SHEEP WHEY VALORIZATION: TECHNOLOGICAL ADVANCES, FUNCTIONAL POTENTIAL, AND CIRCULAR ECONOMY PERSPECTIVES

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Abstract

Sheep's milk whey is one of the most significant by-products of dairy processing and is often regarded as waste, despite its considerable functional and nutraceutical potential. Recent advances in enzymatic hydrolysis, membrane filtration, and fractionation technologies have shifted the paradigm toward the production of high-value products such as functional beverages, nutraceuticals, protein isolates, and bioactive peptides. This review provides an overview of sheep whey valorization, with a particular focus on its biofunctional applications and sustainability implications. Special attention is given to closed-loop models, where the transformation of waste into health-promoting food innovations is emphasized. Challenges related to scalability, economic feasibility, and regulatory constraints are critically discussed as key barriers to large-scale industrial adoption. Ultimately, sheep whey valorization is aligned with sustainable development goals and offers significant opportunities for improving food system resilience and public health.

Key words: *Bioactive peptides, Circular economy, Functional foods, Membrane filtration, Sheep whey valorization*