available cellulases. Endo5A is very robust and thermostable enzyme with optimal activity at 50°C. Moreover, there was no loss in enzyme activity even when enzyme was kept at 40°C for 24h. The optimal pH for the endoglucanase activities was found out to be pH 7. The comparison of the cellulolytic activities of both native and recombinant Endo5A showed that the specific activities of both the endoglucanases were similar, indicating that heterologous expression of endoglucanase did not affect its conformation and activity.

Graphical Description

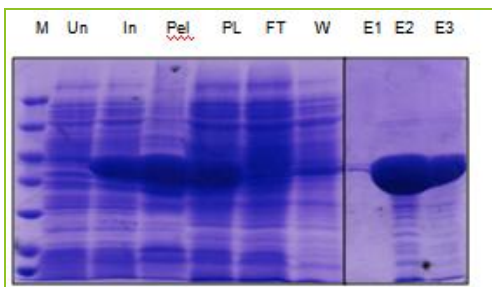
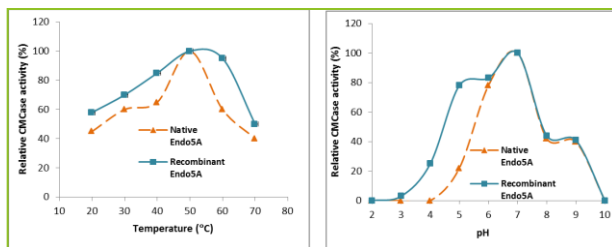


Figure 1: Purification of recombinant Endo5A using metal affinity chromatography

Figure 2: Temperature and pH optima of native and recombinant Endo5A

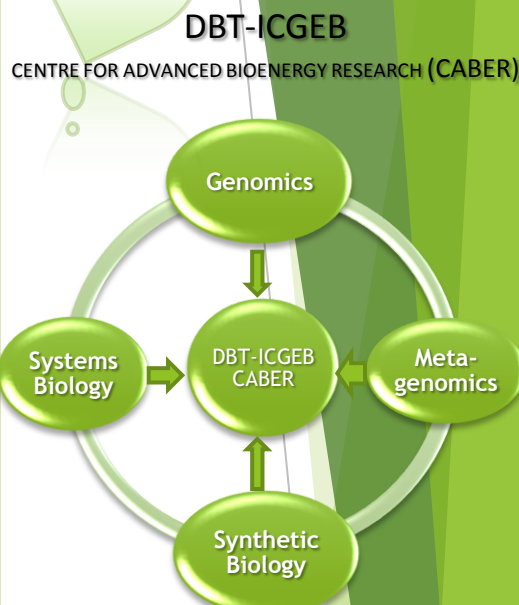


Exploitable Technology

The lab scale recombinant enzyme technology is now ready to be upscaled industrially to meet the energy needs of human beings.

Reference for the Invention

Adlakha, N., Rajagopal, R., Kumar, S., Reddy, V.S., Yazdani, S.S. 2011. Synthesis and characterization of chimeric proteins based on cellulase and xylanase from an insect gut bacterium. *Applied and Environmental Microbiology* 77(14):4859-66.
 Yazdani, S.S., Adlakha, N., Rajagopal, R., Pramanik, D. Plant cell wall hydrolyzing enzymes from insect mid-gut bacterium" (*Indian Patent Application No. 2071/DEL/2010*).



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