

## Production of a Thermo Stable Protease

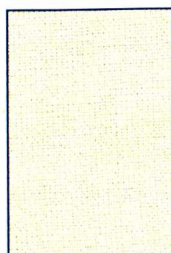


**Award Winner**

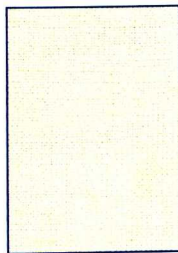
A thermophilic *Bacillus stearothermophilus* F1 that produced an extremely thermostable alkaline protease was isolated from decomposed oil palm branches. The bacterium was able to grow at high temperatures up to 80°C and within a broad pH range of 5.0 to 11.0. In liquid medium, an alkaline protease (an enzyme) was secreted after 12 h incubation at 60°C. We have cloned the protease gene to mesophilic host, namely *Escherichia coli*. Thus this enzyme can be produced at a lower temperature. The thermostable alkaline protease produced by *B. stearothermophilus* F1 had remarkable characteristics that can be marketable as industrial enzymes. Among them, was its stability at 80°C within the period tested (10 h) and a half-life of about 4 h, 25 min and 8 min at 85, 90 and 95 °C, respectively. In addition, the thermostability of protease F1 was better than thermolysin and subtilisin. Our studies showed that the enzyme has good potential to be used in detergent formulation. Protease can also be used in the food, medical and leather industries.

Production of this enzyme through large-scale fermentation of the cloned *E. coli* carrying the protease gene has good commercial potential.

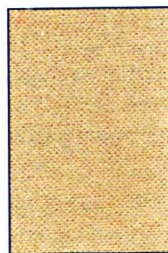
Samples of swatches tested on the washing performance of F1 protease



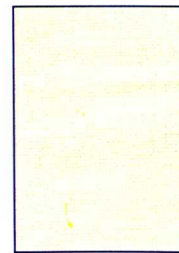
**AS12 (-030)**—Cotton  
EMPA 211 soiled with  
pigment, oil and milk



**AS12 (-049)**—Cotton  
EMPA 211 soiled with  
pigment, oil and milk



**CS1**—Cotton  
EMPA 211 soiled with blood



**CS9**—Cotton  
EMPA 211 soiled with egg  
yolk

**For further information, kindly contact:**

Prof. Dr. Abu Bakar Salleh  
Faculty of Biotechnology and Biomolecular Sciences  
Universiti Putra Malaysia  
43400 UPM, Serdang, Selangor  
Malaysia

Tel: +603 8946 6692

Fax: +603 8943 0913

E-mail: [abubakar@putra.upm.edu.my](mailto:abubakar@putra.upm.edu.my)