

## ***The Potential of Polypore Fungal Species Found in Sri Lanka, to Produce Mycelium- based Leather***

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The conventional tanning techniques and animal product involvement of the leather industry relies on present ethical and environmental problems. Mycelium-based leather (MBL) has shown its potential as a green, cost-effective alternative to animal-based leather. This study explored the potential of producing MBL from Basidiomycetes fungi found in Sri Lanka, with improved features. Five potential Basidiomycetes Polypore fungal species were collected from decaying wood from the vicinity of Wilpatthu National Park (8°17'56.8"N 80°08'34.8"E), and five isolates (isolates 1, 2, 3, 4 and 7) were obtained aseptically at SIST microbiology laboratory. Isolates were cultivated under solid-state fermentation (SSF) using rubber sawdust and liquid-state fermentation (LSF) using Potato Dextrose Broth for 7, 10, and 14 days. Mycofabrication techniques were applied to enhance the mycelial mats' robustness, including heat killing, plasticization with glycerol, and beeswax coating followed by heat pressing. Tensile strength and elasticity of the mats were recorded to assess MBL's mechanical properties. Data were analyzed using R-studio version (2022.07.2). Growth rates varied significantly, with isolate 4 showing the highest (102.995mm<sup>2</sup>/h) and isolate 3 showing the lowest (23.541 mm<sup>2</sup>/h) values (P<0.05). ANOVA results showed significant differences in growth rates between samples. SSF did not yield mycelial mats, but LSF did, with the 14-day fermentation period being the most promising for sample 2,4 and 7. Sample 7 had the highest tensile strength (12.30 N/20 mm) and elongation at break (15.7%), while samples 2 and 4 had tensile strengths of 4.50 N/20 mm and 3.23 N/20 mm, respectively, showing values similar to animal-based leather. These findings warrant the use of Polypores as a renewable resource for sustainable leather manufacturing and offer vital insights for future development and commercialization as a Sri Lankan product in the global leather market.

**Keywords:** Polypores, Mycelium-Based Leather, Mycofabrication, Tensile Strength, Solid and Liquid Fermentation.

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