

# Model-Driven Optimization of Bioprocess for the production of High-value Natural Product by an Engineered strain



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### Seminar Abstract

Bioprocess optimization of an engineered *E. coli* depends on various key critical, such as inducer concentration, inducer addition timing, and feed profile playing pivotal roles. Traditionally, these parameters are determined through laborious trial-and-error methods and design of experiments, necessitating a significant number of iterations. Additionally, the control of feed profile provides a substantial challenge which stems from the high cost of implementing real-time glucose analysis and feedback control system. Therefore, in my graduate study, a mathematical model-based optimization approach is employed to gain insights in an engineered *E. coli* bioprocess and select critical parameters that increases final product titre. *E. coli* that was already engineered to produce viridifloral, a high value terpenoid compound, was taken as a case study for model development and bioprocess optimization. In this presentation, I will guide you through my PhD journey, highlighting application of mathematical model-based optimization to contribute to the advancement of bioprocess optimization strategies.

### About the Speaker

I am Prashant Mainali, Ph.D. graduate from the National University of Singapore (NUS), having completed my doctoral studies in 2023. For my doctoral research, I was attached to Singapore Institute of Food and Biotechnology Innovation (SIFBI), A\*STAR. In September 2023, I joined Microbial Cell Bioprocessing (MCB) group, where my focus lies in optimizing the production of recombinant proteins from organisms such as *L. lactis*, *E. coli*, and *Pichia pastoris*.