

LEATHER-LIKE MATERIAL BIOFABRICATION USING *PLEUROTUS OSTREATUS*

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Leather remains one of the most durable and versatile natural materials. However, some consumers question the ethical ramifications and environmental sustainability of wearing products sourced from animals. Fungi-derived leather substitutes are an emerging class of ethically and environmentally responsible fabrics that are increasingly meeting consumer aesthetic and functional expectations and winning favor as an alternative to bovine and synthetic leathers. The new material uses agricultural and forestry byproducts, such as sawdust, to grow chitinous polymers and other polysaccharides that form into mats of mycelium, the underlying root networks of fungi. From there, the material is altered physically and chemically to visually resemble leather and exhibit comparable properties [1].

The main task of the experimental work was to obtain the prototype of the leather-like material based on the mycelium of the *Pleurotus ostreatus* the whole procedure can be divided into several parts: cultivation of fungus on suitable nutrient medium, harvesting of mycelium, plastification, and drying.

P. ostreatus was inoculated into Sabouraud agar and cultivated at temperature 27 °C for 7 days. The aerial mycelium was picked up and used for inoculation of liquid Czapek medium in sterile 3 L trays. After 7 days of cultivation at 27 °C obtained fungal mat was used for further activities. Glycerol was used as plastifying agent. Ultrasonic treatment was used for more effective mycelium saturation with glycerol. The sonication process was conducted in ultrasonic bath Type UM-4 for 30 min. Then mycelium was rinsed under running tap water and dried at a temperature of 60 °C. The obtained material had the following characteristics: flexibility, buoyancy, relatively tensile strength.

The technology of leather-like material production is ecologically safe. The main advantage of biofabricated leather-like material is biodegradability. The application of this technology in Ukraine can be realized by the utilization of several substrates for the fungi cultivation. We can propose to use molasses, starch-containing materials, and other agro-industrial wastes as carbon sources for cultivation.

Reference:

1. Jones M., Gandia A., John S., Bismarck A. Leather-like material biofabrication using fungi *Nature Sustainability*. 2021. Vol. 4. P. 9-16. URL: <https://doi.org/10.1038/s41893-020-00606-1>