

Fungal Biotechnology and the Circular Economy



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Abstract To satisfy the needs of an expanding worldwide population, industrialization will continue to play a crucial role. However, the rapid depletion of natural resources necessitates the exploration of sustainable alternatives. Adopting a circular economy model offers a promising solution to address resource exhaustion. Microorganism-based biotechnologies are undeniably pivotal in this transition, with fungi standing out due to their diverse metabolic capabilities and broad substrate utilization. Fungi are well known for producing a wide range of metabolites and for their ability to convert agro-industrial waste into valuable products, making them ideal candidates for circular economy applications. Numerous fungal species can transform agricultural residues into biofuels, offering a renewable energy source. Additionally, fungi contribute to alleviating global hunger by producing high-nutrition products such as mushrooms and single-cell proteins. In agriculture, fungal-based biopesticides and biofertilizers help reduce reliance on chemical inputs. Overall, fungi play a significant role in recycling waste into value-added products and thus contribute meaningfully to revitalizing and sustaining the global economy.

Keyword Economy · Fungi · Natural resources · Renewable energy · Recycle

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