

Effect of cultural conditions on protease production by a thermophilic *Geobacillus thermoglucosidacius* SKF4 isolated from Sg Klah Hot Spring Park, Malaysia

ABSTRACT

Major progress in the fields of agriculture, industry, and biotechnology over the years has influenced the quest for a potent microorganism with favorable properties to be used in scientific research and industry. This study intended to isolate a new thermophilic-protease-producing bacterium and evaluate its growth and protease production under cultural conditions. Protease producing bacteria were successfully isolated from Sungai Klah Hot Spring Park in Perak, Malaysia, and coded as SKF4; they were promising protease producers. Based on microscopic, morphological, and 16S rRNA gene analysis, isolate SKF4 was identified as *Geobacillus thermoglucosidacius* SKF4. The process of isolating SKF4 to grow and produce proteases under different cultural conditions, including temperature, pH, NaCl concentration, carbon and nitrogen sources, and incubation time, was explored. The optimum cultural conditions observed for growth and protease production were at 60 to 65 °C of temperature, pH 7 to 8, and under 1% NaCl concentration. Further, the use of casein and yeast extract as the nitrogen sources, and sucrose and fructose as the carbon sources enhanced the growth and protease production of isolate SKF4. Meanwhile, isolate SKF4 reached maximum growth and protease production at 24 h of incubation time. The results of this study revealed a new potent strain of thermophilic bacterium isolated from Sungai Klah Hot Spring Park in Perak, Malaysia for the first time. The high production of thermostable protease enzyme by *G. thermoglucosidacius* SKF4 highlighted the promising properties of this bacterium for industrial and biotechnological applications.

Keyword: Protease; *Geobacillus thermoglucosidacius* SKF4; Hot spring; Malaysia