Special Issue

Innovations in Microbial Enzyme Production: From AI-Driven Design to Industrial Bioprocessing

Message from the Guest Editors

Enzymes serve as core biocatalysts enabling sustainable manufacturing across the pharmaceutical, food, and daily chemical industries. Engineering high-performance enzymes (e.g., glycosyltransferases, lipases, plastic-degrading enzymes, and diagnostic enzymes) in robust microbial cell factories promotes the technological upgrading of traditional industries while creating high-value products with significant economic potential. Recent advances in genome editing, multi-omics technologies, and machine learning now transcend traditional enzyme discovery paradigms. These innovations enable the targeted mining of enzyme genes, rational design of protein stability and activity, and optimization of enzyme expression in host systems. Integrated with structural biology breakthroughs and AI-driven protein engineering, these tools allow for the systematic design of novel biocatalysts and the reconstruction of synthetic pathways in microbial factories for efficient multi-enzyme cascades featuring optimized cofactor regeneration.

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Editor-in-Chief

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