הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע״ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Seminar

Tuesday, February 25th, 2025 at 12:30

ZOOM link:
https://gtiit.zoom.us/j/95796373127?pwd=0tAnQXkWrbqG2xACgWYuNquv9vSG6g.1

Metabolic Engineering of *Escherichia coli* for Enhanced Naringenin Biosynthesis

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MSc Seminar

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Abstract:
Naringenin, a valuable flavonoid with significant pharmaceutical applications, presents challenges in microbial production due to inherent metabolic inefficiencies and regulatory constraints. This seminar outlines a systematic metabolic engineering approach in *Escherichia coli* to optimize naringenin biosynthesis through three key strategies. First, the integration of biological quantum dots (QDs) was employed to enhance the catalytic efficiency of tyrosine ammonia-lyase (TAL), a radical enzyme critical for the synthesis of the precursor coumaric acid. Second, synthetic pathways were designed to circumvent the traditional acetyl-CoA route, allowing the direct production of malonyl-CoA—a critical precursor for naringenin—from amino acids. Third, a growth-coupled high-throughput screening technique (HST) was developed to identify optimal chalcone synthase (CHS) mutants, which enabled the rapid and efficient selection of CHS variants with improved catalytic performance. Collectively, these strategies led to a significant improvement in naringenin production compared to the baseline. This work highlights the potential of integrating advanced nanomaterials, pathway engineering, and dynamic selection systems to overcome metabolic bottlenecks, offering a robust framework for the scalable microbial production of complex plant-derived compounds.