

## Analysis of the whole proteome of the hyperthermophilic archaeon *Sulfolobus solfataricus* under normal conditions

Min-Ju Son, Kyoung-Ri Kim, and Sun Bok Lee

Department of Chemical Engineering and Division of Molecular Life and Sciences,  
Pohang University Science and Technology, San 31, Hyoja Dong, Pohang 790-784, Korea  
Tel: +82-54-279-5970, Fax: +82-54-279-5528

### Abstract

*Sulfolobus solfataricus* is a hyperthermophilic archaeon which grows optimally at 75-85°C and pH 2.0-4.0 under strictly aerobic condition. In this study, proteome of *S. solfataricus* P2 was analyzed using 2-DE method. Cell culture was carried out using the YE medium (pH 3.0) at 78°C in 500ml flasks and harvested at the late exponential growth phase. Crude extracts of cells were subject to isoelectric focusing using IPG strips of various ranges (pH 3-10, 4-7, 5.5-6.7). Second dimensional SDS-PAGE was performed in 12.5% acrylamide gel. The dried spots were digested in-gel with trypsin to analyze the proteins by MALDI-TOF mass spectrometry. Peptide masses obtained were used to identify proteins by database search (ProFound and Mascot). The 2-DE gel revealed approximately 360, 170, and 280 visible protein spots in pH 3-10, 4-7, and 5.5-6.7 gels, respectively. About 400 spots that have a relatively high intensity were selected for further analysis. A total of 182 different proteins were able to be identified unambiguously. Of these, as much as 64 proteins have been detected at more than one position on the 2D gels, indicating that *S. solfataricus* P2 proteins are subject to regulation by post-translational modifications. It was also found that 39 proteins annotated as hypothetical proteins in the genome sequence database were expressed in the cells. Although all of proteome were not identified, this study will be helpful for our understanding of cell physiology, protein modification, and metabolic pathway of thermoacidophilic archaea.

### Reference

1. C. B. Park, S. B. Lee, and D. D. Y. Ryu, L-Pyroglutamate spontaneously formed from L-glutamate inhibits growth of the hyperthermophilic archaeon *Sulfolobus solfataricus* (2001), *Appl. Environ. Microbiol.*, 67, 3650-3654.