Genome of a thermophilic bacterium Geobacillus sp. TFV3 from Deception Island, Antarctica

ABSTRACT

Thermophilic microorganisms have always been an important part of the ecosystem, particularly in a hot environment, as they play a key role in nutrient recycling at high temperatures where most microorganisms cannot cope. While most of the thermophiles are archaea, thermophiles can also be found among some species of bacteria. These bacteria are very useful in the fundamental study of heat adaptation, and they are also important as potential sources of thermostable enzymes and metabolites. Recently, we have isolated a Gram-positive thermophilic bacterium, Geobacillus sp. TFV3 from a volcanic soil sample from Deception Island, Antarctica. This project was undertaken to analyze the genes of this thermophilic Antarctic bacterium and to determine the presence of thermal-stress adaptation proteins in its genome. The genome of Geobacillus sp. TFV3 was first purified, sequenced, assembled, and annotated. The complete genome was found to harbor genes encoding for useful thermal-stress adaptation proteins. The majority of these proteins were categorized under the family of molecular chaperone and heat shock protein. This genomic information could eventually provide insights on how the bacterium adapts itself towards high growth temperatures.

Keyword: Temperature; 16S rDNA; Genomes; Geobacillus; Deception Island