

## Proteome Analysis of Acrylamide-induced Proteins in a Novel Acrylamide-degrader *Enterobacter aerogenes* by 2D Electrophoresis and MALDI-TOF-MS

Jittima Charoenpanich<sup>1,2,3\*</sup> and Akio Tani<sup>4</sup>

<sup>1</sup>Department of Biochemistry and Centre of Excellence for Innovation in Chemistry (PERCH-CIC), Faculty of Science, Burapha University, Bangsaen, Chonburi 20131, Thailand

<sup>2</sup>Environmental Science Program, Faculty of Science, Burapha University, Bangsaen, Chonburi 20131, Thailand

<sup>3</sup>Centre of Excellence on Environmental Health and Toxicology (CHE), Ministry of Education, Thailand

<sup>4</sup>Institutes of Plant Science and Resources (ISPR), Okayama University, 2-20-1 Chuo, Kurashiki, Okayama 710-0046, Japan

\*Corresponding author. E-mail: jittima@bua.ac.th

### ABSTRACT

Despite tremendous advances in understanding the microbial degradation of acrylamide, reports on the nature of the two-dimensional protein patterns for acrylamide-degrading bacteria are not yet available. This work, focusing on the acrylamide-inducible proteins, studied the response of *Enterobacter aerogenes*, a novel acrylamide-degrading bacterium, to acrylamide. Proteome analysis was applied using 2D-polyacrylamide gel electrophoresis and matrix-assisted laser desorption/ionisation-time of flight mass spectrometry to identify proteins differentially expressed from *E. aerogenes* grown on acrylamide. Six protein homologues with amidohydrolase, urease accessory protein, quaternary ammonium compound resistance proteins, dipeptide transport protein, Omp36 osmoporin and large conductance mechanosensitive channel proteins (MscL) are seemingly involved in acrylamide stress response and its degradation. Five proteins identified as GroEL-like chaperonin, ArsR-transcriptional regulator, Ts- and Tu-elongation factor and trigger factor and four proteins (phosphoglycerate kinase, ATP synthase  $\beta$ -subunit, malate dehydrogenase and succinyl-CoA synthetase  $\alpha$ -subunit) responsive for the adaption of *E. aerogenes* in the presence of acrylamide

**Keywords:** Acrylamide, Biodegradation, *Enterobacter aerogenes*, 2D-PAGE, MALDI-TOF MS

### INTRODUCTION

Acrylamide ( $\text{CH}_2=\text{CHCONH}_2$ ) is used as a conjugated reactive molecule in polyacrylamide production as well as a binding, thickening or flocculating agent