Magnetic micro-macro biocatalysts applied to industrial bioprocesses

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Abstract

The use of magnetic biocatalysts is highly beneficial in bioprocesses technology, as it allows their easy recovering and enhances biocatalyst lifetime. Thus, it simplifies operational processing and increases efficiency, leading to more cost-effective processes. The use of small-size matrices as carriers for enzyme immobilization enables to maximize surface area and catalysts loading, also reducing diffusion limitations. As highly expensive nanoparticles (nm size) usually aggregate, their application at large scale is not recommended. In contrast, the use of magnetic micro-macro (μm-mm size) matrices leads to more homogeneous biocatalysts with null or very low aggregation, which facilitates an easy handling and recovery. The present review aims to highlight recent trends in the application of medium-to-high size magnetic biocatalysts in different areas (biodiesel production, food and pharma industries, protein purification or removal of environmental contaminants). The advantages and disadvantages of these above-mentioned magnetic biocatalysts in bioprocess technology will be also discussed.

Keywords

Enzyme immobilization; Magnetic supports; Industrial bioprocesses

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