Focal Point & the Purpose of Innovation

Novel Xylanase (Xyl11D) from natural isolate

Hemicelluloses are polysaccharides in plant cell walls that have beta-(1-->4)-linked xylose backbones which provide strength to cell wall by interacting with cellulose and lignin. Thus, efficient degradation of lignocellulosic biomass to monomeric sugar unit requires the presence of xylanases in the cellulolytic enzyme cocktails. For this, we identified the xylanase (GH family 11), secreted by *Paenibacillus* sp. (isolated from *Helicoverpa armigera*) for hemicellulosic hydrolysis and expressed heterologously in *E.coli* system. The Xyl11D protein was overexpressed intracellularly in *E. coli* and purified from the cell lysate by metal affinity chromatography. Native Xyl11D (20 kDa) was also purified from the culture supernatant of *Paenibacillus* sp. ICGEB2008 and used for characterization.

The specific activities of native and recombinant Xyl11D were similar, indicating that recombinant Xyl11D folded in a similar manner to native Xyl11D. The activity of recombinant Xyl11D at different temperatures and pHs was similar to that of native Xyl11D and exhibited optimal activity at 50°C and pH 6 to 7.

Graphical Description

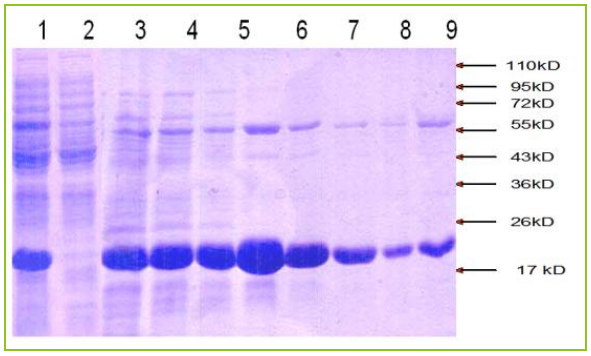

Figure 1: Purification of recombinant Xyl11D using metal affinity chromatography

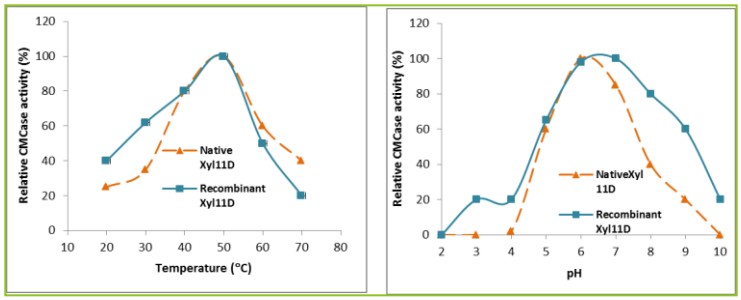

Figure 2: Specific activities of native and recombinant Xyl11D

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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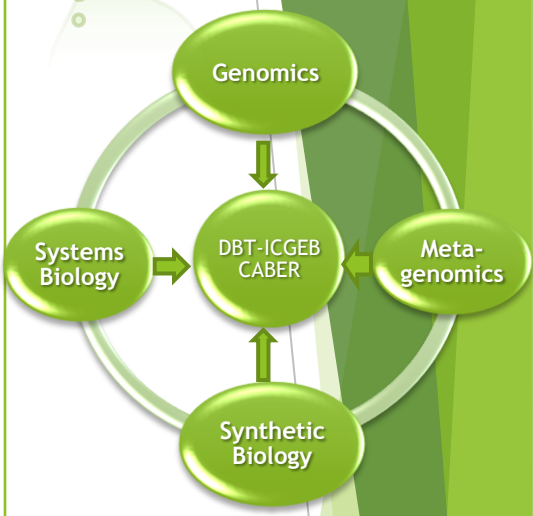

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