Special Issue

Recent Advances in Bioprocess Engineering and Fermentation Technology

Message from the Guest Editors

This Special Issue highlights pioneering research that bridges computational intelligence, metabolic engineering, and sustainable practices to unlock the potential of agricultural and agro-industrial waste streams. *Suitable topics for this Special Issue include, but are not limited to, the following*:

- **AI/ML-driven optimisation**: genetic algorithms for strain selection, neural networks for predicting fermentation dynamics, and digital twins for real-time bioprocess control.
- **Metabolic engineering**: in silico flux analysis, CRISPR-enhanced pathways, and multi-omics integration for substrate conversion.
- **Anaerobic digestion**: novel reactor designs, microbiome engineering, and process intensification for **biomethane**and/or **biohydrogen**
- **Sustainable fermentation systems**: innovations in solid-state and submerged fermentation for agro-waste valorisation into biofuels, enzymes, or bioplastics.
- **Circular biorefineries**: hybrid systems combining enzymatic hydrolysis, microbial electrosynthesis, or electro-fermentation for multi-product cascades.
- **Waste-to-energy technologies**: lifecycle assessments and techno-economic analyses of waste-derived bioenergy systems.

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