EcoReishiFlex: An Innovative Sustainable Biodegradable Plastic Alternative Made From Ganoderma lucidum (Reishi Fungi) Polysaccharides

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The urgent need for sustainable alternatives to plastics has highlighted the challenges of developing biomaterial with similar mechanical properties, particularly focusing on biodegradability. Traditional plastics are a significant source of environmental pollution due to their non-biodegradable nature, contributing to the global plastic waste crisis (Alemu et al., 2022). Many existing materials are non-recyclable, made from non-natural substances, and harmful to the ecosystem. To address this issue, EcoReishiFlex was developed as a biodegradable polysaccharide- based composite membrane derived from Ganoderma lucidum (Reishi Fungi), offering an eco-friendly alternative to plastic. The EcoReishiFlex formula was designed using edible components to enhance its structure and function as a bioplastic membrane. It was created through a process involving polysaccharide extraction, casting, and slow dehydration for curing. After curing, the material was evaluated for its biodegradability and mechanical properties through degradation rate analysis, Thermogravimetric Analysis (TGA), Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), and tensile testing. The results confirmed that the fungal polysaccharide was successfully incorporated into a stable composite matrix with both biodegradability and mechanical integrity. EcoReishiFlex shows promising applications in biodegradable protective films, sustainable edible packaging, and medical dressings. This research contributes to reducing plastic pollution and reliance on non-renewable resources. Future work will focus on enhancing its mechanical strength by adding reinforcing fibers and stabilizers.

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