Mushroom Makeover: Revealing the Potential of Mushroom Residues in Skincare

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Commercial mushroom production generates significant amounts of fruiting body waste, with up to 20-30% of harvested mushrooms being discarded due to mishappen caps or stalks [1]. Drawing inspiration from recent advancements in chitin-glucan nanofilm research [2], we propose repurposing waste mushrooms into value-added materials. By leveraging the chitin-glucan complex found in common mushrooms, we developed flexible chitin-glucan sheets with an innovative application as a fungi-based cosmetic sheet mask (see figure). The chitin-glucan complex was extracted from two different fungal types, namely white button mushroom (Agaricus bisporus) and lion's mane mushroom (Hericium erinaceus), both containing numerous valuable components beneficial for skin health [3]. Mild extraction processes were chosen to preserve cosmetical valuable compounds in the extracted chitin-glucan biomass. The resulting materials were characterized by porosity, mechanical properties, surface properties, water absorption and disintegration. Our findings demonstrate the potential of fungi-derived chitin-glucan sheets as viable alternatives to conventional cosmetic sheet masks. The developed materials exhibited tensile strength (up to 12.3 MPa) and strain to failure (up to 44.9%), comparable to commercial products. Moreover, our study highlights the eco-friendly and cost-effective nature of fungi-derived materials. By repurposing waste mushrooms, we not only address waste management challenges but also contribute to the development of a more sustainable and circular economy. The utilization of mild extraction processes together with the scalability of the sheet preparation enables cost-effective production, offering an economically viable solution for the cosmetic sector.

Figure 1: Final cosmetic sheet mask derived from white button mushrooms

Keywords: chitin-glucan, mushroom residue, mechanical properties, biobased products, biodegradability

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