Untargeted Metabolomics for Probing Mechanisms of Microbial Responses and Tolerance to Organic Solvents

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About Assistant Professor Nawaporn Vinayavekhin

Assistant Professor Vinayavekhin received her BS in Chemistry and Biological Chemistry from the University of Chicago in 2006. She completed her MS and PhD study in Chemistry at Harvard University under supervision of Prof. Alan Saghatelian in 2008 and 2012, respectively. She came back to Thailand after her study and became a lecturer at the Department of Chemistry, Chulalongkorn University. She was promoted to an Assistant Professor in 2017. She was awarded the Outstanding Teaching Award in 2015 and the Outstanding New Researcher Award in Biological Sciences in the Science Forum in 2016 from the Chulalongkorn University. Her research focuses on LC–MS-based untargeted metabolomics, natural product discovery, microbe–microbe interactions, microbial environmental stress response, and microbial biotransformation.

Abstract

Metabolomics is a comparative, global profiling method used for detection, quantitation, and discovery of metabolites in different sample groups under conditions of interest, such as diseases, mutations in genes, or environmental perturbation. Metabolomics can be performed in two modes: targeted and untargeted analyses. In this talk, we will first explore the differences in these two modes of analyses briefly. We will then discuss how untargeted metabolomics might be employed to probe mechanisms of microbial responses and tolerance to organic solvents, as well as the related downstream experiments that eventually led to the obtainment of strains with higher tolerance to organic solvents for potential use in biotechnological industry. The case studies will include the responses and tolerance of (i) Bacillus subtilis strain 168 (a laboratory strain) to 1-butanol, and (ii) Aspergillus niger strain ES4, which was isolated from the wall of an ethanol tank of a petroleum company, to ethanol.

References


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