

ABSTRACT

Fervidibacter sacchari is found in Great Boiling Spring, a terrestrial geothermal hot spring and grows on multiple plant polysaccharides utilizing up to 117 putative glycoside hydrolases. Enzyme Fsa01040Cel from *F. sacchari* is in the glycoside hydrolase family 5. The gene was synthesized, cloned into pET-21b, and heterologously expressed using *Escherichia coli* strain T7 Express cells. temperature range of 60-90 °C (T_{opt} 80 °C), thermostable to 90 °C, and a pH range between 4.5-7.5 (pH_{opt} 5.0, 7.0). Phylogenetic analysis of Fsa01040Cel showed the evolutionary relationships to GH family 5_1. Determining the activities of Fsa01040Cel can assist in understanding life in extreme environments and the contributions of extremophiles such as *F. sacchari* to science.