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Cold active endo-glucanase from Antarctic yeast, *Glaciozyma antarctica* PI12: Expression and characterization

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Glaciozyma antarctica PI12 is a psychrophilic yeast that was isolated from the surface of Antarctica sea ice. Psychrophiles thriving permanently at near-zero temperatures synthesize cold-active enzymes to sustain their survivals. Most psychrophilic enzymes are characterized by high catalytic efficiencies at low temperatures compared with their mesophilic counterparts. β -glucanases are carbohydrate acting enzymes which break down glycosidic bonds within β -glucan, which is usually present in plants and algae cell wall and play an important role in biodegradation of polysaccharide in nature. This study is the first to describe the molecular cloning, expression, purification and biochemical characterization of novel cold active β -glucanase from psychrophilic yeast, *G. antarctica* PI12. cDNA sequence of endo-1,3(4)-glucanase (GaEGL) with an open reading frame of 1182 bp encoded for 394 amino acids has been cloned and expressed in *E. coli* expression system. Sequence analysis through bioinformatics studies revealed few homology identities of this protein with other endo-glucanases which belongs to glycosyl hydrolase family 16. The recombinant GaEGL with molecular mass of 44 kDa was purified with nickel affinity chromatography and subjected to enzymatic characterization. Generally, this enzyme was active at low temperature and broad range of pH and able to hydrolyze several substrates such as laminarin, lichenan and yeast beta glucan. Analysis of the reaction products released using purified proteins on respective substrates via HPLC revealed that the main hydrolysis products were disaccharides and oligosaccharides. Overall, the findings of this study provide new insights on β -1, 3(4)-glucanase from psychrophilic organism.

Biography

Salimeh Mohammadi is a PhD student working under the supervision of Associate Professor Dr Munir Abdul Murad. She received her Master's degree in Biotechnology from the University Technology Malaysia. Her main research interests are protein engineering, enzymology, protein modeling and mammalian cell culture. She also cooperates with the Malaysian Genomic Institute in the Framework for structural genomic project.

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