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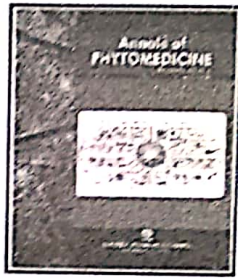
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Sericin-based formulations for skin and hair care: From waste valorization to multifunctional cosmeceuticals

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Abstract

Silk sericin, a glycoprotein making up 25-30% of *Bombyx mori* silk cocoons represent the successful valorisation of an industrial waste stream into a multipurpose and sustainable cosmeceutical ingredient. Traditionally, this protein discarded as waste during silk degumming, now reclaimed for its remarkable biochemical properties including potent humectancy, antioxidant capacity and film-forming capabilities that are in lines with the principles of clean beauty. This review details the complete cycle of sericin from its biosynthesis and molecular characterisation in the silk gland to sophisticated, environmental friendly extraction techniques that recover the protein from wastewater. It thoroughly evaluates the sericin's proven effectiveness in skincare and haircare where it enhances skin barrier function, reduces hyperpigmentation, speeds up wound healing and fortifies hair. The study also examines its multifaceted formulation science from emulsions and serums to nanoparticles and analyses the developing commercial sector driven by eco-conscious consumers. Finally, it addresses key issues in standardization and safety while outlining future perspectives that position sericin as a cornerstone of circular economy innovation in the cosmetic and biomedical industries.

1. Introduction

This review explores sericin's journey from sericulture effluent to

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