

Recent advances in Bioprocess Technology-2020

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Abstract

Now-a-days, bioprocesses catalyzed by the whole cells and enzymes in industrial settings are gaining momentum over the traditional chemical synthetic processes. In this context, biotransformations show many advantages, such as one-pot reactions under mild conditions, high stereo- and regioselectivity, environmental friendliness and broad portfolio of substrates (including liquid, solid and gas waste). Nonetheless, some limitations such as the instability of biocatalysts and poor performance under certain reaction conditions, the low solubility of some substrates in the reaction medium, the high production costs due to complex downstream processing and product isolation and the limited knowledge in the microbiology or design of the bioprocesses, often hinder the scale-up of bioprocesses from the laboratory to the manufacturing plant.

To develop efficient, sustainable and low-cost processes, both industrial and environmental biotechnology have an increasing demand for novel bioprocesses, capable of overcoming the abovementioned drawbacks. In this sense, the industrial sector demands novel processes using biocatalysts that exhibit a superior activity and stability under a wide range of reaction conditions (often achieved using metabolic engineering), the optimization of feedstock utilization by employing low-cost waste resources, the use of green chemistry solutions that allow the reduction of the use of hazardous solvents and reagents, or the development of cost-competitive biorefinery concepts able to convert industrial waste and byproducts into added value products, thus creating new value chains.

This special issue (SI) aims at highlighting the recent advances in Bioprocess Technology. To this end, twenty-eight scientific articles, including experimental and review papers, were compiled in order to show the reader the state-of-the-art and future trends in bioprocess technology in the context of circular economy. These papers have been selected based on the standard peer-review process of the journal and have been classified in six different categories: i) Bioprocess design and circular economy, ii) Biotransformation catalyzed by whole cell or enzymes, iii) Microbial biomass valorization into high-value chemicals

and biofuels, iv) The use of renewable carbon and waste resources, v) Novel fermentation strategies, v) Metabolic engineering and vi) New bioprocesses applications.

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Keywords

Bioprocess technology, Industrial settings, Microbiology